

An essay concerning the nature of aliments, and the choice of them, according to the different constitutions of human bodies. In which the different effects, advantages, and disadvantages of animal and vegetable diet, are explain'd / [John Arbuthnot].

Contributors

Arbuthnot, John, 1667-1735.

Publication/Creation

Dublin : printed by S. Powell, for George Risk, George Ewing and William Smith, 1731.

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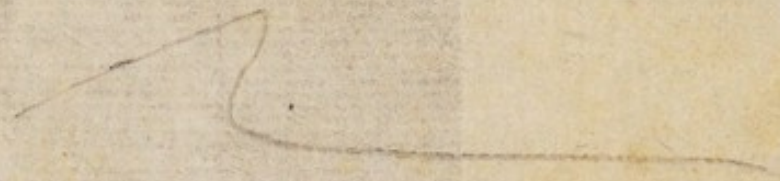


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AN
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Concerning the
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ALIMENT S,
AND THE

CHOICE OF THEM,
According to the different Constitutions
of HUMAN BODIES.

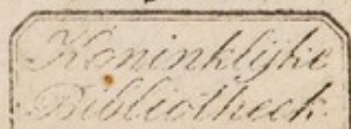
In which the different Effects, Advantages
and Disadvantages of Animal and Vegetable
Diet are explain'd.

By JOHN ARBUTHNOT, M.D.
Fellow of the *College of Physicians*, and of
the *Royal Society*.

DUBLIN:

Printed by S. POWELL,

For GEORGE RISK, at the *Shakespear's Head*;
GEORGE EWING, at the *Angel and Bible*, and
WILLIAM SMITH, at the *Hercules*; Book-
sellers in *Dame's-Street*, MDCCXXXI.



ESSAYS

IN A T U R E

AND THE

CHARACTER OF THEM

As relating to the different Constitutions
of Human Bodies

In which the different Effects of various
and different kinds of Animal and Vegetable
Diets are explained

By JOHN ARNOTH, M.D.
Fellow of the College of Physicians, and of
the Royal Society

LONDON

Printed by G. G. & J. W. Smith, Stationers, Strand





THE
PREFACE.



*W*HAT gave Occasion to the following Essay is briefly what follows, my learned and worthy Friend Dr. Cheyne, some Years ago published an Essay upon Health and long Life, in which he gave a Proof both of his Judgment and Humanity. This Book was receiv'd by the Publick, with the Respect that was due to the Importance of its Contents; it became the Subject of Conversation, and produc'd even Sects in the dietetick Philosophy. In some of those symposiac Disputations amongst my Acquaintance, being appeal'd to; I happen'd to affirm that the dietetick Part of Medicine depended, as much as any of the rest, upon scientific Principles: Being call'd upon to make good my Assertion, I compos'd the following short Treatise which is properly speaking only an Essay or Attempt of a Physiology of Aliment. The most of it was wrote in a Situation, where I had no Assistance except from Extracts out of some imperfect Editions of the Works of the most learned and industrious Boerhaave, and from a very excellent Edition of his Chymistry by Dr. Shaw, and Mr. Chambers. This I

The P R E F A C E.

am oblig'd to say once for all, to save my self the Trouble of perpetual Quotations: The Circumstances of ill Health, and Absence from my Books in which I compos'd it, and the Want of Leisure since to correct it sufficiently, may be some Excuse for the Want of that Accuracy which the Subject deserves, and which I frankly own, I have discover'd in some Things of small Moment since the Book was printed off. I am likewise obliged to make use of a very common and trivial Reason for publishing it at this Time, viz. the Approbation of some Friends who perus'd it, and persuaded me that it might be of some Use to the Publick. I can say but little of the Merit of the Performance, but a great deal of that of the Subject; for surely the Choice and Measure of the Materials of which the whole Body is compos'd, and what we take daily by Pounds, is at least of as much Importance, as of what we take seldom, and only by Grains and Spoonfuls.

The Reader must not be surpriz'd to find the most common and ordinary Facts taken notice of: In Subjects of this Nature there is no room for Invention; many important Consequences may be drawn from the Observation of the most common Things, and analogous Reasonings from the Causes of them.

I believe a Reader with as much Anatomy as a Butcher knows, and moderate Skill in Mechanicks, may understand the whole Essay, provided he goes through it at Leisure, and with Attention: To a Person so qualify'd many Observations concerning his own Constitution will occur, which I was not capable of making; as for the hard Words which I was oblig'd to use, they are either Terms of Art, or such as I substituted in the place of others, that were too low, and vulgar; the Reader will find most of them explain'd at the Beginning of the Book: And I hope an Indulgence to a few, will not be reckon'd an Indignity to the rest; and that I shall not be suspected of Affectation, where my principal Intention was Perspicuity. In Subjects of this Kind, one is oblig'd in the same Paragraph, to
join

THE P R E F A C E.

join many Particulars together in one Proposition; because the Repetition of the Substantive Verb would be tedious and unnecessary. This hinders the Stile from being smooth, but not from being perspicuous.

I have laid a Plan for treating the other Parts of Diet, as Air, Rest, and Motion after the same Manner; but I am oblig'd to delay the Execution of my Design till I have more Leisure.

I do not presume to instruct the Gentlemen of my own Profession; and if any of them shall instruct me better, I declare before-hand that I am very willing to be convinc'd: I will not defend any Mistake, and at the same time I do not think my self oblig'd to answer every frivolous Objection.





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A N
E X P L I C A T I O N
O F
S O M E W O R D S
I N T H I S
E S S A Y.

A



Absorbent, that sucks in a Liquid.

Æquilibrium, equal Weight, Force or Balance.

Alimentary Duēt, the whole Passage of the Aliment from the Mouth to the Anus.

Anodine, abating Pain.

Aorta, the great Artery which proceeds from the left Ventricle of the Heart, and carries the Blood thro' the Body.

Atrophy, decay.

B. Brot-

B.

Bronchia, the Air-Pipes of the Lungs.

C.

Carminative, dispelling Wind.

Cacochymy, Redundance of ill Humours.

Caput mortuum, the thick Matter which remains after Distillation.

Chronical Disease, that does not kill soon.

Coagulum, a Curd.

Contraindication, when a Remedy is proper and improper for different Reasons.

Conical, in the form of a Sugar-loaf tapering and diminishing by Degrees.

Cylindrical, like a Drum equally wide.

Cystick, belonging to the Gall-Bladder.

D.

Defrutum, Wine sodden to a thick Consistence.

Demulcent, mild, abating Acrimony.

Depletion, emptying.

Duodenum, the first of the Guts.

E.

Ebullition, boiling.

Elastick, springy.

Elasticity, Springiness.

Eluted, cleansed, wash'd away.

Emetick, vomitory.

Emissary, that throws out a Liquid.

Ephemera, a Fever that lasts but one Day.

Eruetation, belching.

Evanescant, vanishing, or growing extremely small.

Exudes, sweats out.

F. *Fœtid*,

F.

Fætid, stinking.

H

Hepatick, from the Liver.

Hydraulicks, raising or forcing of Water thro' Pipes.

I.

Ichor, a watery Humour flowing from Ulcers.

Immeability, what renders unpassable.

Incubation, hatching of an Egg.

L.

Lacteals, Vessels which carry the Chyle thro' the Mesentery.

Lixivium, a Lye or a Solution of some fixed in Water.

Leucophlegmatick, pale and phlegmatick, bloated.

M.

Membrana adiposa, a Membrane which contains the Fat.

Mastication, chewing.

Mesentery, a membranous Part in the middle of the lower Belly, to which the Guts are connected.

Mucus, Snot.

N.

Nidorose, with the Flavour of something hot or burnt.

Narcotick, causing Sleep, stupifying.

O.

Omasus, one of the Stomachs of a ruminating Animal,
Omentum, the Caul.

P.

Pancreas, Sweet Bread, a large Salivary Gland in the lower Belly.

Papillous, like a small Nipple.

Parotids, Glands behind the Ear.

Peristaltick, alternate Motion of the Contraction and Dilatation of the Guts, commonly tending downwards.

Plethora, Fulness.

R.

Ramification, branching.

Repletion, filling, Fulness.

S.

Sapa Rob Extract, Juices boil'd and evaporated to several Degrees of Consistence.

Sanguification, making of Blood.

Siliquose, that has Pods.

Sphincter, a Muscle which shuts up any Cavity of the Body.

Stimulus, what irritates.

Styptick, binding.

Subclavian Vein, a Vein which passeth under the Collar-bone.

Suppuration, gathering of Matter, ripening of a Boil.

T.

Tetrapetalous, Flowers that have four Leaves.
Thoracick Duēt, a Canal through which the Chyle
 passeth from the Lacteals into the Blood.
Tophaceous, chalky, gritty.

V.

Villous, downy, with a Pile like Velvet.
Visciditv, a sticking or gluish Quality.



THE



THE
EXPLANATION
OF SOME
CHYMICAL TERMS.

Used in the following

ESSAY.



S the following Treatise is chiefly design'd for Persons not bred up in the Profession of Physick, it is necessary to give a general Notion of the meaning of some Chymical Words that frequently occur in it.

The Principles of Natural Bodies according to the Chymists, are Water, Earth, Oil, Salt, Spirit,
b 2 of

of all which every one has some general Notion ; but the Diversity of the Names and Qualities of Salts and Spirits occasions some Confusion in the Minds of such as are ignorant of Chymistry.

The Chymists define Salt from some of it's Properties, to be a Body fusible in the fire, congealable again by Cold into brittle Glebes or Chrystals, soluble in Water so as to disappear, not malleable and having something in it which affecteth the Organs of Taste with a Sensation of Acrimony or Sharpness. Of Native Salts there are,

First, Sea-Salt and Sal Gemmæ, or Rock-Salt, which are of the same Nature. The first in all appearance being a Solution of the Second in the Water of the Ocean; these two are perfect Salts, fixt, and immutable by any Power in Animal Bodies; for the other Salts are never found in the Urine of any Animal that swallows them down, but Sea-Salt is always found in the Urine of every Animal that takes it, and in no other.

Secondly, Sal Nitre, or Sal Petre, which is more easily dissolv'd by Fire, and less easily by Water than any other Salt, it is cold and affects the Tongue like a saltish Ice: It seems to be of a middle Nature between Fossile and Animal, being producible from Animal Excrements intermix'd with vegetable Salts.

Thirdly, Sal Ammoniac of two Sorts, the ancient describ'd by *Pliny* and *Dioscorides* no more to be found: And the Modern which is a Compound of Fossile, Animal and Vegetable Salt. This Salt cools Water, it is fix'd in a gentle Fire and sublimes in a great one, its Taste is quicker than that of common Salt resembling that of Urine.

Fourthly,

Fourthly, Borax, a Fossile Salt of a sweetish Taste, it promotes the Fusion of Metals.

Fifthly, Alum, which tho' no pure Salt, has most of the Properties of Salts, being soluble in Water, &c.

Salts are divided into Acid and Alkaline: Of Acid or Sour, one has a Notion from Taste; Sourness being one of those simple Ideas, which one cannot more plainly describe. What being mix'd with an Acid, causeth an Effervescence, is call'd an Alkali.

Effervescence in the Chymical Sense, signifies an intestine Commotion, produced by mixing two Bodies together, that lay at rest before; attended sometimes with a hissing Noise, Froathing and Ebullition: For Example, let us place in the first Class, Acids as Vinegar, Juice of Lemons, Juice of Oranges, Spirit of Nitre, Spirit of Alum: In the second Class, other Saline Substances obtain'd from Animals and Vegetables, by Distillation, Putrefaction, Calcination, as Spirit of Urine, Spirit of Hartshorn, Salt of Tartar; because the Substances of the second Class, being mix'd with the Substances of the first raise an Effervescence, they are call'd Alkalis. There is a third Class of Substances, commonly call'd Absorbents, as the various Kinds of Shells, Coral, Chalk, Crabs-eyes, &c. Which being mix'd with the first Class, likewise raise an Effervescence, and are therefore call'd Alkalis, tho' not so properly; for they are not Salts and have nothing common with the second Class, except this Quality of fermenting with Acids.

It is observable that a violent Cold, as well as Heat may be produc'd by this Ebullition; for if Sal Ammoniac, or any pure volatile Alkali dissolv'd in Water be mix'd with an Acid; an Ebullition with a great Degree of Cold will ensue, therefore, I think (with leave of the Chymists) Effervescence not so proper a Word to express this intestine

stine Motion. There is another Criterion of Acid and Alkali by the Change of Colour, which they produce in some Bodies; for Example, thole Liquors, which being pour'd to the Syrup of Violets turn it red, are Acids; those which change it into a green Colour, are reckon'd Alkalis. Thus Oil of Vitriol turns Syrup of Violets red, and Oil of Tartar green.

The Word Alkali, comes from an Herb call'd by the *Egyptians*, Kali. This Herb they burnt to Ashes, boild them in Water; and after having evaporated the Water, there remain'd at the bottom a white Salt, this they call'd Sal Kali, or Alkali. It is corrosive, producing Putrefaction in Animal Substances, to which it is apply'd.

Substances which are not perfectly Acid, but naturally turn so, I call Acescent. Substances which are not perfectly Alkaline but naturally turn so, I call Alkalescent.

These are not Qualities in Bodies merely imaginary, but have very different and contrary Effects upon Human Bodies.

Salts which are neither Acid nor Alkaline, are call'd Neutral, so are Sal Ammoniac, Sea-Salt, Sal Gemmae, Borax, Alum, Nitre, which as long as they retain their Saline Quality, are neither Acid nor Alkaline. But the Chymical Products of them all (except Sal Ammoniac) are generally Acid.

Fix'd Salts are such as sustain the Fire without flying away.

Volatile Salts fly away with a small Heat, affecting the Nose with an urinous Smell.

There are volatile and fix'd Alkalis.

The essential Salts of Plants are such as shoot upon the Sides of the Vessels, which contain their express'd Juices.

In Distillations what trickles down the Sides of the Receiver in certain unctuous Rivulets, if it will

will not mix with Water, it is call'd Oil, if it will mix with Water, it is call'd Spirits; Spirits are either inflammable, or not inflammable. The last either Acid, or Alkaline. Alkaline Spirits, are subtle volatile Liquors that run in Veins down the Sides of the Receiver in Distillations, which will not take Fire, mix with Water, and contain some Alkaline Salt, as Spirit of Harts-horn. Such are obtain'd from all the Parts of Animals, from all Plants by Putrefaction, and from the pungent Kind, as Mustard, Horse-Radish, &c. without it. Acid Spirits are subtle Liquors which come over in Distillations, not inflammable, miscible with Water, such are obtain'd from Vegetables distill'd with Water, and likewise from Fossils; inflammable Spirits are subtle volatile Liquors which come over in Distillations, miscible with Water, and wholly combustible; such Spirits are obtainable from Plants by a previous Fermentaton, and not without it. By the Spirit of a Plant or that of an Animal, we understand that pure elaborated Oil, which by reason of its extreme volatility exales spontaneously, in which the Odour or Smell consists.

Soap is a Mixture of a fix'd Alkaline Salt and Oil, in common Use its Virtues are cleansing, penetrating, attenuating and resolving. Any Mixture of any oily Substance with Salt may be call'd a Soap.

Bodies of this Nature are call'd Saponaceous.

He who would skilfully treat of the Nature and Choice of different Sorts of Aliment, ought to draw his Observations from the following Particulars. *First*, from the Alterations which the Aliment undergoes in its Passage into the Blood. *Secondly*, From the Alteration it undergoes during its Circulation with the Blood. *Thirdly*, From the Nature and most simple Analysis of Vegetable Substances. *Fourthly*,

Fourthly, From the Nature and most simple Analysis of Animal Substances. *Fifthly*, He ought to treat of the Effects of different Sorts of Alimentary Substances upon the Fluids and Solids of a Human Body. *Sixthly*, Of the different Intentions to be pursued in the Choice of Aliment in different Constitutions. Tho' I have neither Time, Ability, nor Observations sufficient to handle those Particulars so fully as they deserve, I hope at least to give a Specimen how they ought to be treated.

This is agreeable to the Doctrine of *Hippocrates*, who tells you in his first Book of Diet, that to write duly upon it, one must understand the Nature of Aliment, and of the Person it is given to.

For the Ease of the Reader, I have set down every thing in distinct Propositions with Inferences and Observations; the first in *Roman*, the other in common Numbers.



A N
E S S A Y
C O N C E R N I N G

The Nature of Aliments, and the Choice of
them, according to the different Constituti-
ons of Human Bodies.

C H A P. I.

*Observations drawn from the Alterations which the Ali-
ment undergoes in its passage into the Blood.*

P R O P. I.

MASTICATION is a very neces-
sary Preparation of solid Aliment, with-
out which there can be no good Digestion.
By chewing, solid Aliment is divided into
small Parts ; in a human Body, there is no other In-
strument to perform this Action, but the Teeth. By
the Action of chewing, the Spittle and Mucus is
squeez'd from the Glands, and mix'd with the Ali-
ment, which Action if it be long continued, will
turn the Aliment into a sort of Chyle. The Spittle
is an active Liquor, immediately deriv'd from the ar-
terial Blood. It is saponaceous, as appears by its
froathing, and likewise by distillation, and conse-
quently is attenuating, resolving, penetrating, and de-
A de-

deterging. After long Abstinence, it is extremely acrid, and copious, it ferments with the Juices of Vegetables, and consequently disposeth them to be chang'd into inflamable Spirits, it discovereth its Virtues in several Chirurgical uses. Besides, in the action of chewing, the Mucus (which is an Humour different from the Spittle, and by its Viscidity collects Air) mixeth with the Aliment, and helps to attenuate it. The necessity of Saliva or Spittle to dissolve the Aliment, appears from the contrivance of Nature in making the salivary Ducts of Animals, which ruminates or chew the Cud, extremely open. Such Animals as swallow their Aliment without chewing, want salivary Glands; and Birds have them placed in their Maw. There are instances of Men who swallow'd their Meat whole, but ruminated or chew'd the Cud afterwards. (Rumination is given to Animals to enable them at once to lay up a great store of Food and afterwards to chew it.) And Animals ruminate more upon Hay than Grass, the Food being harder. From all which Observations it appears, that the Solution of the Aliment by Mastication is very necessary; and that without it the Aliment could not be duly disposed; for the other changes which it receives as it passeth through the Alimentary duct.

First, A great loss of Spittle causeth a decay of Appetite. This has been confirm'd by Experience in several, who have made it their constant custom to chew Mastick; chewing and smoaking of Tobacco is only good in phlegmatick People.

Secondly, The humour of Salivation is not properly Spittle, but putrified Blood.

Thirdly, The depravation of the Instruments of Mastication, by a paralytical disposition, or by the want of Teeth, as in old Men and Infants, is a natural Indication of a liquid Diet, as of Milk and Broaths, and even such of them as take Solids ought to chew in order to make an expression of the Spittle.

PROP.

P R O P. II.

The Change which is made of the Aliment in the Stomach, is effected by Attrition of the solid Parts, or inward Coat of the Stomach, and the action of a dissolvent Liquor assisted with Heat.

The Liquor in the Stomach consists of that which is separated from its inward Coat ; of the Spittle, which is almost continually swallow'd, and the Liquor which distills from the Gullet. By the help of this Liquor, and the constant Attrition of the solid Parts, the Aliment is dissolv'd by an Operation resembling that of making an Emulsion, in which Operation the oily parts of Nuts and Seeds being gently ground in a Marble Mortar, and gradually mix'd with some watery Liquor, are dissolv'd into a sweet, thick, turbid milky Liquor, resembling the Chyle in an Animal Body. That the Stomach in Animals levigates the Substances, which it receives, is evident from the Dissection of some Animals which have swallow'd Metals, which have been found polish'd on the side next the Stomach. Birds being without Teeth to make the first preparation of their Aliment, have strong and nervous Stomachs, to make this Attrition the stronger ; and this Motion in them hath been both seen and heard. The Rugæ or Plyes of the inward Coat of the Stomach contribute to the detaining the Aliment in the Stomach. The Heat in Land Animals helps likewise to the Solution of the Aliment, but not much, for Fishes have a strong Digestion without it, tho' by the tryal of the Thermoscope, they have more Heat than the Element which they swim in. It has been shew'd before that the Spittle is a great Dissolvent, and there is a great quantity of it in the Stomach, being swallow'd constantly, at least in Sleep. He who eats a Pound of Bread swallows at least as much Spittle as Bread. This Liquor of the Stomach in a sound state is not Acid, for

it has been found by Experiments, that Pearls have pass'd through Cocks and Hens undissolv'd.

1. The Liquor of the Stomach, which with fasting grows extremely Acrid, and the quick sensation of the inward villous Coat of the Stomach, seem to be the Cause of the Sense of Hunger.

2. Such as have, by the use of spirituous Liquors, weaken'd and destroy'd some of the solid parts of the Stomach, cannot recover a right Digestion, for this inward villous Coat when destroy'd cannot be restor'd.

3. This Liquor of the Stomach may (by reason of some saline Acrimony) be made of some determined quality, and affect human Creatures with Appetites of other Animals, which in that case they can take without hurt; or it may likewise occasion an exorbitant Appetite of usual things, which they will take in such quantities till they vomit it up like Dogs, from whence it is call'd Canine; in the first case the Organs of Taste are vitiated; both Diseases are cur'd by Diet, opposite to this Acrimony, whether Alkaline, Acid or Muriatick.

4. Thirst and Hunger denote the state of the Spittle, and Liquor of the Stomach. Thirst is the sign of an Acrimony commonly Alkalescent or Muriatick.

5. A Paralytical disposition of the Nerves of the Stomach, a deprav'd condition of the Liquor of the Stomach, something viscous, fat and oily remaining there, destroys the Sensation of Hunger.

6. The Action of the Stomach is totally stopp'd by too great Repletion, in which case both the Orifices of the Stomach by a necessary Mechanism close, and neither will admit nor expel any thing. In which case relaxing, as by warm Water, is the only proper Expedient.

The Signs of the Functions of the Stomach being deprav'd, are Pains in the Stomach many Hours after Repast; Eructations either with the Taste of the Aliment Acid, Nidorose, or Fœtid, resembling the Taste of rotten Eggs; Inflations, or the Sensation of

of Fulness ; Sickness, Hiccup, Vomiting, a Flushing in the Countenance, Foulness of the Tongue. In general, whatever be the State of the Tongue, the same is that of the inward Coat of the Stomach. When the Taste of the Mouth is bitter, it is a Sign of a Redundance of a bilious Alkali, and demands a quite different Diet from the case of Acidity or Sourness.

P R O P. III.

By Digestion in the Alimentary Duct the specifick Difference of all Substances is abolish'd, and the whole Action resembles Putrefaction.

Digestion is a Fermentation begun, because there is all the Requisites of such a Fermentation, Heat, Air and Motion, but it is not a compleat Fermentation, because that requires a greater Time than the Continuance of the Aliment in the Stomach. Vegetable Putrefaction resembles very much Animal Digestion. Vegetable Putrefaction is produced by throwing Green succulent Vegetables in a Heap in open warm Air, and pressing them together, by which all Vegetables acquire, *First*, A Heat equal to that of a Human Body. *Secondly*, A putrid stercoraceous Taste and Odour, in Taste resembling putrid Flesh, and in Smell Human Fæces. This putrid Matter being distill'd, affords, *First*, A Water impregnated with an urinous Spirit, like that obtainable from Animal Substances, which Water is separable into Elementary Water, and a volatile Animal Salt. *Secondly*, A volatile oily Alkaline Salt. *Thirdly*, A volatile thick Oil. *Fourthly*, The Remainder being calcin'd affords no fixt Salt ; in short, every thing happens as if the Subject had not been Vegetable, but Animal. Putrefaction utterly destroys the specific Difference of one Vegetable from another, converting them into a pulpy Substance of an Animal Nature : Making the same Alteration very near as if the Vegetable had

gone through the Body of a sound Animal, for tho' such an Animal should entirely live upon Acids, no Part of its Body affords any acid fix'd Salt. * This is so far true, that even the Herbs taken out of the *Omasus* of ruminating Animals afford the same Contents as putrified Vegetables. But tho' this Action of Putrefaction comes the nearest to Animal Digestion, it so far differs from it, that the Salts and Oils are only detain'd in the Animal Body so long as they remain benign and friendly to it; but as soon as they putrefy intirely, are either thrown off, or must produce mortal Distempers.

