

The system of the womb, with a particular account of the menses, independent of a plethora: to which are subjoin'd, a few observations relating to cold, and its effects upon the body / [Thomas Simson].

Contributors

Simson, Thomas, 1696-1764.

Publication/Creation

Edinburgh : R. Fleming & Co., 1729.

Persistent URL

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THE
 SYSTEM
 OF THE
 WOMEN,

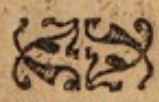
WITH
 A particular Account of the
 MENSES, independent of a
 PLETHORA:

To which are subjoin'd,

A few OBSERVATIONS relating to *Cold*,
 and its Effects upon the *Body*.

By THOMAS SIMSON Chandos-Professor of Medi-
 cine and Anatomy in the University of St. Andrews.

*Vestigia filo regenda sunt: Omnisque via usque a primis
 ipsis sensuum perceptionibus certa ratione munienda.*
 BACON. præf. ad organ. nov. scientiæ



EDINBURGH,
 Printed by ROBERT FLEMING and COMPAN-
 Y, and sold by the Book-sellers in Town.
 MDCCLXXXIX.

THE
SYDNEY
OF THE
WOMEN
WITH
A BRIEF HISTORY AND ACCOUNT OF THE
SOCIETY FOR THE IMPROVEMENT OF
FEMALES

To which is added
A few Observations on the
State of the Female Sex in
the Colonies

By Thomas Wilson
Esq. of the Middle Temple
and Barrister at Law
in the High Court of Chancery
and of the Inner Temple
and of the Middle Temple
in the High Court of Chancery

LONDON
Printed and Sold by
J. DODDING, in Pall Mall
1759



TO THE

Duke of Chandos.

MY LORD,



THE Honour you have done to Learning, in establishing a new Profession in this University, is an abundant Proof that

* *

Your

Your *Grace* has a different Thought from these who officiously wou'd persuade the World, too lazy of itself, that all Proposals for improving the Liberal Arts are idle and presumptuous, these having long since got their finishing from Masters that are not now to be equal'd.

Medicine, 'tis true, has been more than Two thousand Years under the Tutorship of Professors, and some of these Men of an extraordinary *Genius*; but how short a Time is it since the Circulation of the Blood was found out, before which it was impossible there could be any tolerable Reasoning on the *Phænomena* of the Body? So that in this Respect our *Theory* is yet in a State of Infancy.

The

The Invention brought immortal Glory to our Nation, and promises the greatest Advantages to Mankind ; but Nothing besides the Continuation of *Harvey's* Industry and Method can make them good.

He demonstrated the general Circulation, by describing the System of the Heart, and whoever pretends to shew how it is varied in particular Parts of the Body, and to trace its Irregularities there, must describe these Parts, as he did the Heart with its Appurtenances.

How far I have followed the laudible Example, in making out the System of the Womb, is what the Men
of

of our Profession must judge of; in the mean Time, my own Thoughts of the Performance are such as determine me to put it into your *Grace's* Hands, to serve, at least, as a Proof of my Industry in answering the Design of the *Chandos-Profession*.

You have been, my Lord, the living Executor of your own Bounty, (to use the Spectator's Phrase in the delicate Character of *Manilius*, which, in my Judgment, no Pen cou'd have drawn but in Your *Grace's* Lifetime) and what can be more wish'd for, by one who daily shares in it, than that the benevolent Projector, so studious of the Interest of Mankind, shou'd have the Satisfaction to see of its Fruits?

[]

Fruits? All Sense of Gratitude and Honour must be lost, when such Ambition ceaseth. I am,

MY LORD,

Your Grace's

most obedient,

most devoted

humble Servant,

THOMAS SIMSON.

[]
Honour must be lost, when such Am-
bition catches. I am,
Fruits? All Seals of Gratitude and

MY LORD,

Tom Grace's

most obedient

most devoted

humble servant,

THOMAS SIMSON



THE
INTRODUCTION.



