

**A synopsis of a course of lectures, on the theory and practice of medicine.  
In four parts. Part the first. / [Benjamin Waterhouse].**

**Contributors**

Waterhouse, Benjamin, 1754-1846.

**Publication/Creation**

Boston : Printed by Adams and Nourse, 1786.

**Persistent URL**

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*re London Medical Society from  
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A  
SYNOPSIS <sup>262</sup>

OF A  
COURSE OF LECTURES,

ON THE  
THEORY AND PRACTICE

OF  
MEDICINE.

IN FOUR PARTS.

PART THE FIRST.

By B. WATERHOUSE, M. D.

PROFESSOR OF THE THEORY AND PRACTICE OF PHYSIC IN  
THE UNIVERSITY OF CAMBRIDGE, AND OF NATURAL  
HISTORY IN THE COLLEGE OF RHODE-ISLAND.

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COURT-STREET.

M,DCC,LXXXVII

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TO THE STUDENTS OF NATURE,

I N T H E

UNIVERSITY OF CAMBRIDGE.

GENTLEMEN,

**I**F one of the most celebrated Professors\* of the age had reason to say, that to deliver a system of the doctrines and rules proper for directing the practice of Physic, was an undertaking attended with such great difficulty, that after an experience of *forty years*, as well as much reading and reflection, it was with great diffidence he entered upon such a work.—With how much more diffidence ought one to appear who cannot boast of either?

I always intended to present my hearers with a *Synopsis* of my *Course of Lectures*, when years and more experience should give me sufficient confidence; but several circumstances concurring at this time, induce me to offer you the **FIRST PART** of my design, crude and imperfect as it is.

Prejudices have operated against our Medical Institution in general; and although the preli-

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minary

\* CULLEN in his preface.

minary or auxilliary branches, *Anatomy, Botany, Chymistry* and *Natural Philosophy*, are allowed to be not altogether uselefs or void of entertainment, yet the THEORY AND PRACTICE OF PHYSIC, which comprehends and connects them all, is represented as neither useful nor entertaining, and if necessary, easier collected from books than lectures. Although every thing in nature hath a reference to the *human person*, yet the Physician may observe that some things here treated of, or rather the view in which they are exhibited, can hardly be called medical.—This will be sufficiently explained when it is known that hitherto far the greatest part of my hearers mean not to pursue physic as a profession; but, in imitation of several illustrious characters, wish only to fill up their liberal leisure in that most useful of all studies, the knowledge of themselves. It hath been lamented that those who have studied the philosophy of the human mind, have been little acquainted with the structure of the human body and the laws of the animal œconomy; notwithstanding the mind and the body are so intimately connected, and have such a mutual influence on one another, that the constitution of either, examined *a part*, can never be thoroughly understood.\*

In

\* Dr. Gregory,

In consideration of your various pursuits, we have gone one step further, and encouraged you to study man in relation to other animals and things ; and glancing at the wondrous *chain* of universal existence, have called your attention to some of its links ; and this in order that you might view this “goodly frame” in the light of a large and well regulated family, all subservient to each other in proper *subordination*,—all contributing in their proper places to the perfection and happiness of the whole. In contemplating the *principle of animation* through the innumerable species of beasts, birds, fishes and insects, ’till we reached the vegetable, we have been led on to enquire, whether these two tribes of organized beings do not form (instead of two distinct kingdoms) one *immense family*?

Thus, without neglecting the doctrine of diseases, and their remedies, have we endeavoured to give you a more pleasing picture of man and his relations, than what mere medical lectures afford ; and I was glad of such an opportunity to combat certain prejudices : for when I reflected how all the sciences commonly taught in Universities were linked together, I felt a repugnance to the idea of physic being *insulated*, and wished to suggest to you that  
the

the art of medicine, when properly pursued, actually comprehended more of the sciences than any other branch of knowledge you could name,—that man, placed at the head of the visible series, was an *Epitome* or compendium of the great world, and included within himself all the powers and properties of nature, *vegetable, mineral, animal and intellectual*,—that such a knowledge of him was so essential to the human race, that without it the great *Linnaeus* seems to doubt whether any other characters be sufficient to entitle one to be ranked among mankind ; for says he, “ *Hæc si noveris Homo es, et a reliquis animalibus distinctissimum genus.*”

Natural History is not introduced here barely to amuse, but with a hope that by cultivating a taste for the works of nature some solid advantages may arise. The American may possibly be reminded, in his researches, that while factitious wealth is dug up from the bowels of the earth, *our* only true and solid riches must be drawn from its *upper stratum*, from thence man receives a reward of his honest industry by a kind of perpetual miracle wrought in his favour.

Should we not, moreover, encourage the natural curiosity of our countrymen to read that *sacred scripture* written by the finger of the DEITY himself,

himself, upon every *animal*, every *plant*, and every *mineral*? An uncorrupted scripture this! A kind of second revelation! The GREAT BOOK OF NATURE, which comprehends the objects of every science, is peculiarly inviting in this country; its ample pages strike all who have eyes to see and hearts to feel!

SOME have said, these subjects, though curious, are foreign to the medical profession—but they are mistaken. Where did HIPPOCRATES, and other Princes of the art, study? Wherever there were men, and the concomitants of humanity, disease and death,—AIR, EARTH and WATER,—all that surrounded them were the pages they studied.

The utility of a SYNOPSIS need not be dwelt on. Method is the soul of science; by it a confused heap of facts may be so ranged and disposed, that the judgment may act with freedom, and perform its office with advantage.\* After the subject of an enquiry is fixed on, and well defined, it should be divided into particular heads of enquiry: then the order of the things themselves are to be ranged and digested into the form of regular tables, so that the mind may act upon them in just order and with regularity; *the whole to be so constructed as to admit of being transposed, added to, or corrected.\**

The

\* See preface to *Novum Organum*.

The SYNOPSIS is divided into *four parts*. The FIRST PART is in your hands.

Although most of the subjects here mentioned have been treated of by men of eminence, the Physician will however see that we have taken a different view of the same subject from what is found in authors, and as far as I know among lecturers. Whole aphorisms are inserted upon some subjects, where we knew of no book that could serve as a guide to the pupil. The aphorisms on the *Vis vitalis* may serve as an example. The obscurity in which the process of *digestion* was involved till very lately, will serve to explain the length of that section; the same may be said of the *Lymphatic system*, while the well established doctrine of the *circulation* will explain the brevity of that subject. Under this head, some entire sentences are taken from *Fordyce* and *Haller* to comment on, and wherever we have taken the same liberty with any author, it is mentioned in the margin in general, and in the lectures in particular.