P R O P. IV.

The Gall is the principal Dissolvent of the Aliment, and when it is peccant or deficient, there can be no right Digestion.

The Bile is of two Sorts, the Cystick or that contain'd in the Gall-Bladder, which is a sort of Repository for the Gall, and the Hepatick or what flows immediately from the Liver. The Cystick Gall is thick and intensely bitter, so that one Drop of it will make a whole Pint of Water bitter. The Hepatick Gall is more fluid and not so bitter. There is no other bitter Humour in a Human Body, besides Gall, except the Wax of the Ear. The Gall is not a perfect Alkali, for it does not ferment with an Acid, but it is Alkalescent, entirely opposite to Acescents, and soon corruptible, and convertible into a Corrosive Alkali. It is a saponaceous Substance, being compos'd of an Alkaline Salt, Oil and Water, all which can be extracted from it. The Bile, like Soap, takes out Spots from Wool or Silk, and the Painters use it to mix their Colours; by this saponaceous Quality, it mixeth the oily and watery Parts of the Aliment toge-

* *Vide Philosophical Transactions.*

ther. But tho' the Bile be an Oil, it is not combustible till dry. These Qualities make it a most powerful and proper Dissolvent, which appears by Experience. The Milk in the Stomach of Calves, which is coagulated by the Runnet, is again dissolv'd, and rendered fluid by the Gall in the *Duodenum*. Voracious Animals, and such as do not chew, have a great Quantity of Gall, and some of them have the Biliary Duct inserted into the *Pylorus*. It is likewise the chief Instrument (by its Irritation) of the peristaltick Motion of the Guts. Such as have the Bile peccant or deficient are reliev'd by Bitters, which are a sort of subsidiary Gall. The learned *Boorhaave* has found the Gall of an Eel, which is most intensely bitter, a most effectual Remedy in such Cases. The common Symptoms of the Excretion of the Bile being vitiated, are a yellowish Colour of the Skin, white hard Fæces, a Loss of Appetite, a lixivial Urine.

P R O P. V.

The Bile is so acrid, that of itself it could not be admitted into the Lacteal Vessels. Therefore Nature has furnish'd another Humour, *viz.* the pancreatick Juice to temper its Bitterness and Acrimony, after it has done its Office.

The Pancreas is a large salivary Gland separating about a Pound of an Humour like Spittle, in twelve Hours. The Bile mix'd with Spittle loseth its Bitterness in time, and even Wormwood eat with Bread will do so, because it is mix'd with a great Quantity of Spittle. The pancreatick Juice likewise mixeth the Parts of the Aliment rendring the Chyle Homogeneous. When the Bile is not separated in the Liver the Fæces are white, but this is not occasion'd by the Mixture of the pancreatick Juice.

P R O P VI.

Acrimony and Tenacity are the two Qualities in what we take inwardly most to be avoided.

The papillous inward Coat of the Intestines is extremely sensible, and when the Acrimony is so great as to affect the solid Parts, the Sensation of Pain is intolerable. The peristaltick Motion of the Guts, and the continual Expression of the Fluids, will not suffer the least Matter to be apply'd to one Point the least instant of Time ; for the smallest quantity of Turpentine or Pitch will stick to the Fingers, but not to the Guts. But this Motion in some Human Creatures may be weak in respect to the Viscidity of what is taken so as not to be able to propel it, the consequence of which is dangerous, and perhaps fatal to the Life of the Creature. Substances hard, cannot be dissolv'd, but they will pass ; but such whose Tenacity exceeds the Powers of Digestion will neither pass nor be converted into Aliment. Besides, the Mouths of the Lacteals may permit Aliment too acrimonious, or not sufficiently attenuated, to enter in People of Lax Constitutions, whereas their Sphincters will shut against them in such as have strong Fibres. The Mouths of the Lacteals may be shut up by a viscid *Mucus*, in which Case the Chyle passeth by Stool, and the Person falleth into an Atrophy.

1. Fat or Oil is necessary, as for Animal Motion so likewise for this peristaltick Motion of the Intestines, and lean People often suffer for want of it, as fat People may by Obstruction of the Vessels. The *Omentum* will melt by strong Motion, as has been found in Horses by hard running.

2. This peristaltick Motion, or repeated Changes of Contraction and Dilatation, is not in the Lower Guts, else one would have a continual needing to go to stool. Wind and Distention of the Bowels are Signs of a bad Digestion in the Intestines, (for in dead Ani-

Animals when there is no Digestion at all, the Distention is in the greatest Extremity) and Diarrhæas which proceed from Acrimony, Laxity of the Bowels or Obstruction of the Lacteals.

P R O P. VII.

The Mechanism of Nature in converting our Aliment into Animal Substances consists chiefly in two Things. *First*, By mixing constantly with it animal Juices already prepar'd. *Secondly*, By the Action of the solid Parts as it were churning them together. This is evident, if we consider first the vast Quantity of *Saliva* mixed with the Aliment in chewing. He that eats a Pound of Bread mixeth it very near with as much Spittle, and this separated from Glands that weigh only about four Ounces. Afterwards the same Aliment is mix'd with the Liquor of the Stomach, the Bile and Pancreatick Juice, and if we compute the Quantity of Bile and Pancreatick, from the Weight of these *Viscera* in respect of the salivary Glands, we shall find still a vastly greater Quantity of these animal Juices mix'd with the Aliment; this is not all, for when the Chyle passeth through the Mesentery, it is mix'd with the Lymph (which is the most spirituous and elaborated Part of the Blood) from the Glands of the Mesentery: So that the Juices of an Animal Body are as it were * cohobated, being excreted and admitted again into the Blood with the fresh Aliment; all the while the solid Parts act upon the Mixture of Aliment and Animal Juices so as to make the Mixture more perfect; besides, none of these Juices except the Liquor of the Intestines, are mix'd with the Fœces of an Animal, which in a sound State are hard. So that one may compute that a Pound of Bread before it enters the Blood, is mix'd perhaps with four times the

* i. e. new distill'd.

Quantity of Animal Juices. The same Oeconomy is observ'd in the circulation of the Chyle with the Blood, by mixing it intimately with the Parts of the Fluid to which it is to be assimilated.

1. From whence it follows, that an Animal whose Juices are unsound or solid Parts weak can never be duly nourish'd, for unsound Juices can never duly repair the Fluids and Solids of an Animal Body, and without a due Action of the solid Parts, they never can be well mix'd. The Stomach, the Intestines, the Muscles of the lower Belly, all act upon the Aliment; besides, the Chyle is not suck'd but squeez'd into the Mouths of the Lacteals by the Action of the Fibres of the Guts: The Mouths of the Lacteals are open'd by the intestinal Tube, affecting a streight instead of a spiral Cylinder. Thus it is plain, that the Chyle must be peccant in Quantity or Quality when these Actions and Organs are too weak, and whatever strengthens the solid Parts must help the Digestion.

2. Diarrhæas and strong Purgations must spoil the first Digestion, because of the great Quantities of Animal Liquids which they expel out of the Body; a vast Quantity and Variety of Animal Liquors are carried off by Purging, Air, Spittle, *Mucus*, all the Liquors that are separated in the Glands of the Alimentary Duct, both Sorts of Bile, the pancreatick Juice, Lymph, and sometimes Blood; computing the Quantity of these Secretions, makes it plain that the whole Juices may be carried off by purging, and when those Liquors are expell'd out of the Body, which by their Mixture convert the Aliment into an Animal Liquid, this cannot so well be perform'd.

3. The peristaltick Motion of the Intestines is the last that ceaseth in an Animal Body, for it remains after the Motion of the Heart is ceas'd. By the Entry of the Chyle and Air into the Blood, by the Lacteals, the Animal may again revive.

The

The Obstruction of the Glands of the Mesentery, is a great Impediment to Nutrition, for the Lymph in those Glands is a necessary Constituent of the Aliment before it mixeth with the Blood, and for the same Reason young Animals are most and best nourish'd, for the mesenterick Glands are largest in the Vigour of Youth; in old Age they vanish, and are liable to Obstructions. Therefore scrupulous Persons can never be duly nourish'd, for such as have Tumors in the Parotids often have them in the Pancreas and Mesentery.

4. In tabid Persons Milk is the best Restorative, for it is Chyle already prepar'd; if a Nurse after being suck'd dry eats Broath, the Infant will suck the Broath almost unalter'd.

5. The Chyle by Reason of the Smoothness of its Particles is white, it grows more grey in the thoracick Duct where it still retains the Flavour of the Aliment.

6. Animals which take a large Quantity of Aliment by the Mouth, may be less nourish'd, than those that take a smaller, for according to the Force of the * chylopocætick Organs, a larger or less Quantity of Chyle may be extracted from the same Quantity of Food.

Astriction of the Belly is commonly a Sign of strong chylopocætick Organs.

P R O P. VIII.

The most subtile Part of the Chyle passeth immediately into the Blood by the absorbent Vessels of the Guts, which discharge themselves into the meseraick Veins; their Largeness and Number demonstrate this, for they are numerous and vastly larger than their correspondent Arteries; besides,

* Which make the Chyle.

wherever there are Emissaries, there are absorbent Vessels, *ex.gr.* in the Skin, by the absorbent Vessels of which Mercury will pass into the Blood.

Birds which have strong and large Breasts, small Bellies, and their Ribs upon their Backs have no Lacteals nor thoracick Duct, and their Aliment passeth immediately into the meseraick Veins. If one considers the Capacity of the thoracick Duct, and the Slowness of the Passage of the Aliment by the Lacteals through it, and at the same Time the great Quantity of some Liquors, as of chalybeat Water, which in some pass in a small Time by Urine; by an easy Calculation he will be able to demonstrate that such a Quantity could not pass into the Blood by the thoracick Duct in so short a Time.

Therefore when the Intention is to give an immediate Refreshment to the Spirits, as after great Abstinence and Fatigue, thin or liquid Aliment is the properest, and for the same Reason Chalybeat Waters seem to be a proper Remedy in Hypochondrical Cases; their subtle and divided Particles are taken immediately into the Meseraick Vessels, and carried streight into the Liver and Spleen.

C H A P. II.

Observations drawn from the Circulation of the Chyle with the Blood.

P R O P. I.

THE Chyle of it self cannot pass through the smallest Vessels (for it neither will pass by Urine nor Sweat) therefore it cannot nourish the Animal, till it is converted into Blood; and it is converted into Blood by the Mechanism of Nature
above

above describ'd, *viz.* by intimately mixing it with the Particles of the Liquor, to which it is to be assimilated, as will appear by what follows.

P R O P. II.

The Lungs are the first and chief Instrument of Sanguification.

The Chyle first mixeth with the Blood, in the sub-clavian Veins, and enters with it into the Heart, where it is very imperfectly mix'd, there being no Mechanism nor Fermentation by extraordinary Heat, &c. to convert it immediately into Blood, which is first effected by the Lungs. The Wind-pipe divides it self into a great number of Branches call'd *Bronchia*, these end in small Air-bladders dilatible and contractible, capable to be inflated by the admission of Air, and to subside at the Expulsion of it. The Pulmonary Artery and Vein pass along the Surfaces of these Air-Bladders in an infinite number of Ramifications. A great number of those Air-Bladders form what we call Lobuli, which hang upon the Bronchia, like bunches of Grapes upon a Stalk. These Lobuli constitute the Lobes, and the Lobes the Lungs. Let us see what effect an Engine so contriv'd will have upon the crude mixture of Blood and Chyle; first, as the Blood and Chyle pass through the Ramifications of the Pulmonary Artery, they will be still more perfectly mix'd, a red Liquor, and a white Liquor passing through only one Tube, will both retain their Original Colours; but if this Pipe is divided into Branches, and these again subdivided, the red and white Liquors, as they pass through the Ramifications, will be more intimately mix'd, and both Colours will be blended together; the more Ramifications, the mixture will be the more perfect; but this is not all, for as this mixture of Blood and Chyle passeth through the Arterial Tube, it is press'd by two contrary forces, that of the Heart driving it forward

ward against the sides of the Tube, and the elastick force of the Air pressing it on the opposite side of those Air-Bladders, along the surface of which (as was said before) this Arterial Tube creeps. By those two opposite forces, the parts of the Liquor are compress'd together, and as it were churn'd, and more intimately mix'd. Moreover by the alternate motion of those Air-Bladders, whose surfaces are by turns freed from mutual contact, and by a sudden Subsidence meet again by the ingress and egress of the Air; the Liquor is still further attenuated, dissolv'd, and chang'd into a homogeneous Fluid.

1. The force of the Air upon the Pulmonary Artery is but small, in respect of that of the Heart, but it is still something, and whatever the effect of it be, it encreaseth, and diminisheth with the Gravity of the Air, to which the Elasticity is proportional.

As to the admittance of the weighty and elastick parts of the Air into the Blood, through the Coats of the Vessels, it seems contrary to Experience. The spumous and florid state which the Blood acquires in passing through the Lungs, is easily accounted for, from its own Elasticity, and the violent Motion before describ'd: The Aerial Particles in the Blood and Chyle expanding themselves. That the air in the Blood Vessels has a communication with the outward Air, I think seems plain from the Experiments of Human Creatures being able to bear Air of much greater Density in diving, and of much less upon the tops of Mountains, provided the Changes be made gradually; otherwise the Air within the Vessels being of a less Density, the outward Air would press their sides together, and being of a greater Density, would expand them so as to endanger the Life of the Animal.

1. As much Blood passeth through the Lungs, as through all the rest of the Body. The Circulation is quicker and Heat greater, and their Texture is extremely delicate; upon all which accounts they are
ex-

extremely sensible of any Force either from the too violent Motion or Acrimony of the Blood.

2. Since the Lungs are the first and chief Instrument of Sanguification, the Animal that has that Organ faulty, can never be duly nourish'd, nor have the Vital Juices, (which are all deriv'd from the Blood) in a good State; and this is true, understanding the Lungs only as an Instrument of Digestion, and abstracting from an acrid and purulent Matter, that mixeth with the Blood in such as have their Lungs ulcerated; therefore such as have a faulty Circulation through the Lungs, ought to eat very little at a time, because the encrease of the quantity of fresh Chyle must make that Circulation still more uneasy, which indeed is the Case of Consumptive, and some Asthmatick Persons, and accounts for the Symptoms they are troubled with after eating. The great Rule of Diet for Consumptive People, and upon which the whole Cure depends, is taking their Aliment in small Quantities. It happens very often unfortunately for Asthmatick Persons that they have Voracious Appetites, and consequently for want of a right Sanguification are often Leucophlegmatick.

3. The Choice as well as Quantity of Diet, is of great Importance to such as have weak Lungs, for it was observ'd* that the Chyle in the Thoracick Duct retain'd the Original Taste of the Aliment, which not being yet converted into Blood, and intirely subdued by Circulation, must operate upon the Lungs into which it enters in this Condition, according to its original qualities. The Lungs being the chief Instrument of Sanguification, and acting strongly upon the Chyle to bring it to an Animal Fluid, must be re-acted upon as strongly.

4. Good Air assists the Digestion, as it is an Instrument of Sanguification in the Lungs.

* Chap. I. Prop. VII. 5.

P R O P. III.

The Chyle is not perfectly assimilated into Blood by its Circulation through the Lungs, for it is known by Experiments of Blood-letting, that several Parts of it remain unmix'd with the Blood, swimming a top like an oily Substance, even eight Hours after repast, and no doubt this Digestion, as well as that through the Alimentary Duct, is different in different Subjects.

P R O P. IV.

After the Chyle has pass'd through the Lungs, Nature continues her usual Mechanism to convert it into Animal Substances, during its Circulation with the Blood, *viz.* by intimately mixing the Parts of the Aliment, with these of the Animal Juices, by the action of the solid Parts.

The mixture of Blood and Chyle after its Circulation through the Lungs, being brought back into the left Ventricle of the Heart is drove again by the Heart into the Aorta, through the whole Arterial System, every Particle of the Body receives some Branch from the Aorta, except some of the solid Parts of the Liver. The Arteries are Elastick Tubes, endued with a Contractile Force, by which they squeeze, and drive the Blood still forward, it being hinder'd from going backward by the Valves of the Heart. The Arteries are Conical Vessels, with their Bases towards the Heart, and as they pass on, their Diameters grow still less and less. The Celerity of the Motion diminisheth by the encrease of the Friction of the Fluid, against the sides of the Tubes. Without this Motion, both the Blood and the Chyle, would be converted into one solid Mass, but on the contrary by the continuance of it, the Fluid being compress'd by the sides of the Tube; especially in the small Vessels,
where

where the Points of Contact are more ; the Blood and Chyle are still more intimately mix'd, and by Attrition or Friction attenuated, by which the mixture acquires a greater Degree of Fluidity, and Similarity or Homogeneity of Parts. Therefore,

1. Good Blood and a due Projectile Motion or Circulation, are necessary to convert the Aliment into laudable Animal Juices.

2. The Strength of the Aliment (by which I understand its Resistance to the solid Parts) ought to be proportion'd to the Strength of the solid parts, and as Animals that use a great deal of Labour or Exercise, have their solid Parts more elastick and strong, they can bear and ought to have stronger Food, too thin Nourishment being quickly dissipated by the vigorous Action of the solid Parts.

3. The Defects of the first Concoction are not to be mended by the second ; for if the Chyle passeth into the Blood in a bad State, as the force of Fibres, which contribute to the second Digestion is limited, it is not sufficient to convert a Peccant Liquor, into laudable Animal Juices.

P R O P. V.

The Aliment as it circulates through an Animal Body, is reduc'd almost to an imperceptible tenuity, before it can serve the Animal Purposes.

The Blood in live Animals, consists of red Globules, swimming in a Serum or watery Liquor. The smallest Vessels which carry the Blood, or red Fluid by Lateral Branches separate the next thinner Fluid or Serum, the Diameters of which Lateral Branches are less than the Diameters of the Blood Vessels, and will not in a healthy State admit the red Fluid. Such may be call'd Serous Arteries. Those Serous Arteries emit Lateral Branches which carry Lymph, a Liquor still more Limpid than Serum, and from the Liquor which they carry may be call'd Lymphatick Arteries,

transmitting their Liquor into the Lymphatick Veins, those Lymphatick Arteries will not admit Serum. How far this progression goes is not certain; ten capillary Arteries in some parts of the Body as in the Brain, are not equal to one Hair, and the smallest Lymphatick Vessels are a hundred times smaller than the smallest Capillary Artery. What Mechanism is that which can attenuate a Fluid compounded of the Ingredients of Human Aliment, as Oil, Salts, Earth, Water, so as to make it flow freely through such Tubes?

2. Hence one can easily perceive the inconvenience of Viscidity which obstructs, and Acrimony that destroys the Capillary Vessels.

2. Obstructions must be most incident to such parts of the Body, where the Circulation and the Elastick force of the Fibres are both smallest, and those are the Glands which are the extremities of Arteries form'd into Cylindrical Canals.

3. Hence too solid or viscous Aliment is hurtful to scrophulous Persons.

P R O P. VI.

The Fluids and Solids of an Animal Body demand a constant Reparation.

An Animal in order to be moveable must be flexible, and therefore is fitly made of separate and small solid Parts replete with proper Fluids. The whole Body is nothing but a System of such Canals, which all communicate with one another, mediately or immediately (for a Lymphatick Vessel communicates with the Artery, by the intermediate Gland.) In this moveable Body the fluid and solid Parts, must be consum'd by the muscular Motion, and the perpetual Flux of the Liquids; a great part of which are thrown out of the Body by proper Emissaries, and the smaller Solids are likewise rubb'd off, mix'd with the Fluids, and in that

that form exhal'd. Therefore both Fluids and Solids demand a constant Reparation.

1. The Quantity of Solids not Morbid in an Animal Body is very small, as appears by Atrophies, or Decays; and likewise by Microscopes, those Solids are entirely Nervous and proceed from the Brain, and Spinal Marrow, which by their bulk appear sufficient to furnish all the Stamina or Threads of the solid Parts. The Solids are originally form'd of a Fluid, from a small Point, as appears by the gradual Formation of a Foetus. The Solids and Fluids differ, only in the degree of Cohesion, which being a little encreas'd turns a Fluid into a Solid. How the Fluids are repair'd has been already explain'd. The Nutrition of the Solids is somewhat more obscure.

P R O P. VII.

Nutrition of the Solids is perform'd by the circulating Liquid in a due degree of tenuity in the smallest Vascular Solids.

The Fluids and Solids of an Animal Body, are easily transmutable into one another. The white of an Egg (a Fluid resembling the Serum of the Blood, and of which a whole Animal is made) will coagulate and turn Solid by a moderate Heat, and the hardest of Animal Solids are resolvable again into Gellys.

As the white of an Egg by Incubation, so can the Serum by the action of the Fibres be still more and more attenuated. A Fluid moving through a flexible Canal, when the Canal grows extremely small and slender, by its Friction, will naturally lengthen, and as it were Wire-draw, the Sides of the Canal, according to the Direction of its Axis, and as the Canal is lengthen'd or Wire-drawn, it grows still smaller and slenderer so as that the evanescent solid and fluid scarce differing, the Extremities of these small Canals will by Propulsion be carried off with the Fluid continually, and likewise continually repair'd and new ones

made in their room. The Force of the Fluid will likewise separate the smallest Particles which compose the Fibres so as to leave vacant Interstices in those Places where they coher'd before, which vacant Places will be again fill'd up by Particles carried on by the succeeding Fluid (as a Bank by the Mud of the Current) and which of course must be reduced to that Figure which gives the least Resistance to the Current, and consequently must apply themselves to the inward Surface of the Canal so as to preserve the Tube, the System of Tubes that is the Animal entire.

1. Those Tubes that are most recently made of Fluids are most flexible and most easily lengthen'd, such Tubes as have often suffer'd this Force grow rigid, and hardly more extendible therefore.

2. An Animal the nearer to its Original, the more it grows.

3. To this Motion of Elongation of the Fibres is owing the Union or Conglutination of the Parts of the Body, when they are separated by a Wound.

4. From the foregoing Doctrine it is easy to explain the Formation of the most solid Parts of the Body, for when the Fluid moves in several small Vessels, which by the Contact of their Sides stop the Current of the Fluid, those Canals by Degrees are abolish'd and grow solid, several of them united grow a Membrane, these Membranes further consolidated become Cartilages, and Cartilages, Bones ; consequently, an Animal the nearer it is to its Original, the more Pipes it hath, and as it advanceth in Age still the fewer. Many of our Vessels degenerate into Ligaments, the very Sutures of the Skull are abolish'd in old Age.

5. Many practical Rules may be drawn from the foregoing Doctrine, for the Diet of Human Creatures according to their different States of Life, and the Condition of the Solids, it is evident that the Diet of Infants ought to be extremely thin, such as lengthens the Fibres without Rupture ; but in a
young

young Animal, when the Solids are too Lax (the Case of rickety Children) the Diet ought to be gently Astringent.