THE immortal *Harvey*, from a few simple *Experiments*; and the Consideration of a few obvious Things in the Structure of the *Heart*, and the Vessels that immediately are attacht to it, demonstrated the Circulation of the Blood, with such Evidence, that it now forceth the Assent of every one, who gives himself the Trouble to read it, tho' the most distinguished *Anatomists*, cotemporary with the *Author*, had a thousand Things to say against it, and were brought to acknowledge

it with the greatest Struggle; but the Debate was not long; in less than Half a Century their Prejudices wore off, so that there was scarce one found to oppose the *Harvean* Doctrine; the *Author's* Praises were every where celebrated in highest Strains, and *Physicians* took new Courage in their Investigations, when, by one Man, they found the History of the *Heart* at once undertaken, and finished, and that upon Principles, which at any Time might have been known. This Success made some of the more industrious *Artists* attempt, by the same Method, to trace the Use and Action of the other Parts, which now appeared to them as so many *Appendages* to *Harvey's System*.

By *Experiments* and *Anatomy*, the learned *Pecquet* traces the Chyle into the Subclavian Vein; the ingenious *Lower* accounts for a Variety of *Diseases* of the most intricate Kind, and surprises us with the Certainty and Simplicity of the Cure; *Bellini* demonstrates, that the Bile flows from, and not towards the *Liver*; *Pitcairn* reduces the Action of the *Lungs* to what was intelligible and great; one *Anatomist* dwells upon one Gland, another upon a different; some
com-

compleat their *Proposals*, and others prepare Materials for succeeding *Compilers*; in fine, since *Harvey's* Time our *Art* has been improved with incredible Industry and Success; and both *Theory* and *Practice* have been gradually freed from a Deal of the Bombast and Metaphysick which oppress'd them.

For my own Part, I have come to entertain pretty good Hopes, that *Diligence* and *Time* shall make *Medicine* a *Science*, which, from its Beauty and Certainty, shall engage every natural *Philosopher* in its Study; we want only some more Leisure to cut off from it the Remains of these *Luxuri-ances* it acquired in the Times of *Ignorance*, and to bring into Order the vast Multitude of loose *Observations*, which *Anatomists* have made for the Use of *Compilers*; and to promote this, I reckon, was the particular Charge I was intrusted with, when I was raised to be *Chandos-Professor* in this *University*.

It was by the *Laws* of the *University* I printed lately the first four Discourses I had at the *Chandos-Lectures*, where I gave my Opinion very freely upon what I reckoned superfluous in our *Art*, as likewise of the *Method* that was to

be taken further to promote that *Study*, which I endeavoured to illustrate in explaining the Effects of *Cold* upon the *human Body*, and in accounting for several other *Phænomena*, after a more simple and mechanical Way than had formerly been done.

In Pursuance of the same Design, I propose now to explain the *System* of the *Womb*, reckoning, that by this Time, there are Plenty of Materials to carry me thro' in the Undertaking. There is no Part of the Body that has been more studied than this, nor, in my Opinion, with greater Success; but from all the numerous and elegant *Observations* that have been made, nothing of a satisfying *System* has been yet formed. We cannot but admire each particular Part, while we see its intricate Structure laid open, and something of its particular Design; but how all unite their different *Services*, and contribute to one and the same End, has not yet been discovered: This is the *Task* I now take upon me, which must add a Deal to the Value of every particular *Discovery*, if I succeed in it, and not a little raise our Thoughts of the Wisdom of the great *Architect*, tho' the whole

whole of the *Womb* be but a very private *System*, in Respect of the *Species* taken complexly.

I bring in the menstrual *Flux*, in my Considerations on this Subject, only as an accidental *Affair*, and pretend to shew a more certain *Cause* of it than has hitherto been assigned: My *Opinion* in this Matter being singular, contrary to that of the whole Body of our *Faculty*, and in flat Contradiction to the Writings of some of the most distinguished in it, for whom I have always had the greatest Regard, I cannot be too particular in making an Apology for my Presumption, but the Plainness and Certainty of my Arguments, and the many elegant Problems that at once resolve themselves from my Hypothesis, oblige me to entertain it, tho' I design still to lay my self open to the Conviction of my *Friends*; after recommending to their Consideration the following Reasons, which induc'd me to reject the current *Hypothesis*, and think of another.