The SECOND PART treats of the more obvious causes of diseases,—the atmosphere—the situation—the diet—and then of particular ACUTE DISEASES; which will be treated of according to the plan first suggested by SYDENHAM, namely, arranged like the subjects of natural history into  
*classes,*

*classes, orders, genera and species.* By such an assistance the student of nature is led as it were by an *Ariadne's clue*, through the turnings and labyrinths of the *three kingdoms* of nature, and without a similar one, the student of medicine could scarcely retain the description of diseases, or remember how they are treated.

The THIRD PART treats of CHRONIC DISEASES, beginning with the most simple, and ending with the most complicated.

The FOURTH PART considers the OPERATION OF MEDICINES, and treats of the METHODUS CONCINNANDI FORMULAS MEDICAMENTORUM.

In the execution of our plan, we wish not to hold up what we have to offer to you as our own self-created knowledge, but rather what we have collected from the writings of approved authors, from lectures, and from the communications of eminent men. Neither shall we endeavour to stamp a dignity on any of our inventions by the triumphs of confutation, the citation of antiquity, or the mask of obscurity,\* but try to lead you on to things and their relations; and avoiding as much as possible all technical terms, we shall en-

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deavour

\* *Novum Organ.*

deavour to express ourselves in so plain and simple a style, as to require no other preparation than common sense, and an unprejudiced mind.

Boston, May, 1786.



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# SYNOPSIS

O F A

## COURSE OF LECTURES.

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### CHAPTER I.

*History of SCIENCE in general, and MEDICINE in particular.*

THE intentions of our forefathers in founding this College. The idea the Romans had of *education* evident from the origin of that word. The difference in the minds of men, not so much the effect of organization as education. The aptitude to understanding is a dead power in man, when not vivified by passions. The passion of *glory*, the commonly exciting cause. All men are susceptible of it in countries where glory conducts to power.\* Reflections on the progress of civilization from the naked savage to polished humanity. Times and countries have their wastes and deserts. What form of government, and at what period most favourable to learning.

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Computation

\* See Helvetius,

Computation of the numbers of the human species destroyed in building up tyranny, by *Sesostris*, by *Semiramis*, by *Xerxes*, by *Alexander*, the *Romans*, the *Sicilians*, by *Mithridates*, the *Goths* and *Vandals*, the *Crusaders*, and by the *Europeans* on this continent.

The arts and sciences commonly flourish immediately after civil wars and commotions. Some of the most distinguished benefactors of mankind, when and where they lived—of those few who have aggrandized the human mind by cultivating their own.

Distribution of knowledge into particular sciences. PHILOSOPHY divided into the doctrine of the *Deity*—of *Nature*—and of *Man*. The doctrine of *MAN* divided into the doctrine of the *body*, and of the *mind*—and the doctrine of the *union*.

Of the intimate connection of all the sciences—the propriety of making the *Muses* all sisters.

The universe affords nothing so deserving our consideration and wonder as *ourselves*.—The human body, of all created things, most capable of relief; yet this relief most liable to err.

A classical investigation of the origin of the *Healing Art*. The fables of the ancients pregnant with wisdom.

The

The antient poetry divided into (1) The *Narrative*—(2) The *Dramatic*—(3) *Allegorical*. From the *allegorical* the origin of medicine must be drawn. How the sciences were first taught by *signs* and *symbols*. As hieroglyphics preceded letters, so allegories preceded arguments,—various examples. This mode of teaching still among the *Chinese*, and in some degree among our *Indians*. The importance of a *clue* to these allegories, they having *nature* for their basis. How the symbols of ideas came to be taken for ideas themselves, truth came mixed with falsehood, human things with divine. Among all the ruder nations, the *Priest*, the *Conjuror* and *Physician*, were united in one man—other sources of superstition and nonsense—some traces discernable still in the *Materia Medica*.

Explanation of the allegory of *Apollo* or *Phæbus*:—Why called the *God of Physic*. The sagacity of the poets in making *Æsculapius* and *Circe*, brother and sister, and both children of *Apollo*.

An account of some of the Grecian Philosophers and Physicians who flourished during the period of Grecian liberty. *Marcus Cato's* opinion of them in his day.

Of HIPPOCRATES, why called the father of the Medical art—a specimen of his doctrine—a criterion by which his genuine works may be known—imitated by several, equalled by none—reflections on the age of the polished world, from the rich treasure of knowledge found in his writings—who first differed from *Hippocrates*—when and how Physicians were divided into sects—of the *Dogmatic*, *Emperic* and *Methodic* sects—account of *Asclepiades*, and his innovations in practice—his arts to acquire popularity and fortune.

An account of GALEN, wherein he did more harm than good to medicine, and acquired more fame than he deserved.

A short history of the various sects that flourished from this period to the time the *Western Empire* was overran by the Goths, and the *Eastern* by the Arabs.

How a northern swarm of barbarians extinguished the small light of learning that then remained, burning the libraries, universities and cities. Concerning *Mahomet's* conquests. From the 9th century to the 12th, the Arabians engrossed the province of physic, how far they enlarged its boundaries. In the 15th century Constantinople was sacked, the Greeks driven out, and forced to take refuge in Europe. The  
writers

writers from this time called *Moderns*. Hence there appears three periods or revolutions of learning; *one* among the GREEKS, *another* among the ROMANS, and a *third* among the WESTERN nations of *Europe*.

MEDICINE, long cultivated on the coast of *Malabar*, derives its origin according to them, from the supreme God, and handed down for myriads of ages through the successive orders of inferior Deities;—reflections thereon,—a specimen of their theory. Of the state of physic in *Mexico* and *Peru*: their method of acquiring a knowledge of the healing-art more wise than any unlettered people yet known.

The *revival or resurrection of letters*. The nobles of all nations flocking to the holy war, admired the art and cultivation of the Greeks and Romans, shrunk back at their own barbarity—the consequences thence arising. How for several centuries the admiration of the knowledge of former ages retarded the advancement of science.

Elogium on ROGER BACON.

The discovery of the ARS ARTIUM OMNIUM CONSERVATRIX, the *Art of Printing*, and its immediate consequences.