The Aliment likewise ought to be different according to the State of the Solids, in Animals full grown: tho' an Animal arrives at its full Growth at a certain Age, perhaps it never comes to its full Bulk, till the last Period of Life. The *Membrana adiposa* invests almost every Part of the Body, so that there is hardly any Fibre, but is sheath'd with a Part of it. This Membrane separates an oily Liquor call'd Fat, necessary for many Purposes of Life; when the Fibres are Lax, and the Aliment too redundant, great part of it is converted into this oily Liquor, all the superfluous Weight of an Animal beyond the Vessels, Bones and Muscles is nothing but Fat; but the Conversion of the Aliment into Fat is not properly Nutrition, which is a Reparation of the Solids and Fluids, and Fat properly speaking is neither. But I shall treat more particularly of these Subjects in their proper Place.

7. The Matter of Nutrition is most subtle, and Nutrition the last and most perfect Animal Action, to perform it by the foregoing Propositions, there must be a due Degree of projectile Motion, or Celerity of Circulation to which Attrition and Heat is proportional. The Heat equal to Incubation, is only nutritious; any thing less or more is insufficient, and the nutritious Juice itself resembles the White of an Egg, in all its Qualities. By too weak a Circulation the Aliment approacheth to these Qualities which it would acquire by a small Degree of Heat without Motion, is viscous imperfectly mix'd, and the Person in this Condition is subject to all the Accidents of a *Plethora*, by too strong a projectile Motion the Aliment tends to Putrefaction is dissipated; and the solid Parts instead of being repair'd are destroy'd. Hence may be deduc'd the Force of Exercise in helping Digestion, and likewise the Rules for regulating the

Times and Degrees of it. But those are foreign to my Subject.

PROP. VIII.

The frequent Repetition of Aliment is not only necessary for repairing the Fluids and Solids of an Animal Body, but likewise to keep the Fluids from the putrescent alkaline State, which they would acquire, by constant Motion, and Attrition, without being diluted, by a fresh Emulsion of new Chyle.

An Animal that starves of Hunger dies feverish, and delirious as appears by Experiments upon Cats and Dogs, for the most fluid Parts are dissipated, what remains turns alkaline and corrosive affecting the tender Fibres of the Brain. The most severe Orders of the Church of *Rome* who practise Abstinence, feel after it fetid hot Eructations and Head-Aches. Long Abstinence does not kill by want of Blood, for twenty Days fasting will not diminish its quantity so much as one great Hæmorage. An Animal can never die for want of Blood, while there is a quantity sufficient for the continuity of the Pressure, it makes, to apply'd to the Brain, as to produce Animal Spirits. Besides the Diminution both of the Fluids and Solids in an Atrophy, is much greater than what can happen by being starv'd. Therefore fasting kills by the bad State, not by the insufficient quantity of Fluids.

Any watery Liquor will keep an Animal from starving very long by diluting the Fluids, and consequently keeping them from this alkaline State; which is confirm'd by Experience, for People have liv'd twenty four Days upon nothing * but Water, and the Stories of long Abstinence where Water has been allow'd are not incredible.

* *Vide Philosophical Transactions.*

I. Long Abstinence in hot bilious Constitutions may be the Parent of great Diseases, yet it is more troublesome to acid Constitutions by the Uneasiness it creates in the Stomach.

C H A P. III.

Observations drawn from the Nature and most simple Analysis of vegetable Substances.

P R O P. I.

ALL Animals are made immediately or mediately of Vegetables that is by feeding on Vegetables, or on Animals that are fed on Vegetables, there being no Process in *infinitum*.

P R O P. II.

Vegetables are proper enough to repair Animals as being near the same specifick Gravity, with the Animal Juices, and as consisting of the same Parts with Animal Substances, Spirit-Water, Salt, Oil, Earth; all which are contain'd in the Sap, they derive from the Earth, which consists of Rain-Water, Air, putrified Juices of Plants, and Animals; and even Minerals for the Ashes of Plants yield something which the Loadstone attracts. Plants are either eat raw, or prepar'd by the Arts of Cookery.

P R O P. III.

The Sap is diversify'd, and still more and more elaborated and exalted as it circulates through the Vessels of the Plant.

The Sap when it first enters the Root, and is not subdued by the Action of the Plant retains much of its own Nature, and has not much of the Vegetable;

being earthy, watery, poor, and scarce oleaginous. The Sap after it has enter'd the Root is more and more elaborated as it passeth into the Stem, Branches, Leaves, Flowers, Fruit and Seeds. The Juice of the Stem is like the Chyle in an Animal Body, not sufficiently concocted by Circulation, and is commonly tubacid in all Plants. This Juice is yielded in great Plenty by Incision in some Plants. The Juices of the Leaves are, *First*, That obtain'd by Expression which is the nutritious Juice render'd somewhat more oleaginous; from this Juice proceeds the difference of the Taste of the Leaves of Plants. *Secondly*, Wax which is scrap'd off by the Bees and is a vegetable Substance. *Thirdly*, Manna which is an essential Sacharine Salt sweating from the Leaves of most Plants.

The Juices of the Flowers are, *First*, The express'd Juice a little more elaborated. *Secondly*, A volatile Oil and Spirit wherein the particular Smell of the Plant resides. *Thirdly*, Honey exuding from all Flowers, the Bitter not excepted, this is gather'd by the Bees, and suck'd in by their Trunks into their Stomachs. The Juice of the Fruit is still the Juice of the Plant more elaborated. The Juice of the Seed is an essential Oil or Balm design'd by Nature to preserve the Seed from Corruption. The Bark contains besides the common Juice, an oily Juice which sweats out of divers Plants, when this Juice is in greater Plenty than can be exhal'd by the Sun, it renders the Plant ever Green. This Oil farther inspissated by Evaporation turns by degrees into Balm, Pitch, Rosin, &c. Besides all these there is a peculiar Juice in each Species not reduceable to Water, Oils, Balsam, which may be call'd the Blood of the Plant. Thus some Plants upon breaking their Vessels yield a milky Juice, others a yellow of peculiar Tastes and Qualities.

i. Hence it follows, that he who eats a whole raw Plant, or the express'd Juice of it, takes in a greater Variety of Substances, than he who feeds on the
same

same Plant prepar'd or on some of the Parts of it, for all Plants have the most of the foremention'd Ingredients, at least in small Quantities.

2. Vegetables differ from Fossils, and Animals in that being burnt to Ashes they yield a fix'd Alkaline Salt which in those of a sharp Scent, as Mustard, Onions, &c. is in a very small Quantity.

3. The Effects of vegetable Substances upon Human Bodies are more various than those of Animal Substances; and the Mechanism of Plants seems to be more various than that of Animals, for the same Plant produceth as great a variety of Juices as there is in the same Animal, and the different Plants a greater Variety, and yet the Aliment of Plants is one uniform Juice; for from the same soil may be produc'd a great variety of Plants, whereas different Species of Animals live upon very different sorts of Substances; both Mechanisms are equally curious, from one uniform Juice to extract all the variety of vegetable Juices, or from such variety of Food to make a Fluid very near uniform, the Blood of an Animal.

4. The specifick Qualities of Plants reside in their native Spirit, Oil and essential Salt; for the Water, fix'd Salt and Earth appear to be the same in all Plants.

The Effects of the foremention'd Ingredients of Plants are as follows, Vegetable Salts are capable of resolving the coagulated Humours of a Human Body, and of attenuating, by stimulating the Solids and dissolving the Fluids: Salts likewise promote Secretions, Oils relax the Fibres, are Lenient, Balsamick, and abate Acrimony in the Blood. It is by Virtue of this Oil, that Vegetables are nutrimental, for this Oil is extracted by Animal Digestion as an Emulsion, and abounds most in Plants of full Growth, and when the Salts and Water are in least abundance. Aromatick Plants tho' they abound with Oil, yet it is not soft and nutritious, but as it is mix'd with a Spirit, is too heating.

The Volatile Salt and Spirit of Vegetables is penetrating, heating and active, contrary to the Properties of Acids. The Balsams of Plants contain a Volatile Salt, such Balsams when depriv'd of their Acids change into Oils. Wax consists of an acid Spirit of a nauseous Taste, and an Oil or Butter which appears white. This Oil is Emollient, Laxative and Anodyne.

Honey is the most elaborate Production of the Vegetable Kind, being a most exquisite vegetable Soap resolvent of the Bile, Balsamick and Pectoral. Honey contains no inflammable Spirit before it has felt the force of Fermentation, for the Distillation of it affords nothing that will burn in the Fire.

The Fruits of most Vegetables are likewise Soaps, all Soaps (which are a Mixture of Salt and Oil) are attenuating and deobstruent resolving viscid Substances; for meer Water dissolves nothing but Salts: but as the Substance of Coagulations is not merely Saline, nothing dissolves them but what penetrates and relaxes at the same time, that is a Soap or a Mixture of Oil and Salt.

6. Tastes are the Indexes of the different Qualities of Plants as well as of all sorts of Aliment: Different Tastes proceed from different Mixtures of Water, Earth, Oil and Salt, but chiefly from the Oil and Spirit mix'd with some Salt of a peculiar Nature. A Muriatick or Briny Taste seems to be produc'd by a Mixture of an acid and alkaline Salt, for Spirit of Salt and Salt Tartar mix'd, produce a Salt like Sea Salt. Bitter and acrid differ only by the sharp Particles of the first, being involv'd in a greater Quantity of Oil than those of the last. Acid or sour proceeds from a Salt of the same Nature without a Mixture of Oil; in austere Tastes the oily Parts have not disentangled themselves from the Salts, and earthy Parts, such is the Taste of unripe Fruits. In sweet Tastes, the acid Particles seem to be so attenuated, and dissolv'd in the Oil, as to produce only a small and grateful Titillation.

lation. In oily Tastes, the Salts seem to be intirely disentangled,

Vegetables have very different Effects on Human Bodies as they contain acid or alkaline Salts, and are to be us'd according to the different Constitution of the Body at that time, as will appear by what will be said afterwards. All the Tetrapetalous filiquose Plants are Alkalescent.

P R O P. IV.

Mankind take as Aliment all the parts of Vegetables, but their properest Food of the Vegetable Kingdom is taken from the Farinaceous or mealy Seeds of some Culmiferous Plants, as Oats, Barley, Wheat, Rice, Rye, Maes, Panick, Millet; or of some of the filiquose leguminous, as Pease, Beans, &c. Those as they are Seeds (by what was said, Prop. III.) contain the most elaborate part of the Plant, are oily, and therefore proper to make the Animal Emulsion of Chyle, and their Oil is not highly exalted, and hot as that of Acrid and Aromatic Plants, but mild and benign to human Bodies.

Barley is Emollient, moistning and expectorating. Oats have some of the same qualities. Barley was chosen by *Hippocrates* as proper Food in inflammatory Distempers. Rice is the Food of perhaps two thirds of Mankind, it is most kindly and benign to human Constitutions, proper for the Consumptive, and such as are subject to Hæmorrhages, next to Rice is Wheat, the Bran of which is highly Acescent and Stimulating. Therefore the Bread that is not too much purged from it is more wholesome for some Constitutions; Rye is more Acid, Laxative and less nourishing than Wheat; Millet is diuretick, deterring and useful in Diseases of the Kidneys. Panick affords a soft Demulcent Nourishment both for Granivorous Birds, and Mankind. Maes affords a very strong Nourishment, but more viscous than Wheat.

Pease

Pease being depriv'd of any Aromatick parts are mild, and demulcent in the highest degree; but being full of Aerial Particles are flatulent, when dissolved by Digestion. Beans resemble them in most of their qualities. All the foremention'd Plants are highly acefcent except Pease and Beans.

The mealy parts of the foremention'd Plants dissolv'd in Water, make too viscid an Aliment to be constantly us'd, and justly condemn'd by *Hippocrates*. Therefore Mankind have found the means to make them more easy of Digestion by fermenting, and making some of them into Bread, which is the lightest and properest Aliment for human Bodies, Leaven by its Acid Salt, dividing the Mucous and oily parts of the Meal.

The next sort of Substances which Mankind feed on, are Fruits of Trees, and Shrubs, these all contain Water or Flegm, a great Quantity of Oil, much elaborated, and an essential Salt, upon the different mixtures of these Ingredients, depend their different Qualities, by which they are sharp, sweet, sow'r or Styptick. Of Fruits some are Pulpy, others contain'd within a hard Shell, which last are indeed the Seeds of the Plants, to which they belong, and contain a great deal of Oil, entangled with Earthly Parts and Salts, which oftentimes make them hard of Digestion, and pass the Alimentary Duct undissolv'd. There are other Fruits which contain a great deal of cooling viscid Juice, combin'd with a Nitrous Salt, which sometimes makes them offensive to the Stomach; such are many of the low Pomiterous kind, as Cucumbers, Pompions, tho' amongst those, Melons when good, have a rich Juice, and somewhat Aromatick; they are Diuretick, and there are instances of their having thrown People into bloody Urine.

Of Alimentary Leaves, the Olera or Pot Herbs afford an excellent Nourishment, amongst those are the Cole or Cabbage kind, Emollient, Laxative, and re-

resolvent Alkalescent, and therefore proper in cases of Acidity. Red Cabbage is reckon'd a Medicine in Consumptions and spittings of Blood. Amongst the Pot Herbs are some Lactescent Papescent Plants, as Lettuce, and Endive, which contain a most wholesome Juice, resolvent of the Bile, Anodyne and Cooling, extremely useful in all Diseases of the Liver. Artichokes contain a rich Nutritious Stimulating Juice.

Of the Stems of Plants, some, contain a fine Aperient Salt, and are Diuretick and Saponaceous, as Asparagus which affects the Urine with a Fetid Smell (especially it cut when they are White) and therefore have been suspected by some Physicians as not friendly to the Kidneys, when they are older and begin to ramify they lose this quality.

Of Alimentary Roots, some are Pulpy, and very Nutritious, as Turneps, Carrots, these have a fattening Quality, which they manifest in feeding of Cattle. There are other Roots which contain an Acrid Volatile Salt, as Onions, Garlick, Leeks, Radishes, the mildest of these is Selery. Those sorts of Roots are Alkalescent and Heating; and therefore proper in cases of Acidity. The Fungus kind, as Mushrooms, Truffles afford an Alkaline Salt, and much Oil, some of them being poisonous make the others suspicious if taken in too great Quantities.

There are many Vegetable Substances us'd by Mankind, as seasonings, which abound with a highly exalted Aromatick Oil, as Thyme, Savoury, and all Spices. Those are heating and the most of them hard of Digestion. The most friendly to the Stomach, is Fennel: Mustard, which is us'd in Seasoning abounds with a most Pungent Salt and Oil, extremely active, and heating. Sugar is an essential Salt of a Plant combin'd with an Oil, which renders it Inflammable.

P R O P. V.

To give an Account of the Ingredients into which Vegetables resolve themselves by the most simple Operations of Cookery and Chymistry.

The Operations of Cookery and Chymistry fall much short of the vital force of an Animal Body, no Chymist can make Milk or Blood of Grass, yet it gives some light to this Subject, to shew into what Parts Vegetables resolve themselves by such Simple Operations, as barely separate their Parts without confounding or destroying them.

The two Operations already mention'd, *viz.* making an Emulsion and Vegetable Putrefaction resemble Animal Digestion the most.

1. In making an Emulsion, the oily Parts of Vegetables dissolve into a white Liquor, resembling Chyle. Our Vegetable Food consists of mealy Seeds, Fruit, Bread, &c. upon which the Teeth and Jaws act as the Pestle and Mortar, the Spittle, Bile, Pancreatick Juice, &c. are the Menstruum instead of the Water, which the Chymist employs, the Stomach and Intestines are the Press, and the Lacteal Vessels the Strainers, to separate the pure Emulsion from its Fæces. The Chyle is white, as consisting of Salt, Oil, and Water of our Food, much levigated or smooth. This likewise constitutes the whiteness of Emulsions.

2. Vegetable Putrefaction (by what has been mention'd before) turns Vegetable Substances into an Animal Nature.

3. Amongst the Ingredients of Vegetables that which constitutes the most spiritous and fragrant part of the Plant, is what passeth by Perspiration, and exhales by the action of the Sun. This is as it were the presiding Spirit of the Plant, from which it draws its peculiar flavour, and is the most active Principle in the Vegetable. Thus every Plant has
its

its Atmosphere, which have very various effects on those who stay near them, producing Head-Achs, Sleep, Fainting, Vapours; and others, a great refreshment of the Spirits. It is reported, that in *Brazil* there are Trees which kill those that sit under their shade in a few Hours. This fragrant Spirit is obtain'd from all Plants which are in the least Aromatick, by a cold Still, with a heat not exceeding that of Summer.

4. If to a Plant you pour hot Water, and let it stand a sufficient time, the Liquor strain'd is call'd the infusion of the Plant, if the Plant be boil'd in the same Water, the strain'd Liquor is call'd the Decoction of the Plant. The Infusions and Decoctions of Plants contain the most separable parts of the Plants, and convey not only their Nutritious but Medicinal Qualities into the Blood. This is plain by many Experiments. The Infusion of *Cassia Fistularis* makes the Urine Green. The Infusions and Decoctions of Rhubarb, and Saffron will in a quarter of an Hour tinge the Urine with a high Yellow.

5. The most oily parts are not separated by a slight Decoction, till they are disentangl'd from the Salts, for if what remains of the Subject after the Infusion and Decoction, be continu'd to be boil'd down with the addition of fresh Water, a fat sapid odorous viscous inflammable frothy Water will constantly be found floating a top of the boiling Liquor, which being scumm'd off and gently dry'd, will flame away in the Fire. This Liquor is a kind of Soap consisting of the Oil and Salt of the Plant.

6. Infusions and slight Decoctions contain more of the Specifick Qualities of the Plant than these which are more violent, for by a strong Decoction some part of the Taste and Smell fly off every Moment.

7. The Infusion and Decoction prepar'd as before being evaporated to a thicker Consistence, according to the several Degrees of Thickness passeth into a Gelly, Defrutum, sapa Rob extract which contain all the
virtues

virtues of the Infusion or Decoction freed only from some of the watery parts.

8. The utmost force of boiling Water is not able to destroy the structure of the tenderest Plant. The Lineaments of a White Lilly will remain after the strongest Decoction.

9. The extract obtain'd by the former Operation burnt to Ashes, and those Ashes boil'd in Water, and filtrated, yield a fiery Salt.

10. The greater Quantity of volatile Salt any Plant contains, which is the case of the more pungent in Taste, and Odour, the less it affords of this fixt Alkali: Those fix'd Alkaline Salts do not pre-exist in the same form in the Plant, for Acid Plants as Sorrel will afford by this Operation, an Alkaline Salt. Those Salts grow still more fiery and Alkaline by a greater degree of Heat. Of all the Essential Salts of Plants, that which is in most common use in Aliment, is Sugar, which rather dissolves Flegm, than increaseth it; for it grows tenacious only by long boiling, it is a Sal Oleosum, for it is both soluble in Water, and fusible in Fire.

11. Another manner of preparing Vegetables is by expressing their Juices. Those express'd Juices contain the true Essential Salt of the Plant, for if they be boil'd into the consistence of a Syrup, and set in a cool place; the Essential Salt of the Plant will shoot upon the sides of the Vessels. Those Essential Salts of Plants differ according to the Plant unto which they belong, but are reduc'd into three Classes. *First*, Those of Acid Astringent, Austere Vegetables as of unripe Fruits which resemble the Tartar. *Secondly*, Those of succulent watery Plants, as Endive, Cichory which afford a fine nitrous kind of Salt soluble in Water, and very cooling. *Thirdly*, Those from oily Aromatick and odoriferous Vegetables, which will hardly afford any till their Oils be extracted from them: from hence it appears that the express'd Juices of Vegetables not filtrated very clear contain their whole Specifick Virtues.

12. In the preparations of Cookery the most volatile parts of Vegetables are destroy'd; if any of them are retain'd it is in Decoctions which are made in Balneo.

Decoctions, when we take the Liquor, contain the Specifick Virtues of the Plants, when we feed upon the Plant it makes their solid parts more tender, and deprives them of a great deal of their more subtile Oils.

13. The vascular and solid parts of Plants are incapable of any change in the Animal Body, for the remainder of a strong Decoction held over a clear Fire will burn to Ashes, which is true Elementary Earth. The fibrous and solid parts of Plants, pass unalter'd through the Intestines, and sometimes by sticking there occasion great disorders. Grains and Nuts pass often through Animals unalter'd. The Excrements of Horses are nothing but Hay, and as such combustible.

14. Vegetable Substances contain a great deal of Air, which as they are dissolv'd in the Alimentary Duct expands itself, producing all the disorders of Flatulency.

15. There are other Preparations of Vegetables by Fermentation, whereby they are wrought up into spirituous Liquors, which may be call'd by the general name of Wines. Such fermented Liquors have quite different qualities from the Plant itself, for no Fruit taken Crude has the intoxicating Quality of Wine.

C H A P. IV.

Observations from the Nature and most simple Analysis of Animal Substances.

AN Animal consider'd in its material part, cannot well be defin'd from any particular organical

cal part, which in some species are wanting, in others are more than one, nor from its locomotive Faculty ; for there are some which adhere to Rocks, and other places. The Characteristick of an Animal is to take its Aliment by a voluntary action, by some aperture of the Body, which may be call'd a Mouth, and to convey it into another call'd the Intestines, into which its Roots are implanted, whereby it draws its Nourishment much after the manner of Vegetables, only a Vegetable has its Root planted without itself, and an Animal its Root within itself. A Foetus in the Womb is indeed nourish'd like a Plant, but afterwards by a Root planted within itself, perhaps too an Animal may be distinguish'd from a Vegetable in that its Juices move through the Canals by a projectile Motion.

P R O P. I.

To give a short account of the constituent Parts of Animal Substances.

An Animal consists of solid and fluid Parts, unless one should reckon some of an intermediate nature as Fat and Flegm.

1. The solids seem to be Earth bound together with some Oil, for if a Bone be calcin'd so, as the least force will crumble it, being immers'd in Oil it will grow firm again.

The last Animal Solids are Earth in its greatest Simplicity, for the Chymists make Vessels of Animal Substances calcin'd, which will not vitrify in the Fire ; for all Earth which hath any Salt or Oil in it, will turn to Glafs.

2. The Fluids of Animals are more crude, and resemble those of Vegetables, as they are nearer the Root of the Animal. Thus Chyle may be said to be a vegetable Juice in the Stomach and Intestines, and pour'd upon Blood it seems like Oil ; as it passeth into
the

the Lacteals it grows still more Animal, and when it has circulated often with the Blood, it is entirely so.

3 Blood is the most universal Juice in an Animal Body, and from which all the rest are deriv'd, the red part of it differs from the Serum, the Serum from the Lymph, the Lymph from the nervous Juice, and that from the several other Humours that are separated in the Glands.

4. Animal Substances differ from Vegetables in two Things. *First*, In that being reduc'd to Ashes they are perfectly insipid, all Animal Salts being volatile, flying off with great Heat. *Secondly*, In that there is no sincere Acid in any Animal Juice.

5 And yet the Parts of the one are transmutable into the nutritious Juice of the other. An Animal can nourish a Plant, and a Plant an Animal, by which it seems probable that Vegetables have the Power of converting the alkaline Juices of Animals into Acids. From the two foremention'd Differences of Vegetable and Animal Substances follows, *First*, That all Animal Diet is alkalescent, or anti-acid. *Secondly*, That Animal Substances containing no fixt Salt, want the assistance of those for Digestion, which preserve them both within and without the Body from Putrefaction.

6. The constituent Parts of Animals are, *First*, Earth. *Secondly*, A peculiar Spirit analogous to that of Plants. *Thirdly*, Water. *Fourthly*, Salts. *Fifthly* Oil.

7. The Earth as was before observ'd is sincere, and immutable.

8. The Spirit is an oily Substance so attenuated as to become volatile. This Spirit seems to be distinguish'd in every Species, and Individual; a Blood-Hound will follow the Tract of the Person he pursues, and all Hounds the particular Game they have in Chase, and the Faculty by which they distinguish particular Men seems to be analogous to ours of dis-

tinguishing the different Species of Vegetables by their Scent.