The menstrual *Flux* is a very constant *Phaenomenon*, and, with People in Health, keeps its *Periods* very exactly; while the Mass of Blood is influenced by a great many different *Causes*,

which must necessarily prevent its Accumulation in any certain *Proportion*; such *Causes* are principally the Changes, of either the Quantity or Quality, of our *Food*, of our *Exercise*, and of the surrounding Atmosphere, which we can never be sure of, however we may pretend to manage the two former.

If any Person wants full Satisfaction as to the Influence occasioned by these Causes, let him maturely consider the statical *Tables* of the ingenious Dr. *James Keil*, together with his *Aphorisms*; where it is made out by *Experiments*, that the *Body* is in the most variable and fleeting Case imaginable, being sometimes one Pound, sometimes two, lighter and heavier, by most uncertain and sudden Turns; and none of his *Tables* give Ground for the least Suspicion of a gradual Accumulation; whereas the Doctrine of the *Plethora* supposes a daily and gradual Accumulation of about six Drams in the *Mass* of Blood; a strange Supposition! while it is so irregularly supplied; and while there are so many *Secretions* so easily influenced by external Causes. As for *Sanctorius's* Authority, who advanced, that at the End of each Month,

there

there was an Augmentation of the Weight of the Body to one or two Pounds, I think I call it in Question upon very good Grounds, his *Aphorism* upon this Head being delivered with a great many more, which, 'tis plain, the *Author* cou'd never have made any *Experiments* about, but which the *Theory* of the Time he lived in had made him conclude of Course: For it is easy to see, that the few *Experiments*, by which he found out the insensible *Perspiration*, had inclined him to solve the most of the *Phænomena* of the *Body* by Means of it, and look upon that as absolutely necessary in the *Theory* and Cure of all *Diseases* (*a*); while Mr. *Keil* shews that the greatest Changes happen in that without any bad Effects at all, and that the *Diseases* which were most suspected to have followed upon its being stopt, such as the *Cold*, were no-way dependent upon it: Finding then that *Sanctorius* took such Liberty in his *Aphorisms*, and that the monthly Accumulation is so opposite to the certain Observations of *Dr. Keil*, we reckon that we reject it upon

A 4

good

(*a*) *Sanctor. Aphor. 2. 3. 43. 75. 76. 77. § 1. &c.*

good Grounds, as a mere Opinion of *Sanctorius*, which he has been led into from what he saw happen in Fact, *viz.* that Women have a monthly Discharge of about that Quantity, which would naturally prejudice him to think that there should be a preceeding Accumulation, as *Hippocrates* supposed, and several others, who never consulted the *Ballance*.

But I can refer the Justness of my Plea, upon this Head, to what every *Physician* has Occasion to observe every Day in their Practice; the Quantity that *Dr. Friend* supposes daily to accumulate is five Drams and a third of a Dram. Now let us suppose after twelve Days Accumulation, that a Woman, subject to this *Hæmorrhagie*, is let Blood of to the Quantity of eight Ounces, or sixty four Drams, of which there are frequent Examples; then, by this Means, the whole accumulated Quantity is deduced from the Mass of Blood, and consequently the twelve Days past will contribute nothing to procure the *Flux*; and therefore it will not appear till a Month after this extraordinary Loss of Blood; that is to say, it will be forty two Days after the last Period before another

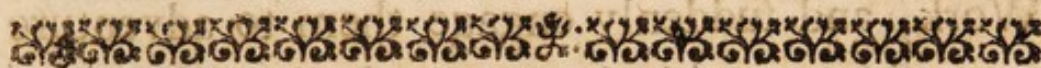
another happens. This Way of arguing is inevitable from the Supposition of the *Plethorists*; and I refer it to the Candor of every *Practitioner*, if ever they were sensible that drawing Blood in the Interval protracted the Flux one Day. For my Part, I have been Witness, with different Surgeons, of two, four, nay, in one Instance, of ten Pounds Blood being taken, in the Space between two *Periods*, where there was no raised Pulse, without protracting the *Interval*; then, and for some Months after, the Flux kept the very same Times it had observed for several Months before, as did the *Saliva* and other Secretions. But 'tis needless to accumulate Particulars in a Case every one has Occasion to try. The same Observations may be made as to Fasting and Purging, which have no Influence to alter this Flux, nor can they ever do it, except they be continued so long, that the Stomach decays with the other Powers of the Body, which are, in many Cases, rather increased than diminished by these Means: Which, to a Demonstration, make out that this *Phœnomenon* must depend upon some other Foundation than that of a *Plethora* of
 one

one or two Pounds gradually accumulated, since the taking that from the *Mass* no-way affects the *Period*: I shall not pretend to trace all the Refuges that may be taken to evite the Force of my Arguments, but only recommend my *Theory* of that *Phænomenon* to be read without Prejudice, and to compare the current *Theory* and it together.