The *two systems* of PHILOSOPHY prevalent at this period, viz.—The Philosophy of *Aristotle*, and the Philosophy of *Plato*: the first occupied the

the *universities* and *cloisters*. The poets, sentimental philosophers, and some others, were disciples of *Plato*. These two systems more or less discernable in all the writings of this period.

A great revolution in the theory and practice of *Physic*, by the introduction of *Chymistry*. An account of *Paracelsus* and his followers.

A short history of *Medical Chymistry*, in contradistinction to that very ancient art of smelting, refining and tempering of metals.

*New* diseases and *new* remedies, in consequence of a great part of the earth being discovered unknown to the ancients, viz. *America*,—the *southern parts* of *Africa*,—*China* and *Siberia*,—together with a vast number of *islands*.

In the 17th century HARVEY demonstrated the *Circulation of the blood*, which, together with the discovery of the *Receptacle of the Chyle* and of the *Thoracic-Duct*, overturned the whole system of Galen and the theory of the Chymists. GALILEO now introduced mathematical reasoning, and BACON his new mode of induction. This the æra of experiment in which several great men flourished.—Societies established for promoting and diffusing experimental philosophy in several parts of Europe with princes for their patrons.—Posts or conveyances by letter established.—*Anatomy* now prosecuted with juster views than  
before

before the discovery of the circulation.—*Injections* of coloured liquors first introduced.—The *Microscope* applied to investigate the more subtile parts of the body.

A catalogue of the most important *anatomical discoveries* from that time to the present.

General account of Theories from HARVEY to the time of HOFFMAN.

1. The *Mathematical* or *Mechanical Theory*, in which the blood was considered as the *primum mobile* of the whole body. How the consequences of this doctrine destroyed the principles on which it was founded.

2. The Theory of STAHL, who maintained that the rational and immaterial soul itself was the source of all the motions of the body.

3. The Theory of BOERHAAVE.

4. HOFFMAN'S Theory, who maintained that so far was the body from depending on a state of the fluids as *Boerhaave* imagined, that the crasis of the fluids themselves entirely depended on the nervous power, and that the greatest part of diseases were affections of the *nervous system*.

General reflections on the foregoing history,—why it appears the history of *opinions* rather than of a progressive art.

An account of the few eminent authors in phyfic, in comparifon of whom the reft are mere compilers.—Fewer books written on phyfic than any other branch of fcience of its extent.

On the *simplicity* of the medical art at prefent, compared with a century ago. By injections and microfcopes, obfcure things now rendered conspicuous, minute things magnified, and from confufion reduced to order and fimplicity.

The more we know of any fcience, the greater number of *particulars* are we able to refolve into *general ones*, and confequently we fhall be able to reduce its principles within narrower bounds.\* This opinion verified by the prefent ftate of medicine.

The almoft endless catalogue of difeafes that afflict mankind a principal difcouragement to ftudents—how remedied.

SYDENHAM was the firft who fuggested the idea of reducing difeafes to a certain determinate fpecies, in imitation of botanic writers. *Sauvages* the firft who attempted it.—*Linnaeus*—*Vogel*—*Sagar* and *Cullen*, the greateft improvers.

All fcholaftic teaching is *claffification*,—exemplified in the divifion of the works of creation, firft  
into

into the *four elements*, then into the *three kingdoms*. The animal kingdom divided into *six classes*, comprehending all animated nature; these classes divided into *orders*, each order into *genera*, each genus into *species*.

The CLASSES are marked by certain symptoms and circumstances which are common to each; the *orders* all agree in having the same marks with the *class* to which they belong, together with some additional ones peculiar to the *order*; the *genera* have all the marks and circumstances of the *class* and *order*, and besides have some which distinguish the *genus*; and the *species* have all the marks and tokens of *class*, *order* and *genus*, with the still further addition of symptoms or circumstances which give the *specific character*. See *Encyclop. Brit.*—also *Lock on Human Understanding*, vol. 1, p. 357, 8vo. and vol. 2, chap. 3, on general terms.

All the known diseases that afflict mankind reduced to *four classes*, and these to 150 genera.\*

The MATERIA MEDICA less advanced than any other branch of the art; the *instinctive principle* more exercised in what we take into the stomach than

\* See part the second.

than the *rational*, one cause. *False Criteria* another,—these reduced to eight heads.\*

*Mercury—Antimony—Opium—Peruvian-Bark*, a few other *Vegetables—Fire, Exercise and Water*, include near all the physicians instruments.

Enumeration of the principal *Desiderata* in *Anatomy*—in the doctrine of the *Animal æconomy*—in *Surgery*—and in the *Therapeutica*.

A view of the *Data and Quæsitæ* in the art of phyfic.

The general problem which comprehends the whole art is,—

*Having the symptoms given to find the remedy; or thus divided,*

(a.) *Having the symptoms given to find the deviations of the body from its natural state.*

(b.) *Having this deviation given to find the remedy.*

It is useful to invert these problems, and enquire,

(a.) *Having the deviations given, what the symptoms must be.*

(b.) *Having the manner of operation of a successful remedy given, what the deviation must be.* (See Hartley, vol. 1st.)

BOERHAAVE's method of studying phyfic—his idea of a consummate physician.

HOFFMAN's

\* See part the fourth.

HOFFMAN'S method, considered under *four heads*.

A rehearsal of Dr. CULLEN'S objections to the *Boerhaavian system*.—How far he has supplied its deficiencies.

The out-lines of *Cullen's Physiology*, wherein he differs from all other medical teachers.

Elogium on BOERHAAVE.

General reflections on the various methods recommended in studying physic. Of the remarkable simplicity observable in the writings of the most successful enquiries after truth—several instances adduced.

Where did HIPPOCRATES, and other PRINCES in the art, study?—Wherever there were men and the concomitants of humanity, diseases and death, *air, earth and water*, all that surrounded them were the pages they studied!

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## C H A P. II.

### S E C T I O N I.

**M**AN, the object of our enquiries, includes within himself all the powers and qualities of nature, viz.—the *mineral, vegetable, animal*

mal and *intellectual* ; therefore has been called the *Microcosmos*.

Of the *Res Macrocosmæ*, or every thing but man. These distinguished into (1.) Aliments, (2.) Medicines, and (3.) Poisons.

Concerning simple matter ;—its astonishing divisibility, illustrated chemically and mechanically. The infinite divisibility of matter a mathematical truth, but a physical falsehood ? A little of the middle of nature known, its two extremes out of sight.

What led some philosophers to believe that all nature was animated. The imperceptible translations of inert matter to organized—from a vegetating body to the lowest order of animals.