9. Therefore, since the Animals of the wild kind have their Scent, and consequently this presiding Spirit more high, it is probable that their Juices are more exalted in Proportion.

10. Water is the chief Ingredient in all the Animal Fluids and Solids ; for a dry Bone distill'd affords a great quantity of insipid Water. Therefore Water seems to be proper Drink for every sort of Animal.

11. The Juices of Animals consist of Water impregnated with Salts of a peculiar Nature (excepting Chyle which as was said before may be reputed a vegetable Juice, and often contains Acids) These Salts are neither acid, nor perfectly volatile ; for in the Evaporation of Human Blood by a gentle Fire the Salt will not rise, but only the Spirit, and Water, not perfectly fix'd ; for Human Blood calcin'd yields no fix'd Salt, nor is it a *Sal Ammoniac* ; for that remains immutable after repeated Distillations ; and Distillation destroys the ammoniacal Quality of Animal Salts, and turns them alkaline, so that it is a Salt neither quite fix'd, nor quite volatile, nor quite acid, nor quite alkaline, nor quite ammoniacal, but soft and benign, approaching nearest to the Nature of a *Sal Ammoniac*. The elementary Salts of Animals are not the same, as they appear by Distillation ; these Alterations being made by Fire. Those Salts are of a peculiar benign mild Nature in healthy Persons who have a vital Force to subdue all the sapid Substances which they feed upon, but in such who have not that vital Force, or commit some Error in their Diet, these Salts are not sufficiently attenuated, and retain their original Qualities, which they discover in Cachexies, Scurvies of several kinds and other Distempers. The Cure of which chiefly lies in the choice of Aliment with Qualities opposite to the Nature of these Salts.

12. Animal Oil is various according to Principles inherent in it, but being freed from the Earth, Salts,

&c.

Es. it is a simple unactive principle, and the same in all Animals.

13. Animal Substances are more easily assimilated into Animal Substances, and therefore it seems probable that they are more nourishing to Human Bodies than Vegetable.

The Nature of Animal Food must depend upon the Nature, Age, Diet, and other Circumstances of the Animal we feed upon.

Animal Juices as well as Vegetable are in their greatest Perfection when the Animal is full grown; young Animals participate of the Nature of their tender Aliment, as Sucklings of Milk.

Animal Nourishment differs considerably as the Animal is terrestrial, amphibious, or aquatick. Fishes contain more of Animal Salts and Oil, for they corrupt sooner than terrestrial Animals, some Fishes as the Thornback when dry'd, taste of *Sal Ammoniac*.

The muscular Fibres of Fishes are generally more small and tender than those of terrestrial Animals, and their whole Substance more watery. Some Fishes as Whitings, can be almost entirely dissolv'd into Water.

From which Qualities a Diet of Fish is more rich and alkalescent than that of Flesh, and therefore very improper for such as practise Mortification. The Inhabitants of Sea-Port Towns are generally prolifick.

The Oils with which Fishes abound often turn rancid, and lie heavy on the Stomach, and affect the very Sweat with a rancid Smell, which is found to be true in some Places where the Inhabitants live entirely upon Fish.

Notwithstanding the redundant Oil in Fishes they do not increase Fat so much as Flesh, by reason of their watery Quality.

Water-Fowl abound with the same rancid Oil as Fish.

Fish being highly alkalescent, wants to be qualified by Salt and Vinegar.

14. Another Difference of the Flesh of Animals depends upon the difference of their Food, from which it is not hard to determine their Qualities consider'd as Aliment. Those Animals that live upon other Animals have their Flesh and Juices more alkalescent, than those that live upon Vegetables.

15. The difference of the Qualities of the Flesh of the same Species, depends upon the manner of living of the Animal.

Abstracting from other Considerations, the most healthy Animal affords the best Aliment, and the castrated ; than those that are not so.

An Animal that feeds itself takes the most proper Food, in the properest Quantities (if it has plenty enough) has better Air, and more Exercise, all which contribute to make the Animal more healthy ; for these Reasons *Hyppocrates* commends the Flesh of the wild Sow above the tame. The wild Kinds of Animals having more Exercise, have their Juices more elaborated and exalted ; but for the same Reason the Fibres are harder, especially when old. For this reason perhaps the Roe-Buck is the finest of the Venison Kind. This Rule in some measure holds true with Fishes ; Sea-Fish living in an Element more agitated, and River-Fish are better than those in Ponds.

Eels for want of Exercise are fat and slimy, for this Reason perhaps Fish without Fins and Scales were forbid the *Israelites*.

As the Fibres of fat Animals are often more tender and moist than those of lean, they are more coveted by Mankind, and tame Fowls offering themselves as it were to Mankind, seem to be their natural Food.

16. The Juices of the same Animal in Decoctions are often more nourishing, when the solid Parts are not so good, and the Broth made of grown Animals more nourishing than that of young ; for of the Parts of the same Animal the muscular Flesh with the nervous Parts, afford the best Nourishment as containing the most spirituous Parts. The difference of the mus-

muscular Flesh taken in Substance depends upon the Hardness, Tenderness, Moisture or Dryness of the Fibres. The Glands differ according to the particular Juices which they separate from the Blood. Of all the Glands the Livers are the most corruptible. Stall-fed Oxen and cramm'd Fowls are often diseas'd in their Livers.

P R O P. II.

To give an Account of the Nature and most simple Analysis of Animal Fluids and Solids.

The properest Subjects for such an Enquiry are, *First*, The Fluid which begins to receive an Animal Nature without having perfectly attain'd to it, and approaches nearest to the Nature of Chyle, *viz.* Milk. *Secondly*, That which having attain'd an Animal Nature by Circulation is noxious if retain'd in the Animal; Urine. *Thirdly*, An Animal Fluid no ways excrementitious, mild, elaborated and nutritious, and from which every part of a perfect Animal can be form'd; the White of an Egg. *Fourthly*, The nutritious Juice of a healthy Human Body which resembles the White of an Egg in most of its Qualities. *Fifthly*, The Bones.

1. None of the Animal Fluids above mention'd, in a sound State is either acid or alkaline. *First*, If to any quantity of warm new Milk you pour Oil of Tartar *per deliquium*, or any other Alkali, no Effervescence will follow, but the whole Body of the Liquor will remain at rest, though it appear somewhat thinner. To another quantity of warm Milk pour Spirit of Nitre, or any strong Acid, and again no Motion nor Ebullition will appear, only the Milk presently after will become thicker than it was; mix together the two Parcels of Milk, upon which the Experiments were made, and a great Effervescence will immediately arise; from whence the Proposition is evident, that Milk is neither an Acid nor Alkali, but

when there is an Acid and Alkali mix'd in it, they manifest themselves by their Conflict: Milk doth not discover itself to be Acid or Alkaline by Trials with the Syrup of Violets.

The same Experiments hold in two Parcels of the Urine of a healthy Person before it has stood twelve Hours.

The same Experiments succeed on two Parcels of a White of an Egg, only it grows somewhat thicker upon mixing with an acid. The Serum of the Blood stands the same Trials of Acids and Alkalis.

2. The Milks of several Animals differ but very little as to their sensible Qualities; Womens Milk is the sweetest, as to their nutritious Qualities they seem to stand in the following Order. That of Women, Asses, Mares, Goats, Sheep, Cows. The Milk of Animals which make hard Dung is most nourishing.

3. Milk standing some time, naturally separates into an oily Liquor, call'd Cream, and a thinner, blue and more ponderous Liquor, call'd skimm'd Milk, neither of which Parts is naturally acid or alkaline (but may turn so by standing for some time) nor in the least acrimonious, for being let fall into the Eye they cause no Pain or Sensation of Sharpness. Milk is a kind of Emulsion, or white Animal Liquor resembling Chyle prepared chiefly from Vegetables, and after it has been mix'd with the Animal Juices of the Saliva, Bile, pancreatick Juice, &c. is easily separated from them again in the Breasts.

4. It differs from a vegetable Emulsion by coagulating into a curdy Mass with Acids, which Chyle and vegetable Emulsions will not: Acids mix'd with them precipitate a tophaceous chalky Matter, but not a chyly Substance; for as was before observ'd, if you pour Spirit of Nitre into any Quantity of boiling new Milk, and no Conflict or Effervescence will follow, but the Liquor divides it self into Curd and Whey, which Whey turns spontaneously acid, and the

the Curd will turn into Cheese as hard as a Stone; which shows that the most solid Parts of Animals may be made of Milk. The same Effect of turning Milk into a hard Curd, may happen in a Human Body that abounds with Acids.

5. Milk drawn from a sound Animal fed on Vegetables, standing in a Heat equal to that of a Man in Health, will soon separate itself into a Cream, and a more serous and ponderous Liquor, which after twelve Days attains to the highest Degree of Acidity. But if the Milk be drawn from some Animals that feed only upon Flesh, that have fasted long, are feverish, or have undergone hard Labour, it will be more apt to turn rancid and putrify than turn acid, acquiring first a saline Taste which is a Sign of Putrefaction, and then it will turn into an Ichor.

6. If to a quantity of boiling new Milk you add by Degrees any fix'd Alkali, as Salt of Tartar, or Oil of Tartar *per deliquium*, there will be a lighter *Coagulum* form'd than by an acid. The Milk by boiling will change into a yellow Colour, and run through all the intermediate Degrees, till it stops in an intense red. The same thing happens by the alkaline Powers of the Body; for when an Animal that gives Suck turns feverish, that is, its Juices more alkaline, the Milk turns from its native genuine Whiteness to Yellow; to which the Suckling has an Aversion: This was the Case (as the learned *Boerhaave* tells us) of the Cows of *Holland*.

7. If a Nurse should abstain from all acid Vegetables, from Wine, Malt-Drink, and feed only on Flesh, and drink Water, her Milk instead of turning sour will turn putrid, and smell like Urine. An alkaliescent Diet except that of Water is often the Case of Nurses in great Families. Their Milk subjects the Child to Fevers; on the other hand the Milk of poor People that feed upon an Acescent Vegetable Diet, subjects the Child to Diseases, that depend upon Acidity in the Bowels, as Cholick: The Symptoms of
such

such a Constitution are a sour Smell in the Fæces, four Belchings, Distensions of the Bowels, and Paleness of the Flesh. The Cure of both Diseases is effected by a change of Diet in the Nurse from Alkalescent to Acescent or contrary ways as the case requires. The best Diet for Nurses is a Mixture of both.

It follows likewise from the foregoing Observations, that no Nurse should give Suck after twelve Hours fasting, and that a tendency to Yellow, is an early Sign of a Fever in the Nurse.

8. Recent Urine as it is neither Acid, nor Alkaline, distill'd yields a Limpid Water, neither Acid nor Alkaline, Saline nor Inflammable, and what remains at the Bottom of the Retort is neither Acid nor Alkaline; but being exhal'd by the Consistence of a Syrup, passeth through all the degrees of Colours, Yellow, Red, Brown and Black; and this soapy Water being calcin'd affords some Quantity of Sea Salt, but only in the case of the Animal's taking Sea Salt with its Food.

9. Hence Sea Salt passeth unalter'd through all the Strainers of a human Body, the moderate use of it is very proper to preserve Bodies through which it passeth from Corruption, it detergeth the Vessels, and keeps the Fluids from Putrefaction. The Ancients gave the *Sal Gemme* in putrid Fevers.

All human Urine distill'd affords a Water of a fetid Odour which that of Animals fed on Vegetables does not. The Urine of hard Drinkers and feverish Persons affords a Liquor extremely fetid, but no Inflammable Spirit, what is Inflammable stays in the Blood, and affects the Brain. Great Drinkers commonly die Apoplectick.

10. The Urine is a Lixivium of the Salts that are in a human Body, and the proper Mark of the State and Quantity of such Salts, and therefore very certain Indications for the choice of Diet may be taken from the state of Urine. Though the Salts of human Urine be neither Acid nor Alkaline, these Salts may

may by the violent Motion of the Blood be turn'd Alkaline, and even Corrosive, and when they begin to turn so, they affect the small and tender Fibres of the Brain more sensibly than other Parts.

11. Recent Urine distill'd with a great Heat, and dry Sand will afford a Volatile Alkaline Salt, and after the same manner the Heat of a human Body as it grows more intense makes the Urine smell still more strong, and of a deeper Colour. But as long as those Alkaline Salts are carried off by Urine, the Brain and Nerves are less affected, but on the contrary, when in a Fever these Salts are left behind, that is when the Urine turns pale, the Patient is in danger.

12. Recent Urine distill'd with a fix'd Alkali is turn'd into an Alkaline Nature, whence it seems probable that Alkaline Salts taken into a human Body, have the power of turning its benign Salts into fiery and volatile, on which account they seem improper in inflammatory Distempers, where the Salts are already too much attenuated. *Hippocrates* who found out this by Experience order'd in such a case Things of an Acid Nature. In general a high colour'd Urine indicates an Acid cooling Diet, for it is certain an Acid or Alkalescent Diet makes a great difference in the Salts of a human Body.

13. The Rob or Sapa of Urine distill'd with quick Lime affords a fiery, but not an Alkaline Spirit, and Lime Water given inwardly in the Case of a Diabetes, will bring the Urine from Limpid Pale to be of a higher Colour, which shows the Power of a Lixivium of quick Lime to unlock the Salts that are entangled in the viscid Juices of some scorbutic Persons.

14. Recent Urine will likewise crystalize by Inspissation and afford a Salt neither Acid nor Alkaline, but of an active Nature, which may be properly call'd the essential Salt of a human Body. Urine becomes Alkaline by Digestion in a heat not greater than that of a human Body, and throws off a stony Matter to the Sides of the Vessel.

15. The Urine long detain'd in the Bladder as well as a Glass will grow red, fetid, cadaverous and alkaline. The Case is the same with the stagnant Water of Hydropical Persons, which at last produce a Drought and feverish Heat.

16. From hence very good Rules may be drawn for the Diet of Nephritick and Dropfical Persons, that it ought to be such as is opposite to and subdueth the Alkalescent Nature of the Salts in the Serum of their Blood; those manifest themselves in the Urine, which as was said before is the Lixivium of the whole Body. Sal Ammoniac may likewise be obtain'd from Urine, which is nearest to the Nature of an Animal Salt.

17. The White of an Egg resembles the Nutritious Juice of an Animal Body, from the White of an Egg every part of a perfect Animal is form'd, for during the Incubation of the Hen, there is nothing of the Egg consum'd but the White.

18. The White of an Egg is a viscous, unactive, insipid, inodorous Liquor capable of mixing with Water, and so mild that apply'd to the most sensible part, the Eye, it causeth no Pain.

19. It is neither Acid nor Alkaline, for if the Juices of an Animal Body were either, so as by the mixture of the opposites, to cause an Ebullition, they would burst the Vessels.

20. The White of an Egg gradually dissolves by Heat, exceeding a little the Heat of a human Body, a greater degree of Heat will thicken it into a white, opaque, dry, viscous Mass, and this is the Case of the Serum of the Blood, upon which different Degrees of Heat produce contrary Effects.

Attention ought to be had to this Maxim in the Management of Diet, Exercise and all outward and inward Application to human Bodies and warm Cataplasms discuss, but scalding hot may confirm the Tumour. Heat in general doth not resolve and attenuate

ate the Juices of a human Body, for too great Heat will produce Concretions.

21. Spirit of Wine mix'd cold with the White of an Egg, coagulates it as much as boil'd Water, which shows that Spirit of Wine is an immediate Styptick; so that injected into the Veins it is sudden Death, and taken by the Mouth in great Quantities is sometimes sudden, but always certain Death. Spirituous Liquors are so far from attenuating, volatilizing and rendering perspirable the Animal Fluids, that it rather condenteth them and hardneth the Solids, and therefore properly us'd to hinder the growth of young Animals, and this it will do by mere external Friction; thereby coagulating the Juices in the Extremities of the Vessels, hardening and abolishing the Canals, and so increasing their Resistance against the Force of the influent Liquid, which would otherwise stretch them. This plainly demonstrates the bad Effects of inflammable Spirits on human Bodies.

22. The Water gain'd from the White of an Egg by a gentle Distillation, is neither Acid nor Alkaline; but by a strong Distillation it affords an Alkaline Spirit, Salt, two kinds of Oil, and an Earth, which is another instance of the Alterations great degrees of Heat cause in Animal Subjects; and hence we may conclude that Volatile Salts never exist in their own form, in an Animal Body, that the Heat requir'd to make them volatile endangers the Life of the Animal; hence a highly Alkalescent Diet in hot Constitutions must be hurtful.

23. The White of an Egg will putrify and turn Alkaline by Digestion, a single Grain of this putrify'd Substance has operated like a Poison, causing vomiting and a Looseness, the Antidote of this Poison is some Acid Liquor, and such are indeed indicated when the Juices of a human Body verge to Putrefaction. The White of an Egg during Incubation is dissolv'd, but not properly speaking putrify'd, for in such a State it would be unfit for Nutrition.

24. It seems probable that the Bile in a human Body by stagnating putrifies, causing a Cholera Morbus in the first Passages, and a Pestilential Distemper when it mixeth with the Blood. In such a state of the Bile, the Aliment ought to be thin to dilute, demulcent to temper, or acid to subdue and destroy an Alkaline Acrimony.

The Nutritious Juice of a healthy Animal resembles the White of an Egg in most of its Qualities, but this nutritious Juice being a subtile Liquor, scarce obtainable from a human Body, the Serum of the Blood is fairly substituted in its place.

25. The Serum of the Blood stands the foremention'd Trials, and discovers itself to be neither Acid nor Alkaline, only Oil of Vitriol thickens and the Oil of Tartar thins it a little.

26. The Serum of the Blood digested in a Heat nor greater than that of a human Body in health, will gradually become thinner, begin to smell Cadaverous and putrify, and at last, like the White of an Egg, turn to an Alkaline Ichor, that ferments with acids, and committed to Distillation affords like the White of an Egg, an Alkaline Salt. This shows the effect of gentle Heat in dissolving Coagulations, for even the viscous Matter which lies like Leather upon the extravasated Blood of Pleuritick People may be dissolv'd by a due degree of Heat.

27. When the Blood stagnates in any part of the Body, it first coagulates, then resolves, turns Alkaline, Putrid and Corrosive.

28. As the Serum of the Blood is resolvable by a small Heat, a greater Heat coagulates it so as to turn it horny like Parchment, but when it is thoroughly putrified it will no longer concrete. The Blood of some Persons who have dy'd of the Plague could not be made to concrete, by reason of the Putrefaction already begun.

29. The Serum of Blood coagulates like the White of an Egg with cold Spirit of Wine.

30. The Serum of the Blood is more Saline than the White of an Egg, perhaps by the Salts taken in Nourishment, and has something of a more fetid urinous Scent.

31. The Serum of the Blood affords by Distillation an exceeding limpid Water, neither Acid nor Alkaline, which shows that the most subtile part of the Blood approacheth nearer to Water than any other Liquor, and that the Blood naturally contains no volatile Salt.

32. These Experiments are to be made on the Blood of healthy Animals: It is possible in a lax and weak Habit of Body, where the Chyle is not thoroughly assimilated by Circulation, but floats on the Blood like Oil, that such a Serum might afford quite other Contents, and perhaps even an inflammable Spirit, by reason of the Vegetable Nature of the Chyle.

33. The Serum of the Blood by a strong Distillation affords a Spirit, or Volatile Alkaline Salt, and two kinds of Oil, and an Earth which still proves the Effect of Heat in human Bodies, in changing the benign Salts into Alkaline.

34. The Serum of the Blood is attenuated by Circulation, so as to pass into the minutest Channels of an Animal Body, and become fit Nutriment for it, but by the continual Attrition, and Heat of some of its Particles becomes sharp and offensive to the Body: Nature has provided the Kidneys to discharge them. Hence appears as by Prop. VIII. Chap. II. the continual Necessity of a fresh Recruit of Chyle, which like an Emulsion dilutes the Serum, the Mischiefs arising from the Retention of Salts, that ought to pass by Urine, and likewise the proper Indications for cooling and diluting, in such an Alkalescent State of the Fluids.

35. It appears by Experiments made upon Bones, and other Animal Solids, that they consist of the same Principles with the Fluids, a dry Bone distill'd affords
a great

a great Quantity of insipid Water, after the Bones have undergone the Violence of the Fire, the Ashes afford no fixt Salt, only sometimes in Animals that take Sea Salt, there will be a very small Proportion of that in the Ashes.

36. The Animal Fluids and Solids are resolvable into the same Principles, and this is true not only of the Fluids and Solids themselves, but likewise of all Preparations of them. The Gellies made of the Decoction of lean Flesh, and Bones in clear Water are resolvable into the same Principles as the Flesh and Bones themselves, and if these Decoctions be repeated till the Water comes off clear, the Remainder yields no Salt by Distillation and little Oil; therefore it is possible to extract the whole Virtues of Animal Substances by Decoctions, but the gentlest, extract the most volatile and finest Parts after the Oil or Fat is separated.

37. Preparations by Cookery of Fish or Flesh ought to be made with regard to rectifying their most noxious and slimy Substances, and to retain those that are most Nutritious; such Preparations as retain the Oil or Fat are most heavy to the Stomach, which makes bak'd Meat hard of Digestion.

38. By Experiments of the Mixture of different Substances with the Serum of the Blood, it appears that all Volatile Alkalis thin it, and Acids coagulate it. I said Volatile Alkalis for the Serum being mix'd with an equal Quantity of Oil of Tartar *per deliquium*, will grow somewhat thicker, and an Alkaline Vapour ariseth from the Mixture; but the same Proportion of Spirit of Sal Ammoniac makes the Serum thinner without causing any Alteration in the Scent or Colour.

39. Spirit of Vitriol pour'd to pure unmix'd Serum coagulates it as if it had been boil'd. Spirit of Sea Salt makes a perfect Coagulation of the Serum likewise, but with some different Phenomena from the former. The Spirit of Nitre produceth the same Effect.

The Serum which is mix'd with an Alkali being pour'd to that which is mix'd with an Acid raiseth an Effervescence, at the Cessation of which the Salts, of which the Acid was compos'd, will be regenerated.

40. Vinegar is an Acid of a very peculiar Nature cooling and yet not coagulating; for Spirit of Vinegar gently dilutes the Serum of the Blood, and even the Oil of Tartar being pour'd to this Mixture causeth no Effervescence; tho' *Honiberg* says, that Spirit of Vinegar concentrated, and reduc'd to its greatest strength will coagulate the Serum.

41. The Mixture of the Solutions of Sea-Salt, Sal Gemmæ, Borax Nitre, and Sal Ammoniac, cause no change of Colour in the Serum; but dissolve its Texture a little, all except that of the Borax. Glaubers Salt maketh a strong Coagulation of the Serum by reason of the Oil of Vitriol it contains.

42. All saponaceous Substances, which are a Mixture of Oil and alkaline Salt, thin the Blood without causing any Effervescence; Spirit of Harts-Horn given in great Quantities will produce Hemorrhages, which I have known by Experience, and therefore is very improper in many Cases. *Boerhaave* in his Chymistry, says, That *Sal volatile oleosum* will coagulate the Serum on Account of the Alcohol or rectify'd Spirit it contains.

43. The Tincture of Salt of Tartar, viz. a Preparation of the highest rectify'd Spirit of Wine, and the strongest fix'd Alkali, preserves the Serum in a neutral State; for the Spirit of Wine tends to coagulate, and the Alkali on the contrary to dissolve it, whence it becomes neither thicker nor thinner.

44. What we take in common Aliment is endued with the above mention'd Qualities in some degree. Therefore from these Experiments very useful Indications for Diet may be taken according to the different State of the Blood, as will appear by what follows.

C H A P. V.

Of the Effects of different alimentary Substances upon the Fluids and Solids of a Human Body.

P R O P. I.

Different Sorts of Aliments are not subdu'd or assimilated by the vital Force of a Human Body so intirely, as to be divested of their original Qualities; but while they repair the Fluids and Solids, act variously upon them, according to their different Natures. Therefore,

I. The proper Way of treating the Subject of Aliment is to consider the Actions of the several Sorts of it upon the Fluids and Solids of Human Bodies, and to separate at least in Idea their Alimentary from their Medicinal Qualities.

P R O P. II.

The Diseases of Human Bodies often require Substances of more active Principles, than what are found in common Aliment, in order to produce sudden Alterations: But where such Alterations are not necessary, the same Effect may be obtained by the repeated Force of Diet, with more Safety to the Body, where the less sudden Changes are less dangerous. The smaller Activity of Aliment is compensated by its Quantity, for according to the Laws of Motion, if the Bulk and Activity of Aliment and Medicines are in reciprocal Proportion, the Effect will be the same.

I. All Bodies which by the Animal Faculties can be changed into the Fluids and Solids of our Bodies are call'd Aliment. But to take it in the largest Sense, by Aliment I understand every thing which a Human
Crea-

Creature takes in common Diet, as Meat, Drink, and Seasoning, as Salt, Spice, Vinegar, &c.

2. It has been explain'd *Prop. VII. Chap. II.* how the Aliment in moving through the capillary Tubes at last, as it were stagnates and unites it self to the Vessel or Tube through which it flows. But in this Motion it will act differently, both upon the Fluid and Solid, according to its different Nature. Every thing that acts upon the Fluids must at the same time act upon the Solids, and contrariwise, yet one may separate these two Actions in Idea.

P R O P. III.

To enumerate the different Actions upon the Fluids and Solids of a Human Body.

There is a multitude of Words to express the various Alterations which are produc'd in a Human Body by Diet and Medicines, but as far as relates to our present Subject, they may be reduc'd to the following general Heads.

1. The Actions upon the Solids are, *First*, Stimulating or increasing their Vibrations or oscillatory Motions. *Secondly*, Contracting, that is diminishing their Length, and increasing their Thickness. *Thirdly*, Relaxing or making them more flexible in their less coherent Parts. And *Lastly*, Constipating or shutting up the Cavity of the capillary Tubes.

2. The Actions upon the Fluids are either changing their Qualities or their Quantity.

3. Their Qualities are chang'd by, *First*, Attenuating and condensing, that is diminishing or increasing the Bulk of their Particles. *Secondly*, By rendering them acrimonious or mild. *Thirdly*, By coagulating and diluting, that is, making their Parts more or less coherent. *Fourthly*, By increasing or diminishing their Motion through the Vessels.

4. The Quantity of the Fluids is increas'd or diminish'd by the Increase or Diminution of the Quantity

of Aliment; or by the suppressing or promoting Animal Secretions.

5. That all these Actions can be perform'd by Aliment as well as Medicines, is plain from Reason, Experience, and in some Cases by ocular Demonstration, by observing the Effects of different Substances upon the Fluids and Solids of a Human Body when the Vessels are open, and gape by a Wound or Sore. The Effects of tepid Water and farmaceous Substances in relaxing; of Spirits, in stopping Hemorrhages, and consolidating the Fibres; the Power of alkaline Absorbents in subduing Acrimony, and of Oil in stopping Perspiration is well known to Chirurgeons, who are likewise well acquainted with the Influence of Diet upon the Wounds and Sores of their Patients, and from the Condition of the one, can guess at the Errors or Regularity of the other. Acrid Substances will break the Vessels, and produce an Ichor instead of laudable Pus. The chief Intention of Chirurgery as well as Medicine, is keeping a just *Equilibrium* between the influent Fluids, and vascular Solids, when the Vessels are too lax, and don't sufficiently resist the Influx of the Liquid, it begets a *Fungus* or proud Flesh; when the Balance is on the other side, it produceth a Cicatrice. Were it not criminal to try Experiments upon Patients, which they too often try upon themselves, I could answer that the Doctrine of this Chapter would be verify'd by Experience in Wounds and Sores, as it is often perceptible even in an Issue.

P R O P. IV.

To explain the Effects of different alimentary Substances upon the Fluids and Solids of a Human Body.

1. The first sort of Alimentary Substances are such as are of so mild a Nature, that they act with small Force upon the Solids, and as the Action and Reaction are equal, the smallest Degree of Force in the So-

Solids digests and assimilates them ; of such sort is Milk and Broths made of the muscular Parts of Animals, which are as it were already prepar'd, and easily converted into Animal Substances ; these are proper Nourishment for weak Bodies, and agree perfectly well with them, unless there be some particular Acrimony in the Stomach, which sometimes makes them offensive, and which Custom at last will overcome.

2. Those Things which stimulate the Solids, produce the greatest Alterations in an Animal Body. This is seen in many Instances. Violent Sneezing produceth Convulsions in all the Muscles of Respiration, and an universal Secretion of all the Humours, Tears, Spittle, Sweat, Urine, &c. So great an Alteration can be produc'd only by the Tickling of a Feather, and if the Action of Sneezing should be continu'd by some very acrid Substance, it will at last produce Head-ach, Vomiting, universal Convulsions, Fever and Death. Therefore such active Substances as taken inwardly in small Quantities make great Alterations in the Fluids, must produce this Effect by their stimulating Quality.

3. Acrid Substances, which are small enough to pass into the capillary Tubes, must stimulate the small Fibres, and irritate them into greater Contraction, and stronger Vibrations.

4. Many things which we take as Aliment, or with our Aliment have this Quality in some degree : As the Juices of acid Vegetables, fermented Liquors, especially sharp Wines, fermented Spirits, aromatical Vegetables as Fennel, Savory, Thyme, Garlick, Onions, Leeks, Mustard, which abound with a volatile pungent Salt, all Spices, in general all Vegetables, which being corrupted easily resolve themselves into a fetid oily Alkali. Onions, Garlick, Pepper, Salt, and Vinegar taken in great Quantities by their *Stimulus*, excite a momentary Heat and Fever, and therefore in some Cases to be mention'd afterwards are very proper.

5. The

The solid Parts may be contracted various Ways. *First*, by dissolving their Continuity, for when a Fibre is cut through, it contracts itself at both Ends; therefore all Things which are so acrimonious as to destroy the small Fibres must contract them. *Secondly*, Whatever makes a Depletion of the Vessels gives room to the Fibres to contract; therefore Abstinence produceth this Effect in the best Manner. Whatever shortens the Fibres, by insinuating itself into their Parts, as Water in a Rope, contracts; fermented Spirits possess their Quality in a great Degree.

6. The more oily any Spirit is, the more pernicious, because it is harder to be eluted by the Blood. Brandy is more easy to be so, than Spirit of Juniper, and that than Spirit of Aniseed. Compound aromatical Spirits destroy, *First*, By their fermentative Heat, *Secondly*, By their oily Tenacity. *Thirdly*, By a caustick Quality residing in Spices apt to destroy the solid Parts, but these Qualities render them proper in some Cases taken in small Quantities.

7. Fermented Spirits contract, harden and consolidate many Fibres together, abolishing many Canals, especially where the Fibres are the tenderest as in the Brain, by which Quality they destroy the Memory and intellectual Faculties.

8. Acid austere Vegetables have this Faculty of Contracting and strengthening the Fibres without some of the bad Effects of fermented Spirits, as all Kinds of Sorrel (the Virtues of which lie in an acid astringent Salt, a sovereign Antidote against the putrescent bilious Alkali) several Kinds of Fruits, as Quinces, some sorts of Pears with the Marmalades made of them, Medlars, Capers, Barberries, Pomegranates, Purslain, such are easily distinguish'd by a rough styptick Taste. Amongst Drinks Austere Wines, unripe Fruits likewise have the same Quality, but are apt to obstruct the Nerves, and occasion Palsies.

9. Re-

9. Relaxing the Fibres is making them flexible, or easy to be lengthen'd without Rupture, which is done only in the capillary vascular Solids. Amongst Liquids endued with this Quality of relaxing, warm Water stands first, next watery Decoctions of farinaceous Vegetables, or Grains, as Oats, Barley, &c. All sweet and mild Garden-fruits, almost all Pot-Herbs, Spinage, Betes, Cabbage, Coleworts, and all that Tribe. Red Cabbage besides is reckon'd a good Pectoral; some of the lactescent and papescent Plants, as Lettuce, Cichory, whose Milk is anodyne and resolvent, therefore good in Diseases of the Liver; but all such Vegetables must be unfermented, for Fermentation changes their Nature. Oils express'd from mild Plants, Animal Oils, Cream, Butter, Marrow, which last is of all oily Substances the most penetrating.

10. It is not probable that any thing which Human Creatures take as Aliment, should have the Quality of entirely constipating or shutting up the capillary Vessels, because such Substances could hardly enter the Lacteals, and if they did, would stop the Circulation in the Lungs, but all viscid Aliment such as is made of farinaceous Substances unfermented, neither pass the Lacteals, nor circulate so easily as the same Substances fermented. Some of the *Fungus* Kind gather'd by mistake for edible Mushrooms, have produced a Difficulty of Breathing.

11. The Qualities of the Fluids can be likewise chang'd by Diet, as *First*, By attenuating or diminishing the Cohesion of the Parts of the Fluid. The Cohesion of the Parts depends upon the Weight and Quantity, therefore Abstinence and a slender Diet attenuates, because Depletion of the Vessels gives room to the Fluid to expand itself.

12. Whatever penetrates and dilutes at the same time; therefore Water impregnated with some penetrating Salt, attenuates most strongly; Water with *Sal Ammoniac* will pass through a Human Skin. To

this Quality may be justly ascrib'd the great Effects of medicated Waters, all stimulating Substances by increasing the Motion of the Blood attenuate, unless they increase the Motion so much, as at last to produce Coagulation.

13. Thickening the Blood is most easily brought about by exhaling the most liquid Parts by sudorifick or watery Evaporations; but this brings it into a morbid State. Acid austere Vegetables before mention'd, have this Quality of condensing the Fluids, as well as strengthening the Solids.

14. The Blood of labouring People is more dense and heavy than of those who live a sedentary life, and the Diseases which People imagine proceed from the Thickens of Blood, come often from the contrary Cause; too thin Blood strays into the immediately subordinate Vessels which are destin'd to carry Humours secreted from the Blood, according to what was said Prop. V. Chap. II. This causes an Obstruction falsely ascrib'd to the Thickens of the Blood.

The Qualities of the Blood in a healthy State are to be florid when let out of the Vessel, the red Part congealing strongly and soon together in a Mass moderately tenaceous, swimming in the Serum, which ought to be without any very yellow or greenish cast. The Gravity of Blood to Sea-Water is as 26 is to 25, that of the Serum to the same Water, as 300 to 353, it's an easy matter to examine extravasated Blood by these Marks.

15. Acrimony is not Natural, but induc'd into the Fluids of an Animal Body. Acrimony may be introduc'd by Diet, that is either Muriatick, (Briny) or Acid, which likewise is of two sorts, of things naturally Acid, or (made so by fermentation) Aromatick, consisting of Salts, and highly exalted Oils, intimately united. Or *Secondly*, by increasing the Velocity of the Blood, and consequently the Attrition of the Parts.

16. Acrid

16. Acrimony in the Blood it self is commonly of three Sorts according to the Nature of the Salts in which it resides. Acid, Alkaline or Muriatick as in the Sea Scurvy, but the last approaches more towards the Alkaline, and admits of the same Cure: Acid Acrimony resides chiefly in the first Passages, proceeding often from the Weakness of Digestion, and the too long Duration of Vegetables, and Milk in the Stomach. Animal Substances are all Alkalescent, of Vegetable Substances some are Acid, others Alkalescent, and each Sort is to be used according to the two different Intentions.

17. Antiacid Vegetables are, *First*, All kinds of Garlick, Onions, Leeks, and Selery, the Antiscorbutick Plants, Carrots, Turnips, Eringo Roots, Asparagus, Horse-radish, Mustard, Cabbage. *Secondly*, All Animal Substances especially of such as live on other Animals; the Juices of which are more Alkalescent than of the Animals which live upon Vegetables, such are most Fishes, especially some of the Testaceous kind. *Thirdly*, Water as it dilutes and subdues Acidity. *Fourthly*, Oils are Antiacids so far as they blunt Acrimony, but as some times they are hard of Digestion they produce Acrimony of another Sort.

18. On the other Hand when the Acrimony is Alkaline, which is more frequently the Case in the circulating Juices. The proper Diet is Decoctions of Farinaceous Vegetables, which seem appointed by Nature for the Vegetable Diet of human Creatures. This Alkaline Acrimony indicates the copious use of Vinegar, and Acid Fruits, as Oranges, which contain a Juice, most effectual in the Cure of the Muriatick Scurvy of Mariners; the Juice of Lemons is likewise more proper and more cooling and astringent than that of Oranges. In this case all the mild Antiscorbuticks are indicated as Sorrel, Cichory, Lettuce, Apples, and of Liquids Whey: On the contrary all the Acrid Antiscorbuticks, as
Scurvy-

Scurvygrats, Horseradishes, Mustard, &c. are hurtful in this hot Scurvy.

19. There is a third sort of Antiscorbuticks proper in this Alkalescent State of the Fluids, which is call'd Astringent, such as Pomegranates, Capers, and most of the common Pickles prepar'd with Vinegar. The Extremity of Alkali is Putrefaction. All Acid Substances, and Sea Salt resist Putrefaction, but as it is a sharp solid Body unalterable in an Animal Body, when it is taken in too great Quantities in a constant Diet of Salt Meat, it breaks the Vessels, produceth Erosions of the solid Parts, and all the Symptoms of the Sea-Scurvy, which is to be cured by Acid Vegetables, and not by hot Antiscorbutick; all Spices likewise induce this Acrimony, as was hinted before.

20. There are other Substances which are opposite to both Sorts of Acrimony which are call'd demulcent or mild, because they blunt or sheath these sharp Salts, as Farinaceous Legumes, such as Pease, Beans, Lentils. Native Oils of Animals, as Cream, Butter, Marrow, which last is a Specifick in that Scurvy which occasions a Crackling of the Bones, in which case Marrow performs its natural Function of moistening them. All Plants which are without Smell or pungent Taste are demulcent, as likewise all the Alimentary Parts of sound Animals, for none of their Juices will hurt the Eye or a fresh Wound. Acrimony which is not viscid may be cur'd by Diet, but Viscidity requires more active Substances to dissolve it.

21. Whatever renders the Motion of the Blood more languid than natural disposeth to an Acid Acrimony: What accelerates the Motion of the Blood beyond what is natural disposeth to an Alkaline Acrimony.

22. The next Alteration which is made in the Fluids is rendring it more thin, which is perform'd by Diluting, there is no real Diluent but Water, every Fluid

Fluid is diluent as it contains Water in it. Water dilutes, but at the same time relaxeth, this last Quality is taken off by mixing some Acid Juice with it: Water mix'd with Acids resists the Heat and Alkalescent State of the Fluids, as long as there is Thirst, a quick Pulse, Dryness, with a free Passage by Urine, and Stricture of the Vessels, so long is Water safely taken.

23. Opposite to Dilution is Coagulation or Thickening, which is perform'd by dissipating the most liquid Parts by Heat, or by insinuating some Substances which make the Parts of the Fluid cohere more strongly. All Vegetables which make a black Tincture with the Vitriol of Steel have this Quality, they have commonly a rough styptick Taste: Vinegar as was said before is an Acid very particular, for it doth not coagulate: Inflammable Spirits coagulate the Fluids, and harden the Solids in a strong Degree.

24. Resolving what is congeal'd is turning it into a Fluid again; this can be perform'd by watery Liquors, impregnated with some penetrating Salt, but more effectually by saponaceous Substances compos'd of Oil and Salt, such are Honey, and the Robs and Gellies of most Fruits. Vinegar and Honey mix'd is a strong resolvent. Spissitude is subdu'd by Acrid things, and Acrimony by inspissitating.

25. The second Manner of Operating upon the Fluids is by increasing or diminishing their Quantity, the first is perform'd by a plentiful Diet, and the Suppression of Evacuations, the second either by a spare Diet or promoting the Animal Secretions, that is expelling the Fluids out of the Body. Tho' Secretions of the laudable Juices are best accomplish'd by increasing the Fluids.

26. What-

26. Whatever generates a Quantity of good Chyle, must likewise generate Milk, such is new Milk season'd with Sugar or Salt. This will encrease the Milk when it is diminish'd by the too great use of Flesh Meat: Gruels made of Grains, Broths, Malt Drink not much hopp'd, Possiet Drinks, and in general whatever relaxeth, have the same Effect.

27. There are as many good Pectorals of the Alimentary, as of the Medicinal kind, as all Preparations of Barley, Oats, Honey, all Saponaceous Substances before-mention'd with attenuate Flegm.

28. There is Aliment lenitive expelling the fæces without stimulating the Bowels, such are Animal Oils quite fresh (for by standing they grow Acrid) as Cream, Butter, Marrow, Broths made of the Parts of Animals about the Mesentery, Oils express'd from ripe Fruits from unripe they are austere and astringent) the Juices of mild and ripe Fruits, Decoctions of farinaceous Vegetables, natural Soaps as Honey, Sugar, such Diet is proper for the hot Constitutions of warm Countries, where strong Perspiration exhales the Moisture. Water, Milk, Whey, taken in the open Air without much exercise so as to make them perspire, relax the Belly.

29. There are Aliments which besides this lubricating Quality, stimulate in a small Degree. Gellies made of the solid parts of Animals, as of their Horns, stimulate by the Salts that are in them. Salted Flesh which often throws Ships-crews into Fluxes, Shell Fishes which have a saline Taste, Garden Fruits which have any Acrimony, most sorts of Berries, some of which will produce Diarrhoeas, warm Water mix'd with Honey, and Honey mix'd with Acids dissolve Flegm in the Bowels. There are others which promote the Secretion of Bile, such as all natural Soaps, the Juices of Fruits sharp, and sweet, especially Grapes, the immoderate use of which will produce a Cholera Morbus.

30. Diure-

30. Diureticks are Decoctions, Emulsions and Oils of Emollient Vegetables, in so far as they relax the Urinary Passages: Such as relax ought to be try'd before such as force and stimulate. Those Emollients ought to be taken in open Air to hinder them from perspiring, and on empty Stomachs. Vegetables which abound with essential Salt, are Diuretick by stimulating, as Sorrel, Chervil, Parsly, Eringo, &c. and likewise all such as contain an Aromatical Balsam as Asparagus, Fennel, &c.

31. As to Sudorificks, it ought to be consider'd that the Liquid which goes off by Sweat, is often the most subtle part of the Blood, and ought not to be forc'd away without manifest Necessity. The Matter of insensible Perspiration is mild, that of Sweat resembles Urine, and yields a volatile Salt, oily and fetid. When Sweat is vehement it will grow bloody. The Matter of Sweat is the watery part of our Drink impregnated with this Salt, sometimes in weak and consumptive People, Crude, Chyle, and sometimes (as was said before) the most elaborate subtle part of our Blood, as in fat People who have a small insensible Perspiration.

32. Sweat is produc'd by changing the balance between the Fluids and Solids (in which it must be confessed that true Health consists) so as the projectile Motion of the Fluids overcome the Resistance of the Solids; therefore it is produc'd by relaxing the Passages of the Skin. *Secondly*, By diluting. *Thirdly*, By dissolving the Blood. *Fourthly*, By accelerating its Motion. Water dilutes and relaxes at the same time, therefore the best and safest Sudorifick, watery and Acid things mix'd prove strong Sudorificks; Spices by Heating, and dissolving the Blood are not so proper and safe Sudorificks.

33. Insensible Perspiration is the last and most perfect Action of Animal Digestion; the keeping it up in due Measure, is the cause as well as sign of Health, and the least Deviation from that due Quantity, the
certain

certain forerunner of a Disease, therefore the best Indications for Diet are taken from the Measure of Perspiration.

The Food which is most Vaporish and perspirable is certainly the most easily digested, but such may be proper or improper, for the Animal according to its Circumstances, especially the Quantity of its Muscular Motion. By Prop. IV. Chap. II. The strength of the Aliment must be proportion'd to the action of the Solids upon it, which in an Animal under a course of exercise or hard labour is much stronger ; therefore Aliment too Vaporose or Perspirable, will subject it to the inconveniences of too strong a Perspiration, which are Debility, Faintings, and sometimes sudden Death. What diminisheth Sweating, or the sensible Perspiration increaseth the insensible, for that reason a Strengthening and Astringent Diet often conduceth to this purpose. According to the Experiments of *Sanctorius* the most nourishing Aliment is the least perspirable except Mutton, which of all others is most so, and Hog's Flesh the least ; and for the same reason Eels, and all very fat and oily Substances : copious Food of small Nourishment perspires much.

A Stomach too void or too full stops Perspiration. The Fruits of the low Pomiferous Plants as Cucumbers, Melons, &c. stop Perspiration, therefore they are wisely provided by Nature in a Season when the Perspiration is too great. Variety of Meats diminish Perspiration, Honey in cold Constitutions increaseth Perspiration, except when it promotes too great a Secretion of the Bile, and then it diminisheth it : Drinking excessively during the time of Chylification, stops Perspiration. Let those who sit long at their Bottle after Meals consider this.

The most sure sign of a deficient Perspiration is Flatulency or Wind.

34. The Menfes are promoted. *First*, By every thing which occasions a Plethora, such are all Aliments of easy Digestion, taken in sufficient Quantity. *Secondly*, By all Saponaceous Substances, which incide the Mucus in the first Passages. *Thirdly*, By Spices and warm Vegetables which abound with a Volatile oily Salt. Of these we have spoken before.

35. Heat in Animal Bodies is produc'd by the Attrition of the Fluids and Solids, for when that ceaseth as in Death, there is extremity of Cold. The solid parts of Animals rubbing against one another would in time produce a Heat capable to destroy the Parts, had not Nature provided an oily Substance to lubricate and moisten them; when that fails as happens sometimes in the Scurvy, Gout, and Rheumatism, an Inflammatory Heat is often produc'd.

36. Stimulating Substances taken in Diet increase Heat, because they increase the Oscillatory Motion of the Solids, but most of all Inflammatory Spirits. Whatever increaseth the Density of the Blood, even without increasing its Celerity, heats, because a denser Body is hotter than a rarer. Extreme Cold at last heats. Cold in Animal Bodies is produc'd by Causes contrary to those productive of Heat, as *First*, by diminishing the force of any Stimulus, as by Whey, Milk, Water, &c. *Secondly*, By all Things which relax. *Thirdly*, Alkaline Substances in respect of Acid, and Acid in respect of Alkaline are cooling.

37. Cephalick are all such Things as attenuate the Blood so as to make it circulate easily through the capillary Vessels of the Brain. A Cordial properly speaking is not always what increaseth the Force of the Heart; for by increasing that the Animal may be weaken'd as in inflammatory Diseases. Whatever increaseth the Natural or Animal Strength, the Force of moving the Fluids and the Muscles is a Cordial, such are such substances, as bring the Serum of the

the Blood in the properest Condition for Circulation and Nutrition, as Broths made up of Animal Substances, Milk, ripe Fruits, and whatever is endued with a wholesome but not pungent Taste. Whatever relaxes the too strict, or strengthens the too lax Fibres, what in some Cases dispels Wind, what excites and takes off the sluggish Motion of the Animal Spirits, as Spices, Wine, and spirituous Liquors.

38. Carminative are such Things as dilute and relax at the same time, because Wind occasions a Spasm or Convulsion in some Part; whatever promotes insensible Perspiration is Carminative, for Wind is perspirable Matter retain'd in the Body.