Of the *Zoophytes*, or that class of beings which connects, animated and insensible nature.

On the SCALE of BEINGS.

The Universe a system whose very essence consists in *subordination*.

SYSTEMA NATURÆ of *Linnæus* briefly explained.

A connection between all ranks and orders by subordinate degrees necessary towards sustaining the magnificent fabric of the world. Wide distinctions made in the *dignity* and *perfections* of animals,

animals, little or none in their happiness. Concerning the various degrees of perfection, beauty, strength and understanding.

The animal produced by a cutting as in the *Zoophytes*, is but *one degree* above a vegetable,—that produced from an egg is a *step higher*,—that class of animals which is brought forth alive, *still more exalted*,—and of these, such as bring forth one at a time, *the most compleat*, the foremost of which stands the great master of all,\*

MAN,—The knowledge of him reduced to six heads,—(1.) Physiologie, (2.) Diæteticæ, (3.) Pathologicæ, (4.) Naturaliter, (5.) Politicæ, and (6.) Theologicæ. “*Hæc si noveris Homo es, et a relinquis animalibus, distinctissimum genus.*”

LINNÆUS.

“Man is a machine,” *Des Cartes*.

Wherein the meanest animal is essentially superior to the most perfect result of human workmanship.

In proportion to the degradation of the animal in the scale of existence, the living and renovating principle is proportionably vigorous; various  
examples

\* Goldsmith.

examples adduced; the same law observed in *vegetables*.

An effort towards a perpetuity of existence distinguishes the works of the *Supreme Creator* from the works of art.

Analogy between the *instinctive* or *preserving* principle in animals, and that *approximating principle* which binds together the terrestrial globe, which guides the revolving planets in their courses, and keeps the material system from dissolution.\*

Man is a being compounded of *body, spirit* and *soul*, or *Corpus, Vis Actuosa et Mens*.

The BODY first offers itself to view—considered collectively as one mass, consists of (1.) Earth, (2.) Oil, (3.) Water, (4.) Salt, (5.) Phlogiston, and (6.) Mephitic air. Considered entire, and particularly its exquisite form and wonderful faculties, place it at the head of the visible series. Amidst the exact harmony of parts and actions, there exists a perpetual conflict; by this conflict the body is supported; that action which is the life of the body is also the cause of its death.

From which view this inference is unavoidable, namely, the most perfect being we know of, depends on a SUPERIOR BEING who created and supports its existence.

## SECTION

\* Jennings.

## SECTION II.

THE actions of the human body distinguished into VOLUNTARY, INVOLUNTARY and MIXED.

The involuntary, or instinctive movements, are exercised in preserving the body, and are, more strictly speaking, the *animal æconomy*.

The appetites and actions on which our very existence depends, are not left to the fallible reason, or caprice of man.

The instinctive actions varying in different stages and circumstances of life, are *strong* in proportion to their importance:—various instances adduced.

All this depends on a principle which some call VIS ACTUOSA, others IMPETUM FACIENS, others ARCHÆUS. This power is *innate*, and is that, by which man lives, it forms him, it nourishes him, refreshes him, pathetically affects him, moves him, animates him ; by it he feels, he desires, refuses, sleeps and wakes : nevertheless it is totally different from the *mind*, for,

In the body, guarded by the *Autocratea*, or VIS MEDICATRIX NATURÆ is found something of quite a different nature from what has been mentioned ;—a *power* of thinking, reflecting, comparing, chusing, and representing to itself

D

past,

past, present, and to come. This power in relation to its several operations, is termed comprehension, understanding, reason, mind, will, freedom, or collectively by the single word SOUL.

This immaterial thinking part of man, is so connected with the material and corporeal part of him, and particularly with the *nervous system*, that motions excited in this, give occasion to thought; and thought, however occasioned, gives rise to new motions in the *nervous system*. This mutual influence we assume with confidence as a fact, but the mode of it we do not understand.\*

The opinion of THALES concerning the immaterial thinking part of Man—of PLATO—of PATHAGORAS and of HIPPOCRATES.

The *Cartesian Hypothesis*—the opinion of some of the *Chemists*, of the THEOSOPHI, particularly MALBRANCHE. The system of LEIBNITZ and WOLFE,—of BAXTER and PRIESTLEY.—All abounding with unfurmountable difficulties. †

## SECTION

\* Cullen's Physiology.

† While the *Divine* ought to consider Man as made up of two distinct essences, and as possessing an immortal soul after the image of his Maker, the *Physiologist* in a humbler walk, is bound by the rigid rules of philosophizing, to consider him as possessed of an amazing fabric, on whose perfect, or imperfect state, its functions and faculties seem to depend. All the knowledge the *Physiologist* pretends to, he derives from *Experiment, or the use of his senses*.

## SECTION III.

ON the original construction of the animal Solids.—Do they consist of streight fibres or threads, as *Boerhaave* taught; or fibres and laminæ forming the *Tela Cellulosa*, as *Haller* supposed? Or are they spiral, convoluted and interwoven with one another?

The construction, extent, and nature of the *Tela Cellulosa*.—On the living, or vital Solids.

All the organical parts of the human body maintained in the *power*, or *fitness* for acting either successively, or simultaneously by *two forces* or *springs*, viz. (1.) The BRAIN and its *appendages the nerves*. (2.) The HEART and its *appendages the Blood-Vessels*, mutually exciting each other like the *main-spring* and *regulator* in a Watch.—These movements, in order to be perpetual and regular, require to be as perpetually and regularly *wound up*, and this is done by the Food taken into the stomach and there digested.

The Brain and Nerves may be considered as forming *one system*. The Heart and Blood-Vessels *another*. The Stomach, Intestines and assistant Chylopoetic Viscera form a *third*. The Lacteals, the common Lymphatics, and the Conglobate-Glands form a *fourth*. May not the *Systema spiritale pneumonicum* be considered as a *fifth*?

From these *five fountains* all the actions of the body, and all the power which it exerts, are derived.

Although each organ or system of the human body, has an action peculiar to itself, yet are they all actuated by *one individual life*. \*

Human life or health, is the sum or aggregate of all these actions and functions, which cannot therefore be derived from the brain alone, or heart, or stomach—or absorbent system—or the pneumatic, but from the conspiracy of all of them ; hence emerges the *sympathy of parts*. †

These subjects are so involved in each other, that it is impossible to begin any where on clear ground, or so as to proceed from the *Data*, to the *Quæsitæ* ; begin where we will, we always find some things necessary to be premised, which are not as yet demonstrated.