39. All emollient relaxing Diet, and all things which destroy Acrimony, abate Pain.

40. There are several Things taken in Diet which kill Worms, as Oil, and Honey.

Whoever attends to the Particulars barely hinted at in this Chapter, will easily perceive that all the Intentions pursued by Medicines, may be obtain'd and inforc'd by Diet.

It may be expected that I should say something in this Chapter of the Qualities of three exotick Plants, whose Infusions and Decoctions are now much us'd in common Aliment, Tea, Coffee, and Chocolate: There are many Treatises wrote about them, which ascribe to them both good and bad Qualities, which they have not. There is lately published a very learned and elaborate Dissertation upon Tea, by Doctor *Thomas Short*, in which the Author with great Knowledge, Industry, and Skill, has not only given us the Natural History of the Plant, but likewise its Analysis.

But as the Infusions and Decoctions of the foremention'd Vegetables in common Water, are the only Preparations of them in Use, there is no necessity in this Place of considering any of their Contents, but such as are extracted by those simple Operations of Cookery. The

The green Leaves of Tea contain a narcotick Juice, which exudes by Roasting. This is perform'd with great Care before it is expos'd to sale. The several Methods of discovering the Adulterations of Tea by Copperas, Galls, Spirit of Harts-horn, one may see in the foremention'd Treatise. Tea by its manner of affecting the Organs of Taste and Smell, contains very little of a volatile Spirit; its Rosin or fix'd Oil which is bitter and astringent, cannot be extracted by Water, but demands rectify'd Spirit. The active Principles of it extracted by Infusion, are the most separable Parts of its Oil or Gum, and its Salt.

Its Salt and Gum are astringent; chalybeate Water draws from it a Tincture of the same Colour as that from Oak Leaves. It is acescent as appears by its Effects upon Stomachs troubled with Acidity. So that Tea is an Infusion of a Plant acescent, and moderately astringent in warm Water.

As a watery Liquor, it is diluting and stimulating by its Salt: By its astringent Quality it moderates the relaxing Quality of warm Water. By what has been said before in this Chapter, Water endu'd with any saline stimulating Substance is very penetrating, and goes into the most inward Recesses of the circulating Juices by its Quality, and refresheth the Brain and Animal Spirits; but by its styptick and stimulating Quality it affects the Nerves, very often occasioning Tremors, by its Heat it promotes Perspiration, by its watery Quality it dissolves what is viscid in the Stomach, and so may help Digestion; but a strong Decoction of it is emetick, and drinking too great Quantities may relax and weaken the Tone of the Stomach.

As stimulating and diluting it is diuretick, but as it is astringent, it is not quite so proper where relaxing the urinary Passages is necessary.

Milk abates some of the foremention'd Qualities, making it more soft and nutritious, and Sugar as a Salt increaseth its *Stimulus*. From those Hints it follows, *First*, That Tea is proper only for such whose Bodies are in such a State as demands some of the foremention'd Alterations. Who these are, will be shown more plainly in the following Chapter. *Secondly*, That the immoderate Strength and Quantity of this Liquor may be hurtful in many Cases, and to most People.

Coffee has in common with all Nuts an Oil strongly combin'd, and entangled with earthly Particles.

The most noxious Part of its Oil exhales in roasting to the Abatement of near $\frac{1}{4}$ of its Weight.

* One Pound of Coffee by Distillations afforded of volatile Spirit, six Ounces six Drachms: of Oil, two Ounces, two Drachms, two Scruples: Of *Caput mortuum* five Ounces three Drachms. Tho' the Chymist did not, or could not calcine the *Caput mortuum* so as to obtain its fix'd Salt, to be sure it must have some.

What is extracted by Water from Coffee, is the most separable Parts of Oil which often swims a top of the Decoction. This Oil is Volatile, and consequently very little Nutritious.

Volatile Oils refresh the Animal Spirits, but likewise are endued with all the bad Qualities of such Substances, producing all the Effects of an oily and aromatical Acrimony mention'd in the following Chapter, as Dryness, Heat, Stimulation, Tremors of the Nerves, from whence it has been accus'd of causing Palsies, Leanness, Watchfulness, and destroying masculine Vigour.

From these Qualities it is easy to imagine, that it must be hurtful to hot, dry, bilious Constitutions,

* *Vid.* Philos. Transact.

and perhaps beneficial to Phlegmatick, and that drank in too great a Degree of Strength or Quantity hurtful to every Body.

Chocolate is certainly much the best of those three exotick Liquors, its Oil seems to be both rich, alimentary, and anodyne; for an Oil as soft as that of sweet Almonds can be extracted from the Nut; and the *Indians* made Bread of it. This Oil combin'd with its own Salt and Sugar, makes it saponaceous and detergent, by which Quality it often helps Digestion and excites Appetite, when it is mix'd with Vanillios or Spices; it acquires likewise the good and bad Qualities of aromatick Oils, which are proper in some Cases and Constitutions, and very improper in others.

CHAP. VI.

Of the different Intentions to be pursued in the Choice of Aliment in different Constitutions.

WHolesome and unwholesome are relative not real Qualities, therefore to affirm that such a Thing is wholesome or unwholesome, without describing the Subject in all its Circumstances to which it bears these Relations, is, with Submission talking Nonsense.

To make these Terms of wholesome and unwholesome Aliment intelligible, there are two Things necessary, *First*, To shew what Aliment is proper for what Intention. *Secondly*, What Intention is proper to be pursued in such a Constitution of a Human Body. The *First* is the Subject of the foregoing Chapter, and the *Second* of this.

P R O P. I.

To enumerate the most common Diversities of the Constitutions of Human Bodies.

The most common Diversities of Human Constitutions arise either from the solid Parts as to their different Degrees of Strength and Tension; in some being too lax and weak, in others too elastick and strong; or from the different State of the Fluids, which, as they consist of Spirit, Water, Salts, Oil and terrestrial Parts, differ according to the Redundance of the whole, or of any of these Ingredients, and therefore are plethorick, phlegmatick, oily or fat, saline, earthy or dry by the Dissipation of the most fluid Parts, which last Constitution is call'd, by the Antients, Atrabilarian or Melancholick. A plethorick Constitution in which true Blood abounds, is call'd Sanguineous. A saline Constitution is either Acid, Alkaline, or Muriatick, according to the Difference of the Salts which occasion it.

2. In some of these Senses, tho' every Human Constitution is morbid, yet are their Diseases consistent with the common Functions of Life, and leave them under their own Conduct as to their Manner of living, and therefore are a proper Subject for this Discourse, in which I am far from pretending to instruct the Brethren of the Profession, or anticipating their Directions to such as are under their Government.

3. I think it proper to advertise the Reader of two Things. *First*, That I endeavour to give the most simple Idea of the Distemper of the Constitution, and the proper Diet, abstracting from the Complications of the First, or the Contra-indications to the Second. *Secondly*, That in a Discourse of this Nature, the Reasonings must be precise, tho' the Practice may admit of great Latitude.

P R O P.

P R O P. II.

To explain the Causes, Symptoms and proper Diet of such as have weak and lax Fibres.

1. In all the Fibres of an Animal Body, and in the Sides of all the Canals, there is a contractile Power whereby the Fibres endeavour to shorten themselves. This is evident; for if a Fibre be cut transversly, both the Ends shrink, and make the Wound gape; the Force oppos'd to this contractile Power of the Fibres, is the influent Liquid. Health consists in the *Equilibrium* between those two Powers, when the Fluids move so equally, that they don't press upon the Solids with a greater Force than they can bear, and no more in one Part than in another; and on the other Hand when the Solids resist, and act upon the Fluids so equally that there's no uneasy Sensation, the Animal is in Health; on the contrary when ever this *Equilibrium* between the influent Fluids and Solids is taken away the Animal is in a morbid State; and whatever destroys it in any Point, destroys it in some measure thro' the whole Body.

2. The first and most simple Solids of our Body are perhaps merely terrestrial, incapable of any Change or Disease; of these Elements are constituted the smallest Fibres, of those Fibres the Vessels, of those Vessels the *Viscera* or Organs of the Body; therefore the Weakness and Laxity of the Fibres, Vessels, Viscera, and all Parts of the Body may be consider'd as one Disease, tho' it must be own'd that the Disease is not always universal, and there will be sometimes a Weakness in some Organ with a great Degree of muscular Strength.

3. A Fibre is said to be Weak when the Cohesion of its Parts is so small that it may be broken, or resolv'd by a Force not much greater than what happens commonly in the Body of a healthy Per-

son: Debility of the Vessels or Organs is so small a Cohesion of the constituent Parts as makes them unable to discharge the common Functions of Life, consider'd in a State of Health. Tho' there is a Debility of Fibres in Infants absolutely speaking, yet it is no Disease, because their Fibres being lax, lengthen by the Influx of the Liquids which is the Cause of their Growth; but in adult Persons, when the Fibres cannot any more yield, they must either break or lose their Spring.

4. Laxity of a Fibre is such a small Cohesion of its Parts, as suffers it to be lengthen'd by a small Force: Laxity is a Species of Debility.

5. The most common Causes of Debility of Fibres are, *First*, A Defect or great Loss of the vital nutritious Juices: If there is not Blood enough the Chyle cannot be easily assimilated. A Person who loseth daily great Quantities of Blood turns Dropsical and Leucophlegmatick. An elastick Fibre like a Bow, the more it is extended, restores itself with the greater Force; if the Spring be destroy'd, it is like a Bag only passive as to the Influx of the Liquid. *Secondly*, Nourishment too viscid and glutinous to be subdu'd by the vital Force; of this Sort *Hippocrates* reckoned unfermented Bread. *Thirdly*, A sedentary Life, for Motion increaseth the Circulation of the Juices, and consequently the Application of the solid Parts to one another. *Fourthly*, Too great an Extention of the Fibres by Plenitude; a Lute string will bear a hundred Weight without Rupture; but at the same time cannot exert its Elasticity, take away fifty, and immediately it raiseth the Weight. *Fifthly*, A moist Atmosphere. The Atmosphere is what keeps the Fibres of an Animal Body together, we feel our Fibres grow strict or lax according to the State of the Air; many who live healthy in a dry Air, fall into all the Diseases that depend upon Relaxation in a moist one. *Lastly*, a natural Weakness from the Frame and Constitution of the Body.

6. The

6. The common Signs and Effects of weak Fibres are Paleness, Smoothness, Coldness of the Skin, Colour of the Blood not Florid (for what maketh that is a strong action of the Solids) a weak Pulse, Tumefactions in the whole Body or Parts, Stagnation of Humours, and its consequence Putrefactions; for when the force of the Vessels and Pressure of the Air is taken off, all the Humours expand themselves, and what stagnates must putrify; if a Person of a firm Constitution begins to bloat, and from being warm grows cold, his Fibres grow weak. Anxiety and Palpitations of the Heart are a sign of weak Fibres: Acid Eructations upon taking Vegetable Food, or Nidorose upon taking Animal is a sign of weak Organs of Digestion. Depravation of the Humours from a sound State, to what the Physicians call by the general Name of a Caco-chymy, Spots and Discolorations of the Skin are signs of weak Fibres; for the lateral Vessels which lie out of the Road of Circulation, let gross Humours pass, which could not if the Vessels had their due Degree of stricture. Atrophy as denoting a Destruction or Obstruction of the Vessels, which carry the Nourishment, and Dropsies proceed from a Laxity of the Fibres being too weak to return the Fluid.

7. It is evident that the Aliment of Persons with weak Fibres, ought to be such as requires but a small force to convert it into Animal Substances, such is that mention'd Chap. V. Prop. IV. V. Milk is the Chylous part of an Animal already prepar'd, the Cheesy part is separated and dissolv'd by the Bile, and the more Serous and Spiritous Part enters into the Blood, meer Whey is too relaxing, Eggs taken warm from the Hen; for the most elaborate and spiritous Part is lost in the dressing Broths made of Flesh, which are the Nutritious Animal Juices separated from the solid Parts. The Alkalescent Quality of them may be corrected, it necessa-

ry, by mixing them with some Acid. Decoctions, and Creams, or Gellies of well fermented Bread, (for Fermentation as was hinted Chap. III. Prop. IV. destroys the glutinous oily Viscidity with which mealy Substances abound) austere Wines diluted with Water, which cool more than Water alone, and at the same time do not relax, Vegetables with an acid austere Juice mention'd Chap. V. Prop. IV. VIII. are all proper in this Case. Relaxations from Plenitude is cur'd by spare Diet, and from any Cause by that which is contrary to it. Care must be taken in contracting the Fibres, not to obstruct the Vessels.

P R O P. III.

To explain the Symptoms, Causes, and proper Diet of such as have too strong and too elastick Fibres.

1. A State opposite to the former is too great Rigidity and Elasticity of the Fibres, which is such a Degree of Cohesion as makes them inflexible to the Causes, to which they ought to yield, so as to preserve the Animal in Health: Too great Elasticity is that Quality by which they not only resist against Elongation, but restore themselves with too great Pressure and Force upon the moving Fluid.

Rigidity of the Organs is such a State as makes them resist that Expansion, which is necessary to carry on the Vital Functions. Rigidity of the Vessels and Organs must necessarily follow from Rigidity of the Fibres, both as the Fibres are their constituent Parts, and likewise because by the strong Force of the Heart and Motion of the Fluids, many of the Solids are compacted into one, and the Canals, through which they flow'd, abolish'd as by Prop. VII. Chap. II.

2. True Health consists in such a Flexibility of Fibres as yield to the Force of the Heart, so as to admit the influent Fluid, and then such a due Spring to restore themselves so as to drive it forward; for if the Canals were entirely rigid, or the Force of the Fibres in restoring themselves were either in *Equilibrium* with, or exceeding that of the Heart, there could be no Circulation, even if the Vessels drive back the Blood with too great a Force upon the Heart, it will produce Polypose Concretions in the Ventricles of the Heart, especially when the Valves of the Heart are apt themselves to grow too rigid, if but one Drop of Blood remain in the Heart at every Pulse; those in many Pulses will grow to a considerable Mass.

3. It is easy by the Laws of Hydraulicks to determine the natural Effects of such a Constitution, which is the Parent of acute Diseases, as Laxity of Chronical.

4. The Cause of such a Disease besides the Natural Constitution and Frame of the Body is too long a Continuance of such Diet as strengthens the Fibres, hard Exercise or Labour, such as use it, according to *Hippocrates* are not easily cur'd of Pleurisy; such a Constitution is easily known by the outward appearances of the Body being lean, warm, hairy, scraggy, dry without a Disease, with hard and firm Muscles, for the great Force by which the small Vessels restore themselves, makes them grow narrow, expelling the Liquor they contain, and scarce admitting what is influent by which the Vessels grow hard and contracted; lastly by the Strength of the Pulse, and the Force of the vital Actions.

5. The Rules of Diet for such a Constitution may be drawn from Prop. IV. of the foregoing Chapter. *First*, Abstinence from things us'd in the contrary State of too great Laxity. Milk is too nourishing, but Whey proper as an Emollient. Austere and strong

strong Wines are improper but much more so are inflammable Spirits which harden the Fibres; Water is the proper Drink being strongly relaxing, there is no better way of supplying a Carcass than by drenching it in Water. All Emollient Nourishment, such as Fruits which contain a Mucilage, and may be boil'd into Jellies. Pot Herbs of the Emollient kind, such things as resolve and cleanse, that is take away any tenacious Solid which adheres to the Fibres, such are Vegetable Soaps, the chief of which is Honey. The Animal Food should be prepar'd in Broths rather than in any other form, all things which increase Fat, all oily Substances. The Animal Oils, Cream, Butter, Marrow, farinaceous Substances unfermented, as little Salt in the Aliment as possible, for Salt hardens.

6. From those two Causes of the Laxity and Rigidity of the Fibres, the Methodists an ancient Set of Physicians deriv'd all Diseases of human Bodies with a great deal of Reason, for the Fluids derive their Qualities from the Solids. There seems hardly any other Account to be given of the different Animal Secretions, than the different Configuration, and Action of the solid Parts, which from one Homogeneous Liquor, separate so many various Fluids in an Animal Body; and I am of Opinion, that in most cases where the Juices are in a morbid State, if one could suppose all the unsound Juices taken away, and sound Juices immediately transfus'd, the Quality of the solid Parts remaining the same, after many Circulations the sound Juices would grow morbid. The Methodists err'd in so far as they consider'd the Disease inhering only in the Vascular Solids, and applied their Remedies chiefly to them, not reflecting that the Solids themselves can be changed by working upon the Fluids.

P R O P. IV.

To explain the Causes and proper Diet of Plethorick Constitutions.

The Diseases of the Fluids are first a Plethora, or too great abundance of laudable Juices, the Causes of which are strong Chylopoetick Organs, plenty of wholesome Diet, a middle Age, sanguineous Temperament (of which afterwards) Laziness or want of muscular Motion, moist Air, Suppression of usual Evacuations. The Effects are Impatience of Heat or Labour, Extension of the greater Vessels, Compression of the lesser, Lacerations upon small Causes, a Stoppage of Circulation by too great a weight upon the Heart, Suffocation, &c. the Remedies for this Constitution are opposite to the Causes of it, spare Diet, Exercise and proper Evacuations, only it must be observ'd that Plethorick Bodies are not to be cur'd by long Abstinence; because in that case the most liquid parts fly off, and the grosser remain: Blood-letting removes a Symptom, but often increases the force of the Chylopoetick Organs, and consequently the Disease.

P R O P. V.

To explain the Symptoms and proper Diet of sanguineous Constitutions.

1. A sanguineous Constitution (in the common Acceptation of the word) that is of a Person who abounds with blood is different from a Plethorick; the common outward Sign of such a Constitution is a florid Appearance in the Countenance, a Blueness and Fulness of the Veins, Softness of the Flesh, a particular, vivid, fair, but not pale Colour of the Skin, such a Constitution with a great Appearance of Health is subject to many Diseases.

2. The

2. The Blood as was observed, Prop. V. Chap. II. consists of red Globules swimming in a thin Liquor call'd Serum, the red part is smallest in quantity. The red Globules are Elastick, and will break, one red Globule into six small, and then they will turn yellow, those yellow Globules break into others still smaller, and then they grow more white and transparent; the Vessels, which admit the smaller Globules, cannot admit the greater without a Disease. Therefore as the Blood passeth through narrower Channels, the Redness disappears more and more. All the Chyle is white, and acquires this red Colour by Circulation. A free and strong Projectile Motion of the Blood must occasion a florid Appearance upon the Skin in such Constitutions, because a stronger Motion forceth the red part into more capillary Vessels. To which likewise there is commonly another Cause that concurs, the greater Transparency of the Vessels occasioned by the Thinness and Delicacy of their Coats. That this is the Case of sanguineous Persons is plain from their great Veins appearing blue and transparent by the Colour of the Blood in them.

3. Therefore such Persons seem to be susceptible of Diseases, that depend upon a strong projectile Motion of the Blood, and too great Thinness and Delicacy of the Vessels; by the first they are subject to Inflammatory Distempers, for the greater Action or Reaction of the Fluids and Solids produceth a greater Attrition, to which Heat is proportional: This great Attrition must produce a great Propensity to the putrescent alkaline Condition of the Fluids, and consequently to Suppuration: a stronger projectile Motion of the Blood, must likewise occasion greater Secretions, and loss of liquid Parts; and from thence perhaps Spissitude and coreaceous Concretions, which are always found in Animals that die of too strong a Circulation,

If the Vessels are in a state of too great Rigidity so as not to yield, a strong projectile Motion occasions their Rupture and Hæmorrhagies, especially in the Lungs, where the Blood is abundant; if the Vessels instead of breaking yield, it subjects the Person to all the Inconveniences of an erroneous Circulation, (that is, when the Blood strays into the Vessels destin'd to carry Serum or Lymph, according to *Prop. V. Chap. II.*) From whence will follow Obstructions and Inflammations, and as the Thinness and Delicacy of the Vessels probably reigns through the whole System, it must affect the Glands and Lymphatick, as well as the Blood Vessels; and such Constitutions must be subject to glandulous Tumours and Ruptures of the Lymphatick, and all the Diseases thereon dependent.

4. The natural Helps from Diet are first Moderation in the Quantity, and all things which relax the Veins; for what does so, prevents too vigorous a Motion through the Arteries: Therefore relaxing and cooling are proper intentions in the Diet, only where there are Signs of too great a Thinness in the Fluids. Subacid Substances are proper, though they are a little Astringent; for Persons who take a great deal of Vinegar, abate their florid Colour, which is the Disease of such a Constitution.

For such Diet the Reader is referr'd to the foregoing Chapter.

A Saline Constitution of the Fluids is either Acid, Alkaline, or Muriatick, as in the Sea-Scurvy: Of these in their Turns.

P R O P. VI.

To explain the Symptoms, Causes, and proper Diet of Acid Constitutions.

1. It has been demonstrated before, that the Juices of a sound Animal, are neither Acid or Alkaline, by the Experiments mention'd *Chapter IV.* All the Substances Fluid, and Solid, of an Animal fed, even with acescent Substances, yield by Fire, nothing but Alkaline Salts. Those Experiments which endeavour to shew the contrary, have been made upon Animals, which had taken much Sea-Salt, which is never totally changed in an Animal Body. The ingenious and learned *Boerhaave* fed a Sparrow with Bread four Days, in which time it eat more than its own weight, and yet there was no Acid found in its Body or Excrements. The reason of this is, that the vital Force of a sound Animal is capable to transmute the Acid Substances it takes in Aliment, into soft nutritious animal Liquids by its vital Force (by which is understood the sum of all those Powers in an Animal Body, which converts its Aliment into Fluids of its own Nature) a Cow fed with Trefoil, Daïsies, Sorrel, gives Milk, in which there is not the least Acidity; but if this vital Force is weak, it is insufficient to subdue the Acidity of the Substances taken by the Mouth. The Liquors, which are made of fermented Plants, as Wine and Malt Liquors standing in a Heat not greater than that of a human Body, turn sour; and so they will in a human Body that has not sufficient vital Force to change them, which makes no more alteration in such Substances, than a Vessel with the same degree of Heat and Moisture. Thus weak Stomachs vomit up the Wine that they drink in too great Quantities to be digested, in the form of Vinegar. Put Bread into the Stomach of a dying Man, and it will follow its own Nature,
and

and undergo the Alteration that is merely the Effect of Heat. A weak Stomach will turn Rye-Bread into Vinegar, and a Plough-Man will digest it. Mealy Substances fermented turn sour, and unfermented Being mix'd with a small Quantity of Water, they turn viscid, and then hard like Stones: accordingly given to a weak Child they still retain their Nature: for Bread will give him the Cholick, and unfermented farinaceous Substances will fill his Belly with a viscid Humour.

2. As no Acid is naturally in an Animal Body, but must be taken in by the Mouth; so if it is not subdu'd in the Passages of the Chyle, it may get into the Blood; and if there is not a sufficient Quantity of Blood, and strength of Circulation to subdue it, it may infect the whole Mass of the Fluids; but this is a morbid State. The Experiments made upon Chyle have never discover'd any Acidity in it; but the Subject of these Experiments has been always the Chyle of healthy Animals.

3. The first and principal Seat of Acidity is the Stomach; this Quality of the Chyle is in some measure taken off in the *Duodenum*, and by the Mixture of Bile with it, grows less in the other Parts of the Alimentary Duct, and still less in the Thoracick Duct, because great Quantities of Animal Liquors have been mix'd with it; but at last it may (as was said before) infect the Blood: Thus it is found by Experience, that the Sweat is sometimes acid, which is a Sign of Recovery after acute Distempers, where the Blood was in the contrary alkalescent Disposition.