### C H A P. III.

Of particular Organs and Functions.

#### S E C T I O N I.

Of the Heart and Blood-Vessels.

**T**HE heart of man consists essentially of two cavities, there being two hearts, strictly speaking, joined together in the human body, serving

\* In some Animals, Life is divisible, as in the *Zoophytes* :

† See *Dissertatio de Sympathia partium corporis humani*, &c. printed at Leyden, in 1780.

serving for two circulations of the blood, one through every part of the body, and one through the lungs. \*

Of the AURICLE.

Of the VENTRICLE.

Of the VALVES.

Origin, general structure, and distribution of the *Aorta*.

From the ultimate branches of the *Aorta* arise tubes which terminate in the heart, joining together as they go on towards it, forming principally two large tubes, which open into the right Auricle :—these are called, †

VEINS,—their general structure.

In all the veins perpendicular to the horizon, excepting the Uterus and Porta, there are small valves, but none in the deep running vessels of the Viscera—none in the Lungs, Brain, Liver, or the whole system of the *Væna Portarum*—nor in any blood-vessels, less than the twelfth of an inch, diameter. ‡

How do the veins begin? There is a structure between the veins and arteries little understood. §

The blood-vessels in a live animal are always full. When

\* Fordyce Natural History of human Body.

† Ibid.

‡ Haller's Physiology.

§ See Malpigh and Ruysch.

When an animal dies, the Arteries and Veins loose their cylindrical form and are flattened, and the capillaries contain less blood, so that the blood sufficient to fill the vessels when the animal was alive, is not capable of filling them after he is dead; therefore the arteries, veins and capillaries of the living animal, are commonly contracted to a greater degree than they can be by their elasticity. †

The elasticity is commonly endeavouring to distend them, but is always overpowered by the contractile power depending on life, which adapts the size of the vessels to the quantity of blood contained in them.

If the vessels are emptied to such a degree that they cannot adapt themselves to the blood, and continue cylindrical, the animal dies. ‡

### On the *Vis Vitalis*.

#### APHORISM I.

ALL the living parts of the body have, besides those attributes common to all bodies, as solidity, extension and gravity, a peculiar *something* which distinguishes the living from a dead body.

A muscular fibre will contract, and that not by the power of gravitation, cohesion, chrySTALLIZATION, (*electricity?*) magnetism, or chymical attraction.

APH.

† Fordyce.

‡ Ibid.

## APH. II.

This property in animal bodies has been in a great measure overlooked by some teachers of great reputation, and totally neglected by others.

## APH. III.

Whatever by its contact with an animal fibre, excites in it a contraction or oscillation, we call a *Stimulus*.

## APH. IV.

That state of an animal fibre in which a contraction or oscillation is produced by the contact of a stimulus, we call *Irritability*.

## APH. V.

That principle in animals, on which sensation, motion, and all the animal powers depend, we call the *Vis Vitalis*.

## APH. VI.

If by the application of a stimulus to the solids, a perception is excited in the mind, this effect we call *sensation* or *facultas sentiendi*.

## APH. VII.

By the action of stimuli on the solids, the *Vis Vitalis* is excited and preserved; when diminished, it may be encreased, and when totally suspended, it may be restored.

## APH. VIII.

Without *heat* as an *exciting* and *preserving stimulus*, vegetable and animal life cannot be supported. Thus the hatching of eggs is the effect of the application of a particular degree of heat, without which the egg remains inanimate. The same application to an animal, or part of an animal consolidated by frost, will re-animate it, or restore the *Vis Vitalis*.

## APH. IX.

Different animals, and the various parts of the same animal, have different degrees of irritability.

## APH. X.

The denser, or more compact the solids of an animal, or parts of an animal, the stronger and less irritable is the animal or parts of the animal. Thus the muscles are in a great degree irritable, but their irritability lessens as they become tendinous, and is in a manner lost when ossified.

## APH. XI.

On the contrary, when by inflammation the fibres of the least sensible parts are elongated, and the cohesion of their constituent corpuscles diminished, their irritability and sensibility is proportionably increased until it arrives at the extreme, when the sensibility and irritability diminishes until it is lost, and a dissolution takes place.

## APH. XII.

## APH. XII.

Experiment teaches us, that the *Heart* is endowed with irritability above most other parts. Even when the heart is taken out of the body, and in some animals though it be cut in pieces, it can be excited to motion by proper stimuli\*.

## SECTION III.

Nature and Properties of the *Blood*.

THE various substances used for food, are converted by the organs of digestion into chyle, and afterwards into blood.

FROM this red mass all the other fluids are formed. The constituent parts of the blood unknown till the time of Monsieur Senac.

THE blood consists of (1.) The serum. (2.) Coaguable Lymph. (3.) The red part, and (4.) The superfluous water. The nature, properties, and mode of mixture in each. Little or nothing to be known from the chymical analysis of the red mass.

*Leuwenhock's* idea of the red globules erroneous. Necessary to know the fallacies of optics before their shape can be determined.

E

Is

\* These Aphorisms, which are meant to be the foundation of a particular work, will be continued in another part of the Synopsis.

Is the blood an inanimate fluid, or is it a live ?

Must the blood be converted into a solid part of the body, before it can feel ?

Where is the first communication between body and mind ?

Does the albuminous fluid incessantly passing through the Lacteals into the blood, only require the heat of the blood-vessels to vivify it like incubation, by the warmth of the Hen ; or is its animation reserved for the lungs ?

Arguments for and against the *celebrated* J. Hunter's hypothesis of the life of the blood.

The red part of the blood, soluble in water, but not in serum, capable of undergoing the putrefactive fermentation ; this fermentation, distinguished into *three stages* ; the process described, part of the blood goes to form the various fluids ; part to repair the waste of the solids ; and part is destroyed and thrown out.

The fluids of animals are formed and destroyed by fermentation. What *we mean* by FERMENTATION.

*Putrefaction* defined—consists of *two* fermentations.

A portion of the blood is constantly destroying. Is it by what we call putrefaction ?

The

The evident evacuations from the blood, are  
(1.) From the skin by evaporation. (2.) From  
the surface of the lungs. And (3.) by the kidneys.

Of the grand Antiseptic of Animal Bodies.

Some uses of the blood, besides those commonly noticed.

Of the actions of the small vessels when divided by a small wound. How in consequence of a slight inflammation, they throw out a new fluid, in order to effect a reunion. This uniting medium, that part of the blood called the *Coaguable Lymph*.

Is not inflammation a process of the animal œconomy, to supply an injured part with Coaguable Lymph? Several phenomena related to countenance this idea.

On the formation and use of *Pus*.

What is the alteration in the vessels of an inflamed part, producing pus? How far is it a regular secretion.

Of the globules of pus, as they appear through the microscope.

The opinion that the solids go to the formation of pus, erroneous.

The intention of pus is not to destroy, but to defend and preserve the parts.

Of

Of the *motion* and *circulation of the blood*, and of the *several organs* and *actions* employed in supporting it.

Of the circulation in the *Fætus*—in *Amphibious Animals*, and in *Scaly-Fishes*.

### Of the Lungs.

Anatomical Description of that set of vessels in the Lungs, which contain AIR, and those which contain BLOOD.

Is the blood in the pulmonary arteries incapable of nourishment, or must its yet crude chyloferous particles complete the circle of the system, before it can nourish?

Of the secretions from the vessels of the Lungs—of the nerves of the Lungs, with their peculiarities.

How respiration is performed in *Man*—how in *Birds*—in some *Reptiles*, and in *Insects*. The reason *Snakes* can live in an exhausted receiver, and *Insects* exist in compact bodies.—How respiration is performed in *amphibious Animals* and *Scaly-Fishes*.

How the blood circulates in the Child in the Womb.

*Nature and properties of the AIR we commonly breathe.*

On the PULSE.—Scarce any two authors use the same terms to express the same pulse. Several passages of Hoffman, Silvius, Etmuller, Decker, Scheldhammar, Bellini, Boerhaave and Prosper Alpinus, compared.

#### S E C T I O N IV.

On the Heat of the *Human Body*.

HOW far does the heat of animals depend on the motion of the blood? Is the heat owing to the nervous fluid, or Æther, or Electricity, or Phlogiston?

The power, whatever it may be, which produces, maintains and regulates the heat of the human body in health, produces HEAT when the surrounding substances are heated to a *less* degree than 98 degrees of Farenh thermometer; and COLD, when they are heated to a *greater* degree\*.

#### S E C T I O N V.

Of the Stomach and *assistent Chylopoetic-Viscera*.

ANATOMICAL description of the *Stomach* and *alimentary Canal*; peculiarity in the distribution of the vessels of the Stomach and Intestines.

The

\* Fordyce,

The Stomach performs two distinct offices ; the first, digesting the food ; the second, communicating fresh life and vigour to the remotest parts of the system. HIPPOCRATES opinion of this wonderful organ.—The opinion of ARETÆUS CAPPADOX, of HELMONT, of SYDENHAM, of FOTHERGILL.

No organ merits so much attention as the Stomach,—no function of such importance to the *Physician*, as digestion.—The feeling and affections attributed to the *heart*, belong to the *Stomach*. No part of the body capable of so many different feelings. On the Stomach in a great measure depends the whole man,—various examples adduced.

Of the consent between the *skin* and the *Stomach*.

A state of distention or erection in the *ultimæ vasculæ* or *villi* of the nerves necessary to free perspiration—this distended or collapsed state is somehow connected with a sound or unsound Stomach ?

### On Digestion.

Systems relative to this function.

(1.) BOERHAAVE's, which supposes *two principal agents*, viz.—the different fluids collected in the  
Stomach,

Stomach—and its mechanical action. The *secondary* agents are, (1.) heat, (2.) air, (3.) the nervous fluid, and (4.) an incipient fermentation.

(2.) SIR JOHN PRINGLE'S and DR. M'BRIDE'S theory, who suppose it a fermentative process. Fermentation divided into *three* stages. Chymical Analysis of the gastric fluid; found to be neither acid, nor alkaline, but neutral.

Experiments in *Papin's Digestor*, not applicable to the human Stomach.—The amazing power in the cold Stomach of some Fishes, sufficient to overturn the system that supposes *heat* the grand instrument of digestion.

The amazing pressure of the Stomach as calculated by DR. PITCAIRN and others, entirely without foundation.

The *Experiments* of SPALLANZANI.

How digestion is performed in animals with *muscular Stomachs*, as common fowls, turkeys, pigeons, &c. Their food triturated previous to digestion, by muscles called *gizzards*. The action of the gizzards upon sharp pointed metallic bodies.—Anatomical description of the *Œsophagus* and gizzards of fowls.—Of the Crop, its glands, cartilaginous coat and excretory ducts.

How

How digestion is performed in animals with *intermediate stomachs*; what we are to understand by *intermediate stomachs*. Experiments proving that in such animals, digestion is owing to the *gastric fluid alone*.

How digestion is performed in the *reptile tribe*; quicker accomplished in warmer seasons. During their torpid state, flesh may remain in their stomachs for months without putrefying.

How digestion is performed in *scaly fishes*.—Anatomical description of their stomach and intestines. Their stomachs remarkably *cold*, with no possibility of triture. Some fish digest crabs, lobsters, shells and all. The bottom of their stomachs digests substances sooner than the upper part. This solvent power greater in the stomachs of fishes than any other creature we know of; few animals can digest an entire live animal. In fishes the gastric fluid *alone* dissolves the small live fish they swallow.

The process of digestion in *sheep, oxen*, and other *ruminating animals*;—wherein their stomach and bowels differ from man's. How digestion is performed in *birds of prey*—anatomical description of their digestive organs, their stomachs approach near to the human; have a double pancreas.

Result

Result of experiments on the gastric juice of birds of prey ; it will not dissolve vegetables, even if boiled, yet their stomachs dissolve the hardest bones. Digestion in birds of prey proved to be owing to the gastric fluid alone.

General observations on the gastric fluid of animals. Does not freeze so soon as a solution of salt, or of simple water. The human gastric juice exposed for weeks in the hottest seasons, suffers no change of colour, taste or smell. The gastric juice of birds of prey, dissolves flesh out of the body, sooner than the process of putrefaction.

Flesh given to a sick bird of prey, found unaltered.—Teeth given to the same class of birds, the fangs dissolved, the enamel untouched ! Horns and tanned leather indissoluble—the Tendo Achillis of an ox dried, perfectly soluble. Raw flesh and other substances, dissolved when tied up in a linen, and even in a broad-cloth bag, and thrown into the stomach of an eagle.