4. The Antecedent Concomitants and Effects of such a Constitution, are Acids taken in too great Quantities: Sour Eructations, a craving Appetite, especially of terrestrial and absorbent Substances, the Case of Girls in the Green Sickness, Sourness in the Stomach, Pain in the Stomach (which tho' sometimes occasion'd by an acrid Bile, this Cause

Cause may be distinguish'd by the Absence of other Symptoms) colical Pains about the Navel, the *West-India* dry Gripes are perhaps occasion'd by the too great Quantities of Acids, as Lime-Juice in Punch. The Colicks of Infants proceed from Acidity, and the Air in the Aliment expanding itself while the Aliment ferments; for Oil of Vitriol will throw the Stomach into involuntary Contractions, inactivity and change of colour in the Bile; for Acids change the colour and consistence of it. Bile is the chief Instrument of Digestion, and as was said before, *Prop. V. Chap. I.* can attenuate the cheesy Substance in the Stomach of a Calf, and render it fluid; hence bilious Constitutions easily digest Cheese, a sour Smell of the Fæces (when the Bile is redundant, they smell cadaverous) acid Sweats, Paleness of the Skin; for as was observ'd before, taking much Vinegar will make the Lips pale. It is possible that Tumours in the Breasts may be the Effect of Acidity in the Milk, and Convulsions in Infants may be occasion'd from Acidity passing into the Blood, and affecting the tender Fibres of the Brain. Some Sorts of cutaneous Eruptions are occasion'd by feeding much on acid unripe Fruits, and farinaceous Substances.

§. Acidity, as it is not the natural State of the Animal Fluids, but induc'd by Aliment, is to be cur'd by Aliment, with the contrary Qualities; for which the Reader is referr'd to the foregoing Chapter. Anti-acid Medicines are ineffectual without a Diet of the same Kind; all Animal Diet is Alkallescent, especially such as feed upon other Animals, as Insects, Fish; and especially Shell-Fish. Acidity in the Infant may be cur'd by a Flesh-Diet; in the Nurse. There are a great many anti-acid Vegetables which do not easily ferment, but putrify, as all the warm Anti-scorbuticks: Selery, Asparagus, Cabbage, Turnips, Carrots, Onions, Leeks, Radishes, Mustard, Eringo-Roots and Nettles, are
Anti-

Anti-acid. In Cases of Acidity, Water is the proper Drink, its Quality of relaxing too much may be corrected by boiling it with some Animal Substances, as Ivory, Harts-horn: Abstinence from fermented Liquors is necessary.

6. This Distemper is most incident to Children, because of the Debility of their Fibres and Milk-Diet; to such as lead a sedentary Life; to those who take much Bread and Wine; and vegetable Acids, to Girls dispos'd to the Green-Sickness, and to Artificers who deal in the Preparations of Acids, as Distillers, Dyers.

P R O P. VII.

To explain the Symptoms, Causes, and proper Diet of Constitutions, which abound with a spontaneous Alkali.

1. A Constitution opposite to the former is that which abounds with a spontaneous Alkali. No Animal unputrify'd being burnt, yields any alkaline Salt, but putrify'd yields a volatile Alkali, therefore in a healthy Animal no true Alkali is found; but as an Animal degenerates from this State, by such Diseases as increase the Attrition and Heat of the Fluids, the Animal Salts formerly benign approach towards an alkaline Nature. Human Blood, when it is first let, is mild, and will not make the Eye or a fresh Wound smart. Let it stand in a Degree of Heat equal to that of a Human Body, it will grow in three Days, fetid, the Salt of it volatile and alkaline fermenting with Acids, the Oil that remains volatile and rancid; the Blood in the Vessels may at last arrive at the same State, but must pass thro' infinite Degrees, and before it comes to the last, the Animal will be destroy'd. All Animal Substances expos'd to the Air turn Alkaline of their own accord, and some Vegetables by Heat will not turn acid but alkaline: Every Plant in that State of Putrefaction by

Prop. III. Chap. I. is converted as it were into an Animal Substance, by Chymical Trials yielding the same Contents.

2. The Causes of such a Distemper, is a Diet of alkalescent Substances. If a Woman should live upon Vegetables, Bread, and fermented Liquors, her Milk would be aced or ready to turn sour; if only on Animal Food her Milk wou'd be apt to turn fetid and putrid, but not sour.

If it was possible to take Mustard in great Quantities, it would quickly bring the Blood into this alkaline State, and destroy the Animal; the warm antiscorbutical Plants taken in Quantities will occasion stinking Breath, and corrupt the Blood. All Animals that live upon other Animals have their Juices more alkalescent than such as live upon Vegetables, and for that Reason perhaps Fishes have this Quality more than terrestrial Animals; for in the open Air they putrify sooner, by what was said *Prop. I. Chap. IV.* An Animal with a strong vital Force of Digestion will turn Acids into Animal Substances; but if its Food be intirely alkalescent, its Juices will be more so. No Person is able to support a Diet of Flesh and Water without Acids, as Salt, Vinegar, and Bread, without falling into a putrid Fever. If his Diet consisted of Snails, Fish, especially their Livers, Shell-Fish, Vipers, ravenous Birds, as some who feed upon Insects and alkalescent Vegetables, the Effect would happen sooner. Eggs and *Spanish Wines*, taken in great Quantities without Exercise, will occasion a Fever. Abundance of good Blood and laudable Juices dispose towards this alkalescent State. Likewise long Abstinence, (by which the Fluids are depriv'd of a Dilution of the cooling Emulsion of fresh Chyle. See *Prop. VIII. Chap. II.*) great Strength of the Bowels, and a right State and Abundance of Bile. Bile is an anti-acid. Another Cause is a vigorous Action of the Vessels, through which the Juices

Juices circulate, which is the Reason strong healthy and young People are more in peril by pestilential Fevers, than the Weak and Old.

Violent Animal Motion produceth this alkaline State. Two hard Bones rubb'd hard against one another, or with a File, produce a fetid Smell. It is possible to produce a Gangrene by strong Friction, and yet Stagnation of the Fluids turns them putrid.

The Effects of such an alkalescent State in any great Degree, are Thirst, and a Dejection of Appetite, which putrid Things occasion more than any other; (those who are troubled with Acidity have often a bad Digestion, but a craving Appetite, nidorose Eructations, which are different from acid: Foulness of the Tongue and Palate, a bitter and hot Taste in the Mouth, Thirst, Sickness, Loathing, bilious Vomitings and Dejections of a cadaverous Smell, iliacal Pains with Heat. These are the Effects of it in the alimentary Diet. Such a State dissolves the Blood, and disposeth it towards Putrefaction, hinders Nutrition; for no Chicken can be hatch'd of a rotten Egg, the Blood turning acrimonious corrodes the Vessels producing Hemorrhages, Pustules red, lead-colour'd, black and gangrenous, and almost all Diseases of the inflammatory Kind.

3. The Aliment of such Persons ought to be acescent Substances, as Bread, Vinegar, such as are describ'd in the foregoing Chapter. Acids keep Animal Substances from Putrefaction; for neither Blood, Flesh or Fat will putrify in Vinegar or sour Wine: The Effect of the strongest Acids, even Oil of Vitriol in putrid Fevers, is known by Experience, in which your alkaline Spirits must be hurtful, farinaceous Things, especially such as are made of Oats, are proper as having an acescent Quality; it is a common Mistake that People in such a State should forbear Wine. Thin Wines, as Rhenish, Moselle mix'd with Water are proper

in a Fever. But when the Distemper is attended with great Heat, Milk mixed with Water is the properest Drink. The properest Seasoning is Saltpetre; Sea-salt creates Thirst, Water is the only Diluent; but as it has no Acidity in it, it is better mix'd with Limon, or with the Rob or Jelly of some acid Fruit, sometimes the demulcent Aliment mention'd *Prop. IV.* of the foregoing Chapter, will be of great Use.

The muriatick Scurvy induced commonly by too great Quantity of Sea-Salt, and common among Mariners, is rather an artificial than a natural Disease, spontaneous only in few who have a great Disposition towards it. Its common Symptoms are a saline Taste in the Spittle, Itching and red Erosions of the Skin, great Thirst, Dryness of the Skin, a lixivial Urine sometimes with a fatty Substance like a thin Skirt a-top, Relief from watery and acid Substances. The Cure of this Distemper lies in a Diet of fresh unsalted Things, watery Liquors acidulated, farinaceous emollient Substances, sour Milk, Butter-Milk, acid Fruits, and avoiding of the hot Antiscorbuticks of the Mustard Kind, the Rule of Diet is not much different from that in the alkaline Scurvy before mention'd.

5. It is of great Importance to know whether cutaneous Distempers proceed from an acid or alkaline Cause, because, according to the difference of the Cause, there must be quite opposite Methods of Cure; they may be distinguish'd first by the difference of the Diet that occasion'd them, crude Aliment, farinaceous Substances, unripe Fruits, and other Acelcents will sometimes produce the Scurvy and Itch, and even Leprosies depending on the same Cause, in which volatile Salts, and such as are taken from Animal Substances are indicated. Secondly, From the Absence of the concomitant Symptoms of the one, and the other: in the acid Acrimony, there is not Thirst, Heat, nor so great a De-

a Dejection of Appetite as in the Alkaline. *Thirdly*, The Erosions of the Skin are not of so deep a Colour in the Acid as Alkaline. In general, an Attention to the Symptoms before enumerated may be a Guide to the Diet.

6. Another Constitution of the Fluids of a Human Body, may be properly call'd Glutinous or Phlegmatick: Phlegm amongst the Antients signified a cold viscous Humour contrary to the Etymology of the Word which comes from *φλέγω*, to burn; but amongst them there were two Sorts of Phlegm, cold and hot. A cold Tumor they call'd simply Phlegmonem; when it came from glutinous Blood, they call'd it Phlegmonem Phlegmenodem.

7. Phlegm or Pituite is a Sort of semi-fluid, it being so far solid, that one Part draws along several other Parts adhering to it, which doth not happen in a perfect Fluid, and yet no Part will draw the whole Mass, as happens in a perfect Solid.

8. The Pituite or Mucus secern'd in the Nose, Mouth, Palate, Stomach, Intestines, and Wind-Pipe, is not an excrementitious but a laudable Humour, necessary for defending those Parts from which it is secern'd, from Excoriations, as happens in the Nose, when the Pituite is too thin. The Want of it in the Wine-Pipe occasions Hoarseness, in the Gullet and Difficulty of Swallowing. The Pituite defends the Intestines from the Acrimony of the Ingesta, and lubricates the Extremities of the Joints. Therefore those are mistaken who imagine that Phlegm cannot be too much purg'd off; but when the Phlegm is either too viscous, or separates in too great a Quantity, it brings the Body into a morbid State; this viscous Phlegm seems to be the vitrious Pituite of the Antients.

9. The first Seat of it is the alimentary Duct where it creates Crudity, Dejection of Appetite, a Sense of Repletion and Sickness; for it hinders the natural Contraction of the Fibres, and that Sense

of Irritation which produceth Hunger. A Sensation of Fulness without eating is a sure Sign of a phlegmatick Stomach. In the Intestines it occasions a Tumour of the Belly, with an Atrophy in the rest of the Body; for the viscous Crust stops the Entry of the Chyle into the Lacteals. The Case of rickety Children. In the Body it often affects the Lungs, Phlegm may be so concocted in the Lungs by the Evaporation of its most liquid Parts as to shut up the Passages of the Bronchea, and it makes Paleness in the Skin; for as it was observ'd before, our Aliment in the form of Chyle before it circulates with the Blood is whitish, by the Force of Circulation, it runs through all the intermediate Colours, till it settles in an intense Red; as much as the Force of Circulation is deficient, so much will the Blood fall short of that florid Colour, and Persons in that Condition are call'd Leucophlegmatick; from this Phlegm proceed white cold Tumors, Viscidity, and consequently Immeability of the Juices; hence Lethargies in old People.

10. The Causes of this phlegmatick Constitution are, *First*, Viscid Aliment as of unripe Fruits, farinaceous Substances unfermented and taken in great Quantities. The Flowers of Grains mix'd with Water will make a sort of Glue. Meals have an Oil in them which makes their Parts adhere. *Secondly*, Great Loss or Want of Blood which is a natural Soap, preserving itself and the Aliment from Coagulation by constant Motion. *Thirdly*, Weakness and Indigestion in the alimentary Duct which leaves the Aliment viscous. *Fourthly*, A Defect or bad Constitution of the Bile (which is the chief Resolvent of the Aliment) phlegmatick and bilious Constitutions are opposite. *Fifthly*, Dissipation of the most fluid Parts by Heat or some great Evacuation, therefore profuse Sweats, and Fluxes of Urine dispose towards this Constitution by thickening the Phlegm. *Sixthly*, Stagnation
from

from the Debility of Instruments of Excretion, for if the Pituite stagnates, it must grow viscid from Heat. These are the Causes and Symptoms of a phlegmatick cold Constitution, but Spissitude attended with Heat, grows inflammatory.

11. The Symptoms point to the Cure. All the Methods of attenuating, mention'd *Chap V. Prop. IV.* well fermented Bread, and well fermented Liquors, Fermentation destroys the Viscidity of farinaceous Substances. High season'd Aliment is proper for Phlegmatics. Spices, Onions, Garlick, dissolve Viscidity. Water impregnated with some stimulating Substance which both dilutes and attenuates. Hot Mineral Waters are the best Dissolvers of Phlegm. All Sorts of Nourishment which promote Heat, and a vigorous Motion of the Blood, and for that Reason Broths made of the most volatile and alkalescent Parts of Animals.

12. A Disease opposite to this Spissitude is too great Fluidity, the Symptoms of which are Excess of Animal Secretions, as of Perspiration, Sweat, Urine, Liquid, Dejectures, Leanness, Weakness, and Thirst. The Methods in such a Case must be opposite to the former. Farinaceous Substances, and watery Liquors, unfermented Gellies of Animal and Vegetable Substances, all such Things as are describ'd *Prop. IV. Chap. V.*

13. Another Constitution is the oily or fat; Animal Fat is a Sort of amphibious Substance, it is scissile like a Solid, resolvable by Heat not greater than what is incident to Human Bodies circumscrib'd and contain'd in proper Vessels, like a Fluid. The Symptoms of this Constitution are too manifest to want a Description, it co-incides often with the plethorick and phlegmarick Constitutions above describ'd. It is but one Species of Corpulency, for there may be Bulk without Fat, from the great Quantity of muscular Flesh, the Case of

robust People. An Animal in the Course of hard Labour seems to be nothing, but Vessels, Bones and muscular Flesh. Let the same Animal continue long in Rest, it will perhaps double in Weight and Bulk. This Superaddition is nothing but Fat or Oil, and in this Sense an Animal perhaps never arrives at its full Growth.

14. The common Causes of this Distemper are a particular, and perhaps a gentilitious Disposition of Body, which seems to consist in the Chylopoetick or Organs of the first Digestion being strong, and the Fibres of the circulating Vessels, especially those about the *Panniculus carnosus* being lax, according to the Doctrine of the Second Chapter. By the Action of the Fibres of the Vessels upon the Fluids the oily Parts of the Chyle are intimately mix'd with the Blood, which by *Prop. III. Chap. II.* will swim a-top of it several Hours after Repast; when this Action is not strong enough, and the Chyle extremely copious, perhaps the thicker Oil is never entirely lubdu'd; some Sorts of cramm'd Fowl have always a milky Juice swimming a-top of their Blood. *Secondly*, Quantities of oily Nourishment, Milk, Butter, and oily fermented Liquors. *Thirdly*, All Things which occasion Coldness in the Skin so as to stop Perspiration, by which the oily Parts are congeal'd, which Heat resolves and attenuates. The Inhabitants of cold moist Countries are generally more fat than those of warm and dry; but the most common Cause is too great a Quantity of Food, and too small a Quantity of Motion, in plain *Englisk*, Gluttony, and Laziness. I am of Opinion that spare Diet and Labour will keep Constitutions, where this Disposition is the strongest, from being fat. You may see in an Army forty thousand Foot-Soldiers without a fat Man amongst them; and I dare affirm that by Plenty and Rest, twenty of the forty shall grow fat.

15. The Oil in Animals is necessary for many Purposes; in all for Motion, in some for Nourishment; such accumulate Fat in the Summer which serves to refresh the Blood in the Penury of Aliment during the Winter, and for that purpose some Animals have a quadruple Omentum. But the too great abundance of Fat subjects Human Constitutions to the following Inconveniencies.

16. *First*, It hinders the Motion of the Joints by making them more heavy by filling the Spaces, occupy'd by the Muscles when they contract and swell. *Secondly*, It subjects them to all the Diseases depending upon a defective projectile Motion of the Blood; for the Blood flows through the Vessels by the Excess of the Force of the Heart above the incumbent Pressure, which in fat People is excessive; and as want of a due Quantity of Motion of the Fluids increaseth Fat, the Disease is the Cause of itself. *Thirdly*, To Suppurations, of which the *Membrana adiposa* is the chief Seat. *Fourthly*, To danger in inflammatory Distempers, a Fever resolves many Things which stagnate, and amongst others the Fat, which being mix'd with the Blood turns volatile, and occasions an Acrimony much more dangerous than the saline; for Salts can be diluted with Water which Oils cannot. That the Fat is dissolv'd by Fevers, is evident from the great loss of Fat, which People undergo in Fevers. Amongst those and many other bad Effects of this oily Constitution, there is one Advantage that such of them who arrive to an advanc'd Age, are not subject to the Stricture and Hardness of Fibres, the Effect of old Age.

17. The Causes above mention'd lead directly to the Cure; as it is the Product of Gluttony and Laziness, Exercise and Abstinence is the Antidote; it has been observ'd that a feverish Heat resolves Fat, and therefore what produceth this Effect

fect in a small Degree so as not to endanger the Life of the Patient, must be proper, such are all acrid and stimulating Substances. Salt, Pepper, Garlick, Onions, Vinegar, &c. taken in Quantities will produce a momentary Fever. Salt taken in great Quantities will reduce an Animal Body to the great Extremity of Aridity or Dryness. The Ancients were so sensible of the Force of Stimulating in this Case, that the celebrated Remedy against Fat was a certain Quantity of the Vinegar of Squills taken every Morning; for the same Reason, saponaceous Substances, as Sugar, Honey, the Juices of ripe Fruits, Pot Herbs with Abstinence from fat Meat, and even an entire Milk-Diet by its Thinness are very effectual. Unfermented watry Liquors are hurtful only as they relax, but on the other hand Quantities of oily fermented Liquors commonly increase the Disease. All Things which promote the Animal Secretions, especially Sweat, and insensible Perspiration, and for that Purpose even Water taken in Quantities is sometimes useful. Salts mix'd with Fat harden it, and acid Things congeal Oil; Spirit of Nitre will turn Oil of Olives into a Sort of fatty Substance; but Acids may be us'd as stimulating. If acid Things were us'd only as Coolers, they would not be so proper in this Case, in which it is necessary to keep up a considerable Degree of Heat; but for their foremention'd Qualities they are strongly indicated in the inflammatory Distempers of fat People, where the Oil disposeth to a rancid Putrefaction; but Abstinence being the chief dietetick Method of preventing or curing the Disease, leads me to say somewhat of the Quantity of Aliment in general.

18. By *Prop. VIII. Chap. II.* The frequent Repetition of Aliment is necessary, not only for repairing the Fluids and Solids, but to keep the Fluids from the putrescent alkaline State, which they

they acquire by constant Attrition without being diluted; from whence it follows, *First*, That long Abstinence may be the Parent of great Diseases, especially in hot bilious Constitutions, and extremely painful to acid Constitutions by the uneasy Sensation it creates in the Stomach. *Secondly*, That the Quantity of Aliment necessary to keep the Animal in a due State of Vigour, ought to be divided into Meals at proper Intervals in the natural Day, by which Method neither the chylopoetick Organs, nor the Blood-Vessels are overcharg'd, nor the Juices depriv'd too long of fresh Recruits of Chyle. *Sanctorius* confirms this Maxim in his Doctrine of Perspiration.

19. The great Secret of Health is keeping the Fluids in due Proportion to the Capacity and Strength of the Channels through which they pass; but the Danger is less when the Quantity of the Fluid is too small; than when it is too great, for a smaller Quantity of Fluid will pass where a larger cannot, but not contrariwise.

20. When the Quantity of the Fluid is too small, the elastick Power of the Canal (in which Life consists) exerts it self with too great a Strength upon the Fluid. In which Case there must follow too great a Dissipation of the Fluid, Dryness and a gradual Decay. In too great Repletion either the elastick Force of the Tube is totally destroy'd; or if it continue proportional to the Degree of Extension like a Bow too strongly drawn, it throws the Fluid with too great a projectile Force forward through the Vessels, and back upon the Heart, and subjects the Animal to all the Diseases depending upon a Plethory, and may bring it into immediate Danger. Therefore the Diseases depending upon Repletion are more acute and dangerous than those that depend upon the contrary State. The Instances of Longevity are chiefly amongst the Abstemious.

stemious Abstinence in Extremity will prove a mortal Disease, but the Experiments of it are very rare.

21. Such as have an imperfect Circulation through any Organ of the Body, should never charge their Vessels with too great a Quantity of Chyle, this was observ'd *Prop. II. Chap. II.* of the Lungs, and is equally true in any other Case, as in Head-aches, which eating little relieves, and eating and drinking much occasions. A Sensation of Drowsiness, Oppression, Heaviness and Lassitude are Signs of a too plentiful Meal, especially in young People.

22. The Measure of insensible Perspiration discover'd by weighing is the best Rule of Diet; therefore in fat People the Use of vaporose or perspirable Food, and exercise (both which increase Perspiration) are proper.

23. The Constitution of the Air disposeth the Inhabitants of one Country more to be fat than that of another. *Sanctorius's* Experiment of Perspiration being to the other Secretions as 5 to 3 does not hold in this Country, except in the hottest Time of Summer; so that the Action of *Panduan* Air in promoting Perspiration the whole Year round, is equal to ours in the Month of *August*.

24. From the foregoing Doctrine, a common Case both of fat and lean Men having great Stomachs may be accounted for: by the last having a great Perspiration, and some of the perspirable Matter in the first not sufficiently attenuated, stopping at the Surface of the Skin, and as it were carried about him. Hunger is only a Warning of the Vessels being in such a State of Vacuity as to require a fresh Supply of Aliment, after Secretions, the Vessels of the fat and lean Man are equally empty; for the Fat is as much out of the Thread of Circulation as what is evaporated, and perhaps the Fat in that Case becomes like a
morbid

morbid Excrescence, requiring a superfluous Nutrition.

25. Infants and old People support Abstinence worst. The first from the Quantity of Aliment consum'd in Accretion, the last from their Weakness, and the small Quantity of Aliment taken at once. The Middle-aged support it the best, because of the oily Parts abounding in the Blood.

26. From the foregoing Principles follow naturally the Hippocratical Rules of Diet in Fevers; of giving more or less, more thick, or more thin Aliment, according to the foreseen time of the Duration of the Fever; for Example, in an Ephemera none, because of its Termination in one Day, in a Fever of four Days Duration less than in one of eight. And as the Fever comes to its Height still subtracting from the Quantity of Aliment, and making it more diluent and thin.

27. We come now to what we may call the earthy or atrabilarian Constitution, where the spirituous and most fluid Parts of the Blood are dissipated, that is the Spirit, Water and subtile Oil so much evaporated, as to leave the Salts, Earth, and grosser Oil in too great a Proportion. The Blood grows darkish and thick, such a Constitution the Ancients call'd Atrabilarian or melancholick: Melancholy, signifying in *Greek*, black Gall; whether there be any such Humour as black Gall, is only a Dispute about Words. *Hippocrates* gave such an Humour this Name, and that is sufficient; besides it is matter of fact, that in the Extremity of this Disease, the Gall itself will turn of a blackish Colour, and the Blood verge towards a pitchy Consistence.