The process of digestion in animals with *membranous stomachs*. This class comprehends the inhabitants of salt and fresh water ; *Amphibious animals*, as the tortoise, frog, water-snake, &c. *Reptiles*, as the viper, land-snake, &c. *Quadrupeds*,

as the horse, ox, cat, dog, &c. Also, birds of prey, as the eagle, owl, &c. And lastly, MAN himself.

Of the advantages of comparative anatomy and analogical reasoning. Analogical arguments probable, but not conclusive. How plausible inferences from well known facts in brutes, occasioned many errors respecting man.

In some animals trituration of the food is necessary—in man it is done by the *teeth*—in gallinaceous fowls, by the *gizzards*.

In frogs, serpents, birds, and fish of prey, no trituration takes place.

Wherein man's digestive faculties differ from all other animals.

*Man* is OMNIVOROUS.

Of the *coaguable liquor* of the human stomach—Of the *runnet* in calves—The inner coat of the stomach of gallinaceous fowls, has the same property—Those with *intermediate* stomachs possess it likewise. The stomachs of various reptiles, and several scaly fishes, have the faculty of curdling milk.

Is this coagulating property inherent in the internal coat, or is it owing to the gastric fluid?

To imagine that nothing but *acids* coagulate milk, is to measure nature by our own narrow prejudices?

prejudices? The blood of a certain animal will not coagulate milk, but pieces of the heart, liver, lungs, and some other parts of the *same* animal, will.

RECAPITULATION. The *succus gastricus* differs from all known solvents of art or nature. It is at once, an antiseptic and solvent. In some quadrupeds, in some birds of prey, it actually sweetens putrid flesh in less than two hours.

Wherein the *succus gastricus* essentially differs from the *Saliva*; hence the fallacy attending *Pringle* and *M'Bride's* conclusions. The result of various experiments made by *Reaumur*, *Spallanzani*, *J. Hunter*, *Stevens*, and others, only confirms the opinion advanced *two thousand* years ago, by HIPPOCRATES.

If digestion is well performed, the chyle is proper, be the food ever so various; the blood from the chyle natural—the secretions—nutriment—and excretions, regular;—health, strength, and activity, will ensue—disease vanish. If digestion languish, the contrary happens, be the food what it may, unless the injured faculties of digestion, be restored to their pristine and natural state. \*

#### On the food of Man.

ALL the food used by mankind consists of

F 2

farinaceous,

\* Fothergill,

farinaceous, or mucilaginous vegetable substances or native vegetable acid—or sugar or expressed oil, or animal solids, or animal fluids, containing a mucilaginous matter—all traced ultimately to *vegetables* and *water*.

A view of the TERRAQUEOUS GLOBE. Of the CIRCULATION between the *ocean*, the *atmosphere*, and *earth*. The whole terraqueous globe, sea as well as land, together with the whole region of the atmosphere, happily contrived to afford sweet and running waters, all of which have a reference to the original food of man, VEGETABLES.

VEGETATION traced from the *sowing of the seed*, to the formation of the root—the trunk—the branch—the flower—the fruit—and last of all, to the seed *again*.

THE SEXUAL SYSTEM OF BOTANY, briefly explained.

Analogy of vegetables to animals.

#### C H A P. IV.

Structure, Course, and Œconomy of the VALVULAR LYMPHATIC SYSTEM.

THE ABSORBENT SYSTEM consists of (1.) the *Lacteals*. (2.) The *Common Lymphatic Vessels*. (3.) The *Thoracic Duct*. And (4.) the *Glands*, called *Conglobate*.

A Lymphatic, is a fine pellucid tube nearly cylindrical, divided by valves, so as to have the resemblance of joints. \*

History of their discovery.

The Lacteals begin from the intestinal tube, and may with propriety be called the *Lymphatics of the Intestines*, they begin with open mouths, in almost every part of the body, as they do in the intestines.

The fluid they contain is colourless, like water; the course of their fluid is from the extreme parts of the body to its center.

The coats of the Lymphatics have in common with other parts, arteries, veins, and nerves.

The Lymphatic System in most animals, † but particularly in man and quadrupedes, is full of valves.

Description of the Conglobate or Lymphatic Glands. The Thoracic Duct, is a lymphatic of the largest order: it begins near the Diaphragm, and commonly terminates in the left subclavian vein; to it, as the common receptacle, the whole lymphatic system tends.

In passing on towards the heart, the lymphatics enter the conglobate glands—the manner described.

\* Fordyce.

† Valves have not been found in the lymphatics of *scaly fishes*.

described. *Haller's* opinion of the absorbing veins, erroneous. As the arteries are evidently connected in structure and office with the Lacteals or Lymphatics of the intestines, may they not in like manner with all the rest in the system? Experiments rendering it highly probable that the Thoracic Duct is not the general or only termination of the Lymphatics. Has the Brain Lymphatics? Arguments for and against this opinion. Absorbent glands found in the *foramen caroticum* in the basis of the skull. Why are the glands of the neck more numerous in man than in any other animal?

*On the action of the absorbents* : objections to their acting on the principle of Capillary, tubes according to Haller and others—a *particular* stimulus required. (See *Vis Vitalis*, p. 21.)

An explanation of their action attempted—The probability of every living body absorbing.

THE USE OF THE ABSORBENT OR LYMPHATIC SYSTEM.

The Lymphatics are the *Modulators* of the nutritive or arterial system. The Lymphatics and arteries are perpetually counteracting each other. \*

\* See part second, on Dropsy.

For a particular description of the course of the Lymphatics, see *System of Anatomy, from Monro, Winslow, and Innes, Edinburgh, 1784.*

The Lymphatics take in our food—They prepare several secreted liquors. The Lymphatic glands, guard the system from poison by their inflammation and pain.

The Lymphatics take up the *solids* as well as the fluids of the body, proved by experiment—they eat off the roots of teeth in children, and absorb the alveolar processes after the teeth drop out in old men. The separation of a mortified part is by means of the absorbents. Their action further illustrated in diseases of the bones. The absorbents regulate the quantity and quality of the chyle.

Does the lymphatic system in certain diseases, where the patient cannot take food into his stomach, absorb the fat to support the system? Observations on animals that sleep all winter.

On favourable and unfavourable surfaces for absorption: An ulcer more favourable to absorption than an inflamed part.

Does the presence of one infectious matter prevent the absorption of another?\*

On the good effects of introducing morbid matter by a different rout from what it would naturally take, as in inoculation. Can two infectious diseases act on the body at the same time?\*

The absorbent system more active after sleep.  
Miscellaneous observations. C H A P.

\* See Cruiksh.

## C H A P. V.

## Nervous System.

THE BRAIN is that soft whitish mass which fills the cavity of the skull, and is immediately surrounded by two membranes, called *Meninges* by the Greeks, and *Matres* by other ancients: one is very strong, and lies contiguous to the skull; the other is very thin, and immediately touches the brain. The first is called *Dura Mater*, the last *Pia Mater*.

The brain is furnished with blood-vessels in the same manner as the other parts, excepting that larger arteries anastomose, and the smaller veins enter more suddenly into a larger trunk, whose sides are of a firmer texture†.

In the more perfect or complicated animals, it is contained in the cavity of the skull:—in the less perfect, it is diffused all over the body.

In man, the brain is in a larger proportion to the whole body than any other quadruped, or any bird, or fish hitherto known†.

From the white part, masses of fibres arise, which go to every part of the body. These are called *Nerves*†.

But

† Fordyce.

But so ignorant are we of the *origin* of the nerves, that the lowest in the spinal marrow may, for ought we know, come from the top of the brain.

One large mass passes down through the cavity of the spine, and is called the spinal-marrow†.

The brain, spinal-marrow and nerves, are covered with membranes of a very firm texture. The nerves sent to the organs of the senses, there lose their firm coats, and terminate in a pulpy substance.

Of the connexion and dependence of the nerves on the *Hydraulic* part of the machine.

*A general view of the Nervous System†.*

The nervous system, as the organ of sense and motion, is connected with so many functions of the animal œconomy, that the study of it must be of the utmost importance, and a fundamental part of the study of the whole œconomy.

The nervous system consists of the medullary substances of the brain, cerebellum, medulla oblongata and spinalis, and of the same substance continued into the nerves, by which it is distributed to many different parts of the body.

G

The

† Fordyce.

‡ From Cullen's Physiology.

The whole of this system may be distinguished into four parts—

I. The medullary substance contained in the cranium and vertebral cavity; the whole of which seems to consist of distinct fibres, but without the several fibres being separated from each other by any evident enveloping membranes\*.

II. Connected with one part or other of (§ I.) are the *nerves*, in which the medullary substance is contained; but here more evidently divided into fibres, each of which are separated from the others by an enveloping membrane derived from the Pia Mater.

III. Parts of the extremities of certain nerves (§ II.) in which the medullary substance is divested of the enveloping membranes from the Pia Mater, and so situated as to be exposed to the action of certain external bodies, and perhaps so framed as to be affected by the action of certain bodies only: these we call the *sentient extremities of the nerves*.

IV.

\* When we speak of functions, which are, or may be in common to every part of this portion of the nervous system, we shall speak of the whole under the title of the *Brain*: but when it is necessary to distinguish particular parts, we shall take care to avoid ambiguity, Cullen,

IV. Certain extremities of the nerves (§ II.) so framed as to be capable of a peculiar contractility ; and in consequence of their situation and attachments, to be by their contraction capable of moving most of the solid and fluid parts of the body. These are named *moving* or *muscular fibres*.

*That muscular fibres are a continuation of the medullary substance of the brain and nerves, has not been shewn by Anatomists, nor universally admitted by Physiologists ; but we now suppose it, and hope afterwards to render it sufficiently probable.*

Are the *Ganglions* of the nerves to be considered as a part of the nervous system distinguished by a peculiar function ?

These several parts of the nervous system, are every where the same continuous medullary substance, which we suppose to be the vital solids, so constituted in living animals, and in living systems only, as to admit of motions being readily propagated from one part to every other part of the nervous system, so long as the continuity and living state of the medullary substance remains.

In the living man there is an immaterial thinking substance or MIND ; and every phenomenon of thinking is to be considered as an affection or faculty of the mind alone. But this immaterial

and thinking part of man, is so connected with the material and corporeal part of him, and particularly with the nervous system, that motions excited in this, give occasion to thought; and thought, however occasioned, gives rise to new motions in the nervous system.

It is probable that the motions excited by the application of stimuli to a moving and irritable part, or to the nerve going to a moving part, *do not arise in the brain*, but immediately in the nerves, or in the part; the brain, in this case, only keeping up the life of the part, and rendering it capable of motion\*.

A substance may act on one part as a stimulant or sedative, and have a less effect, or none at all, when applied to another, although otherwise equally irritable. Such stimuli are called *specific*||. (*See the aphorisms on the Vis Vitalis.*)

It has been conjectured by some, that motion was communicated to parts by a fluid flowing through the nerves as tubes; by others, that it was communicated by vibrations§, and by others, that it arises from *electricity*.

Is a nerve a better conductor of electricity than any other part in the same state of moisture?

By

\* Fordyce.

|| See part fourth, on the action of Medicine.

§ See Hartley, on Man.

By a moderate pressure the nervous influence is intercepted.

Natural History of the *Torpedo*.—The organ which is said to collect the electricity in this animal is not its brain, which is remarkably small.

*Reason and Instinct compared.*

REASON is a self-improving power or faculty of the mind.

INSTINCT is that *discretion* which in different degrees is diffused through every animal, directing them to choose what is good, and to avoid what would be destructive to them. It attains its perfection at once, and is most apparent where reason is weakest.

*On Custom and Habit.*

Custom is the frequent repetition of any application to the body, capable of affecting the sensible or irritable parts ; or it is the repetition of any action or motion of the body\*.

*Habit* is the effect of such repetition.

ON EXERCISE, REST, and SLEEP.

## CHAPTER VI.

### On the PRIMORDIA OF ANIMALS.

THE GENERATION of animals has excited the curiosity of Philosophers and Physicians from

\* Fordyce.

from the time of ARISTOTLE to the present ; still it is involved in impenetrable darkness.

There are facts sufficient to entirely destroy the two famous systems of the *Epigenesists*, and the *Vermiculists*. It is, moreover, a vain and useless speculation : the two extremes of nature, the very *great*, and the very *small*, are out of sight ; from the grandeur of the one, and the subtilty of the other, Admiration itself is soon overpowered, and sinks into undiscerning amazement !

*Quomodo ignoras quod venti vestigium, qualia sint in Prægnantis Utero ossa : sic DEI opus ignoras qui facit omnia !* ECCLESIASTES, chap. XI. ver. 5.

## END OF PART THE FIRST.




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In page 5, line 7, of the Introduction, read, “ *this goodly frame the EARTH.*”