28. The Signs of a Tendency to such a State, are Darkness or Lividity of the Countenance, Dryness of the Skin, Leanness, a penetrating quick Genius, a slow Pulse and Respiration. The Causes of it are all such as expel the most volatile Parts
of

of the Blood, and fix the Residue: Great Applications of the Mind to one Object, either such as produce Sadness or great Joy, both which equally dissipate the Spirits, and immoderate Exercise in hot Air with unquench'd Thirst: Aliments of hard Digestion, as dry'd and salted Flesh, unripe Fruits, farinaceous Substances unfermented, and likewise immoderate Use of spirituous Liquors.

The Effects of such a vapid and viscous Constitution of Blood, are Stagnation, Obstructions, Acrimony, Putrefactions, Viscidity, and imperfect Secretion of the Gall, a defective Circulation, especially in the lateral Branches destined to separate the more fluid Parts, and therefore viscous, and sparing Secretions in the Glands: The Blood moving too slowly through the celiack and mesenterick Arteries, produce various Complaints in the lower Bowels and Hypochondres; from whence such Persons are call'd Hypochondriack: Such as Sensation of Weight, Anxiety and Repletion, a bad Digestion; from whence different Kinds of Aliment acquire such a State as they affect of their own Nature, acescent, if the Diet is of acid Vegetables, and alkaline or nidorose, if of Animal Substances, especially Fat, which remains rancid to as the Spittle will sometimes flame in the Fire. This Indigestion proceeds from the Inactivity of the Gall, which likewise occasions a Constipation of the Belly, and a Difficulty of being purg'd. The Urine is sometimes limpid, sometimes thick, which latter is often a Sign of Recovery. The Obstruction of the Pituite in the lower Belly, forceth it upon the salivary Glands, and produceth Spitting.

29. Such a State of the Fluids at last affects the tender capillary Vessels of the Brain by the Viscidity and Immeability of the Matter impacted in them, and disorders the Imagination, and at last produceth

produceth Corruption in the Bowels of the lower Belly.

30. It is plain, that the Removal of such a Disease is not to be attempted by active Remedies, any more than a Thorn in the Flesh, or pitchy Matter adhering to a Thread of Silk is to be taken away by Violence; what is viscid, ought to be gently attenuated, diluted and carried off. That all Substances, which do heat, will still dissipate the Fluid Parts more, and consequently increase the Disease. Therefore Water impregnated with some penetrating Salt, is found to have great Effects in this Distemper. The Diet ought to be opposite to the particular Acrimony, whether acid or alkaline, which it is easy to guess at by No. 5. of this Proposition. It ought to be demulcent, in both Cases light, and of easy Digestion, moistening and resolvent of the Bile; of such Nature are vegetable Soaps, as Honey, and the Juices of ripe Fruits, some of the cooling, lactescent, papescent Plants, as Cichory, Lettuce, Dandelion, which are found effectual in hot Countries. The Diet proper for all the Intensions in this Case, the Reader may see in the foregoing Chapter.

P R O P. VIII.

To draw a few general Inferences from the foregoing Doctrine.

From the Doctrine of this short Essay, it is as easy to determine the Rules of Diet in the different natural States, as in the different morbid States of a Human Body.

1. By *Prop. VII. Chap. II.* Infancy and Childhood demand thin copious nourishing Aliment, such as lengthens their Fibres without breaking or hardening, because of their Weakness and State of Accretion. Milk has all those Qualities.

2. By

2. By *Prop. IV. Chap. II.* The Solidity, Quantity and Strength of the Aliment is to be proportion'd to the Labour or Quantity of muscular Motion, which in Youth is greater than any other Age, upon which Account a strong and solid Diet would seem to be indicated; but as that Age is still in a State of Accretion, their Diet ought still to be emollient, and relaxing, copious, and without Acrimony.

3. The Diet of a Human Creature full grown, and in the State of Manhood ought to be solid, with a sufficient Degree of Tenacity, without Acrimony, their chief Drink Water cold, because in such a State it has its own natural Spirit and Air, (which Heat destroys) with a Quantity of fermented Liquors proportion'd to their natural Constitutions.

4. The Course of the Fluids through the vascular Solids, and the common Animal Functions without any Violence, must in length of Time harden the Fibres, abolish many of the Canals, and make the Solids grow together; from whence Dryness, Weakness, Immobility, Debility of the vital Force both of the first and second Digestion. Loss of Teeth, Depravation of Mastication, the Condition of old Age, which therefore demands a Diet resembling that of Childhood often repeated, but not so copious in Proportion to the Bulk, emollient and diluting.

5. From the Doctrine of the fifth Chapter, it is likewise easy to determine the Inconveniences arising from the Excess of any one sort of Diet. Too much Sea-salt produceth Thirst, Hoarseness, Acrimony in the Serum (which destroys its soft nutritious Quality) Erosion of the small Fibres, Pains, and all the Symptoms of the muriatick Scurvy.

6. Acids taken in too great Quantities, especially such as are austere, as unripe Fruits, produce too great a Stricture of the Fibres, incrassate and coagulate the Fluids; from whence Pains, Rheumatism

matism and Gout, Paleness, Itch, and other Eruptions of the Skin: Substances extremely stiptick are hurtful to the Nerves, and occasion Palsies.

7. Spices in too great Quantities occasion Thirst; Dryness and Heat, quicken the Pulse, and accelerate the Motion of the Blood, dissipate the Fluids; from whence Leanness, Pains in the Stomach, Loathings, and Fevers.

8. Strong Liquors, especially inflammable Spirits, taken in great Quantities; intoxicate, constrict, harden, dry, and stimulate the Fibres, and coagulate the Fluids. They corrode and destroy the inward Coat of the Stomach and Intestines, and if Digestion be a Putrefaction, Spirits must by their natural Quality hinder that * they produce Debility, Flatulency, Obstructions, especially in the Liver, Fevers, Leucophlegmacy, and Dropsies, as by their stimulating they raise the Spirits for a Moment, to which succeeds a proportional Depression; they create a Habit and Necessity of continuing the same Course, and increasing the Quantity. Liquors in the Act of Fermentation, as Must and new Ale, are apt to produce Spasms in the Stomach, Cholick and Diarrhæas.

9. A Diet of viscid Aliment creates Flatulency and Crudities in the Stomach, Obstructions in the small Vessels of the Intestines, in the Mouths of the Lacteals and Glands, Tumors and Hardness of the Belly, Coldness, Paleness of the Skin, and Viscidity in the Fluids.

10. A Diet of oily Nourishment relaxeth the Solids, and particularly the Stomach and the Intestines, (Monks who take a great deal of Oil are subject to intestinal Hernias) it creates nidrose Eructations, Loathings, Oily and bitter Vomitings, ob-

* Vid. *Whifelton's Anatomy.*

structs the capillary Vessels by hindering the Entrance of the watery and fluid Part, with which it will not mix; it creates Thirst and Inflammations.

11. A constant Adherence to one sort of Diet, may have bad Effects on any Constitution. Nature has provided a great Variety of Nourishment for Human Creatures, and furnish'd us with Appetites to desire, and Organs to digest them (there is a most curious Bill of Fair in Sir *Hans Sloan's* Natural History of *Jamaica*) as Aliments have different Qualities; a constant Adherence to one Sort, may make the Constitution verge to some of the Extremes mention'd in this Chapter; for healthy People, *Celsus's* Rule I. Chap. I. is a good one, *Sanus homo qui bene valet & suæ spontis est, nullis obligare se Legibus debet, nullum cibi genus fugere quo populus utitur, interdum in convivio esse, interdum ab eo se abstinere, modo plus, modo amplius assumere, &c.* The Sense of the whole Passage, is, That a healthy Man under his own Government, ought not to tie himself up to strict Rules, nor to abstain from any Sort of Food in common Use, that he ought sometimes to feast, sometimes to fast, sometimes to sleep, sometimes to watch more than ordinary, &c. An unerring Regularity is almost impracticable, and the swerving from it, when it is grown habitual, dangerous; for every unusual thing in a Human Body becomes a Stimulus, as Wine, or Flesh-Meat to one not us'd to them; therefore *Celsus's* Rule with the proper moral Restrictions, is a good one for People in Health, and even in Persons diseas'd in any of the Senses of this Chapter, as too strict, too lax, acid and bilious, &c. A constant Adherence to one Sort of Diet, may carry the Case beyond a Cure to the contrary Extreme.

12. General Rules about Diet, without Regard to particular Constitutions, are absurd.

13. That

13. That with regard to different Constitutions, the common Distinction of Diet into Vegetable with Water, and Animal with fermented Liquors, is not proper and compleat. *First*, Because in the Enumeration of Constitutions in this Chapter, there is not one that can be limited and restricted by such a Distinction, nor can perhaps the same Person in different Circumstances be properly confin'd to one or the other. *Secondly*, Because a vegetable Diet is not characteriz'd, there is not a general alimentary Quality in which all Vegetables agree; there are Vegetables, acid, alkaline, cooling hot, relaxing, astringent, acrid, and mild, &c. useful or hurtful, according to the different Constitutions to which they are apply'd, there may be a stronger Broth made of Vegetables than any Gravy-soup.

14. As Flesh-Diet is generally alkalescent, and many Vegetables are acid and cooling; People of hot bilious Constitutions find themselves extremely well in a vegetable Diet and Water, and the same Persons perhaps had enjoy'd their Health as well with a Mixture of Animal Diet qualify'd with a sufficient Quantity of Acescents, as Bread, Vinegar, and fermented Liquors.

15. The Oil of most vegetables in which their nutritious Quality chiefly consists, seems not to be so hard of Digestion as that of Animals; fat Meat is harder to digest than the most oily Plant taken as Aliment: Sick People could not take so great a Quantity of melted Fat, as they can of Oil of sweet Almonds.

16. Animal Substances are more nourishing, and more easily transmutable into Animal Juices; than Vegetable, and therefore a vegetable Diet is more proper for some Constitutions, as being less nourishing.

17. As the Qualities of Plants are more various than those of Animal Substances, a Diet of some Sorts of Vegetables may be more effectual in the

Cure of some chronical Distempers, than an Animal Diet.

18. The fibrous or vascular Parts of Vegetables seem scarce changeable in the Alimentary Duct. The Dung of Horses is nothing but the Filaments of the Hay, and as such Combustible.

19. Vegetables abound more with aerial Particles, than Animal Substances; and therefore are more flatulent.

20. Man is by his Frame as well as his Appetite a carnivorous Animal; the Instruments of Digestion are so well adapted to the proper Food of each Animal, that from the Structure of the First, it is easy to guess at the Second. Most Quadrupedes that live upon Herbs, have incisive Teeth to pluck and divide them: after they are swallow'd, they are brought up again from one Stomach to receive a new Alteration by a second Mastication, after that the Mass so prepar'd, passeth through four Stomachs of different Figures and Structure before it comes into the Intestines. This is the Case of ruminating Animals, except some few; as of Hares who have but one Stomach, by which it appears, that Nature is at a great deal of Labour to transmute Vegetable into Animal Substances: Therefore Herb-eating Animals, which don't ruminate, have strong Grinders, and chew much. There have been several Instances of ruminating Men, and that Quality leaving them, was a Symptom of approaching Sickness, Vid. *Philosoph. Transact.* & *Bonnet. Sepulchret. Anatom.* Granivorous Birds have the Mechanism of a Mill, their Maw is the Hopper, which holds and softens the Grain, letting it drop by Degrees into the Stomach where it is ground by two strong Muscles, in which Action they are assisted by small Stones which they swallow for the Purpose, and because this Action of Grinding cannot be perform'd by the weaker Stomachs of their Young; many of them, as Pigeons, half digest the

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Aliment before they give it. Some Birds that live upon Substances easily dissolvable, as Worms, Eggs, have the Coats of the Stomach smooth; as Cuckows. Birds of Prey that live upon Animal Substances, have membranaceous not muscular Stomachs.

The best Instruments for dividing of Herbs are incisive Teeth; for cracking of hard Substances, as Bones and Nuts; Grinders or Mill-Teeth; for dividing of Flesh; sharp-pointed or Dog-Teeth, which seem to be so necessary for that Purpose, that an Eagle has such Teeth, not in his Bill, but two at the Root of his Tongue to hold his Prey, and three Rows in his Jaws at the Entry of his Gullet. A Human Creature has all the three Sorts of Teeth; the Teeth and Stomachs of some carnivorous Beasts, don't differ much from the Human. A Lion has generally fourteen in each Jaw; four Incisors, four Canine, and six Grinders, sharpish, for dividing of Flesh as well as cracking of Bones. A Human Creature has commonly sixteen Teeth in each Jaw, two of them only Canine. The inward Coat of a Lion's Stomach has stronger Folds than a Human, but in other Things not much different. The Stomachs of Water-Fowl that live upon Fish are Human; therefore it seems that Nature has provided Human Creatures with Instruments to prepare and digest almost all Sorts of alimentary Substances, as Herbs, Grain, Nuts, by the Structure of their Parts as well as Appetites, they are plainly carnivorous.

21. It has been objected against this Doctrine, that Granivorous Animals have a long Colon and a Cæcum which in Carnivorous are wanting. Now it is well known that a Man has both, *Vid. Philosophical Transactions*; to this it is answer'd that the Observation is not true without Exceptions; many carnivorous Animals have neither Colon nor Cæcum, and many Granivorous have both. There are Animals not carnivorous that have a large Cæcum and no Colon, and others that have neither. There

There are carnivorous Animals, I mean such as eat Flesh sometimes, that have both Colon and Cæcum; but as the Observation is generally true, it proves at least that Mankind is design'd to take vegetable Food sometimes, and it is a fresh Instance of Nature's being at more Labour to assimilate Vegetable into Animal Substances, by affording them a longer and more retarded Passage.

22. Carnivorous Animals have more Courage, muscular Strength, Activity in Proportion to their Bulk, which is evident by comparing the Cat-Kind, as Lions, Tigers; and likewise the Dog-Kind with Herb-eating Animals of the same Bulk. Birds of Prey excel Granivorous, in Strength and Courage. I know more than one Instance of irascible Passions being much subdu'd by a vegetable Diet.

23. Fermented Liquors are proper, and perhaps necessary for such as live upon an Animal Diet, for Flesh without being qualify'd with Acids, as Bread, Vinegar, and fermented Liquors, is too alkalescent a Diet; and Wine moderately taken, rather qualifies the Heat of Animal Food than increaseth it. Water is the only Diluter, and the best Dissolvent of most of the Ingredients of our Aliment. It is found by Experience, that Water digesteth a full Meal, sooner than any other Liquor; but as it relaxeth, the constant Use of it, may hurt some Constitutions. As it contains no Acid, it is improper with a Diet that is entirely Alkalescent.

The Doctrine laid down in this *Essay*, is in most Particulars (I do not say in all) conform to that of the divine *Hippocrates*, as appears by several Passages of his Works; particularly of his Books of Diet, of his method of Diet in acute Diseases, and *Galen's* Commentaries both upon those Books, and some others of his Works. I shall instance in some few Particulars as far as relates to that Part of Diet call'd Aliment, without referring to the Editions,
Books

Books and Pages, which would be of small Use to my Readers. The Maxims of this great Man are, That Health depends chiefly upon the Choice of Aliment.

That the Physicians before his Time were to be blam'd, for not prescribing Rules of Diet.

That he who would skilfully treat the Subject of Aliment, must consider the Nature of Man, the Nature of Aliments, and the Constitution of the Person who takes them.

In his Books of Diet, he describes the Qualities of all the Substances which Mankind generally feed upon.

As of all Sorts of Flesh, many of which are not in Use amongst us, as of Dogs, Foxes, Asses, Horses.

That the Flesh of Wild Animals is drier than that of Tame, of Stall-fed, than of those fed by Pastorage.

That the Flesh of Animals, in the Vigour of their Age, and of such as are castrated, is best.

That of Animals, which have not us'd hard Labour, is tenderest.

That Beef is bilious that is alkalescent, as all Flesh Meat is.

That the Flesh of hot dry Countries is most nourishing.

He is very particular as to the Manner of Cookery, that roasting destroys the Humidity.

That salted Flesh should be macerated and moisten'd.

That salted Flesh dries, attenuates, and moves the Belly.

He is likewise very curious in tempering the Qualities of his Meats, by Seasonings of contrary Qualities.

He describes the Qualities of the Flesh of most Sorts of Fowl, that the Flesh of granivorous Birds
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is not so moist and oily as that of Ducks; he is particular as to the Qualities of Fishes fresh and salted, and of all Vegetables both Alimentary and Medicinal; that Onions, Leeks, Radishes, &c. are hot and acrimonious, that some of them, as Mustard, and Cresses, will occasion a Dysury; that others as Lettuce, are cooling and relaxing; Sclery, diuretick; Mint, hot; that the Cabbage Kind resolve the Bile, that such Herbs as are odorous are Heating, Legumes are flatulent, ripe Fruits laxative, and unripe, astringent.

That unripe Cucumbers are hard of Digestion.

That the Fruits of the Earth in hot Countries, are dryer and hotter than in cold.

He is no less exact in describing the Qualities of Milk, Whey, all Sorts of Bread and Water, which he chooses clear, light, without Taste or Smell, drawn not from Snow, but from Springs with an Easterly Exposition; tho' he seems to have known something of Mineral Waters, he says nothing of the Use of them.

He is no less accurate in the Description of the Qualities of several Sorts of Wines; black, white, austere, oily, thin, with the proper uses of them, by which it appears, that Wine was seldom or never drunk in his Country without Water. He allows Wine unmix'd after great Dissipations of the Spirits by Fatigue, and regulates the Quantities of it according to the Seasons.

He likewise consider'd the Medicinal Qualities of Aliments, and tells you, that of Aliments some are laxative, some moisten, some dry, some bind, some move Urine.

Indeed the Qualities which he ascribes to alimentary Substances, are the four in common Use amongst the Ancients, as hot, cold, moist, and dry; according to those, his Notions are often very just and instructive, and nothing can be more
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so than what follows, that acid, acrid, austere and bitter Substances do not nourish; but by their Astringency create Horror, that is, stimulate the Fibres; that sweet, oily and fat Things are nourishing and anodyne, that Water dilutes and cools, that Honey is detergent, and Vinegar profitable to bilious Constitutions: No less judicious are his Intentions in the Cure of Diseases by Aliment.

That Diseases depend on the Parts contain'd, and the Parts containing, that is, on the Fluids and Solids.

That the solid Parts were to be relax'd or astring'd as they let the Humours pass, either in too small or too great Quantities.

That Animals consist of Fire and Water, which Division is not so uncompleat as one may imagine; for by Water he seems to understand the unactive, and even the solid Parts, and by Fire all the volatile and active Parts, and that the difference of Constitutions, consists in the Excess or Defect of these Principles, and he compares the due Mixture of them to a Sort of Harmony.

That there are in a Human Body Bitter, Salt, Sweet, Acrid and Insipid.

That Contraries are the Remedies of their Contraries.

That Health consists in a due Proportion of Blood, Pituite and Gall.

That Redundance of Blood and Gall, are the Causes of acute Distempers.

That long Abstinence occasions Bitterness in the Mouth and beating of the Temples, and he finds fault with the Physicians that starv'd their Patients in the beginning of a Distemper, and gives a Reason for it conformable to the Principles laid down in this *Essay* that it dry'd too much, that is, the liquid Parts were dissipated.

That a Man cannot be healthy and digest his Aliment without Labour, and that the Quantity

and Kind of Diet must bear a due Proportion to the Labour. His Commentator *Galen* lays down this Aphorism.

Young, hot, strong and labouring Men may feed on Meats giving both a hard and gross Juice (as Beet, Bacon, powdered Flesh and Fish, hard Cheese, Rye-Bread, and hard Eggs, &c.) which may nourish slowly, and be concocted by Degrees; for if they should eat Things of light Nourishment, either their Meat would be too soon digested, or else converted into Choler.

And again, Milk is fittest for young Children, tender Flesh Meat for them that are growing, and liquid Meats for such as have acute Diseases.

Hippocrates observes, that Palenels is the Effect of Acidity.

That the Choice of Diet should be according to the difference of Constitutions, as in phlegmatick Constitutions, Fish and Flesh well season'd: The Flesh of Fowls (which is an alkalescent Diet) not many Vegetables, black austere Wines. In dry Temperaments, lenitive Fruits, Figs, Raisins, and soft Wines. In such as have a bad Digestion, and moist Bellies, (the Case of acid Constitutions) the Flesh of Fowl, which is a Diet both alkalescent and of easy Digestion; for such as have dry Bellies, Pot-Herbs.

Galen this Commentator tells you, that bitter Substances engender Choler and burn the Blood, giving no general Nourishment to the whole; howsoever they may be acceptable to some one Part, that is, (according to what was said in this *Essay*) that they are a Sort of subsidiary Gall: And again, sharp Spices are most unfit for tender Bodies, whose Substance is easily melted and inflam'd. However, strong Men may eat them with gross Meats, and consequently by the Principles of the *Essay*; Spices by their melting Quality are proper for fat People: Meats over-salted are dangerous: Inflammations, Leprosies, Sharpness of Urine, and great

great Obstructions happening to such as use them much, agreeing with none but strong Bodies, as Sailors, Soldiers, and Husband Men, accusom'd to hard Labour, and much Toiling.

Fat Meats are not good but for dry Stomachs; for in sanguine and cholerick Stomachs; they are soon corrupted; in phlegmatick Stomachs, they procure Loosness, and hinder Retention.

When any Man is sick or distemper'd, let his Meats be of contrary Qualities to his Disease; for Health itself is but a Kind of Temper gotten and preserv'd by a convenient Mixture of Contraries. Accordingly, in Fevers the Aliments prescrib'd by *Hippocrates*, were Ptisans and Cream of Barley. Decoctions of some Vegetables likewise with the Mixture of some acid, Hydromel, that is, Honey and Water, Oxymel, Honey and Vinegar, then Wines without Flavour diluted with Water, when there was no Tendency to a *Dilirium*. Water, Vinegar and Honey in Pleurifies and Inflammations of the Lungs. Sometimes he mixeth Spices, which seems odd; but that must have been for promoting Expectoration; and even in Ulcers of the Lungs, he prescribes Fat and Salt for the same Purpose; and to Women troubled with Pains after Child-bearing, he mixeth his Ptisan with Leeks and Fat; which Practice no doubt he had found successful.

He prescribes great Quantities of Asses Milk as far as an *English* Gallon in proper Cases, especially as a Restorative; and to such as had hot, dry Constitutions, Asses Milk, Whey and Abstinence from Fat and Oil.

No less judicious are his general Maxims for preserving of Health.

A Diet moderate in Quantity with a due Degree of Exercise.

That such as are of hot Constitutions, should abstain from violent Exercises, use Bathing in hot Water

Water, rather than Unctions, feed upon Maize (which is his favourite Food) and Pot Herbs.

That one must not accustom one's self to a too regular Diet, because the least Error is dangerous.

That all sudden Alterations in Extremes, either of Repletion, Evacuation, Heat or Cold, are dangerous.

Galen, speaking the Mind of *Hippocrates*, tells us, That the whole Constitution of Body may be chang'd by Diet.

That we should take those Kinds of Meats which are best for our own particular Bodies, for our particular Age, Temperature, Distemperature, and Complexions; for as every particular Member of the Body is nourish'd with a several quality'd Juice; so Labourers, and idle Persons, Children and Striplings, old Men and young Men, cold and hot Bodies, phlegmatick and cholerick Complexions must have diverse Diets. It is easy to produce a great many more Instances to prove the Conformity of the Doctrine of the *Essay*, with the Notions and Practice of *Hippocrates*; but those already mention'd are sufficient, and may be of use to some Readers to confirm by Authority, what they will not be at the Trouble to deduce by Reasoning.

F I N I S.