As to that Position of the *Plethorists*, that Women have come to the ἀκμὴ or Pitch of their Growth, before the Phænomenon takes Place, I have been at Pains to enquire into this, and find the Fact every where contradicted, the Growth never being more remarkable than after this Time, at which the Body becomes every Way more healthful; while before the commencing of this Discharge all the Actions of the Body languished; the Cause of which we shall explain afterwards.

And thus I have ventured, in every other Article upon this Head, to dissent from the Multitude, not having yet learned, that *Heresy*, or the dissenting from the current Opinions of the generality, is accounted a Crime among Physicians. Our Glory, if I mistake it
not,

not, is in a constant and gradual Reformation, and not in caballing, and making up of Parties, resolutely to adhere to certain Positions, which only Bigots, thro' all the Quarters of the World, place a Merit in; they can take no Trouble to search into Things, and so they are generally in the Wrong, but keep up their Credit by their Zeal for the established Opinions, which is every where, by the Multitude, more esteem'd than Truth.



C H A P. I.

Of the Structure of the Womb, the Ingraftment of the Ovum upon it, and the Production of the Secundines.

ONE *Stomach* (where the Food lies undistinguished) supplying the Mass of *Blood*, which is distributed thro' the different Parts of the *Body*, by the impartial *Heart*, must convince us that the *Variety*, which we find in the *Form*, *Velocity*, and *Exit* of the Liquors, after their Protrusion from the *Heart*, is owing

ing

ing to the *Circumstances* of the Parts, thro' which they afterwards pass; and consequently these must be carefully remarked in the Solution of Problems relating to such Cases.

2. This is what the more judicious of our modern *Theorists* have at length become sensible of, so that we have now very few *Schemes* where the *Structure* of the Parts is not less or more regarded, tho' seldom is it enough, so as fairly to guide them in every Step of their Procedure; the smallest Hints set their busy *Fancy* at Work, and suddenly engage them to adventure on a *Scheme*, with the Help of *Suppositions*, and *Comparisons*, which is generally well received, if it has so much *Art* in its *Composure*, as to be of a *Piece* with itself; tho' no less different from what takes Place in *Nature*, than if her *Works* had never been consulted: I shall not add any Thing to what is already advanced, to shew how much this has been the Case of the *Schemes* hitherto prefer'd to explain the *Phænomena* of the *Menses*; but shall immediately enter upon the *Structure* of the Parts concerned, and to their Guidance wholly resign my self.

3. The

3. The Womb is the great *Nursery* of Mankind, contrived for the *Reception, Sustainance,* and timeous *Discharge* of the *Fætus*, but noways employ'd in the Concerns of the *Mother*, (tho' so intimately united to her, that it is justly look'd upon as one of her most distinguished Members) its *Apparatus* is manifold and various, but at present we shall not meddle with any Part of it, except what may be subservient to the Understanding of the particular Heads we have undertaken to explain in this Chapter.

4. *De Graaf* (a) reckons, that, from the *Os Uteri* to the upper Part of the *Fundus*, the Womb is three Fingers Breadth; and that at the *Fundus*, measured a-cross, it is two and an half; and at the *Cervix* scarce two: In Infants he reckons its Weight to be a Dram, and sometimes a Dram and an half; in *Women* past the Time of Child bearing, and *Virgins* come to *Puberty*, he finds it to be of the same Weight; and for the most Part, to weigh from an Ounce to an Ounce and an half; so that

(a) *De Graaf de mulier. organ. Cap. viii.*

that after *Puberty* the *Womb* does not encrease, except in extraordinary Cases.

5. The same *Author* observes a considerable Disparity in the different Parts of the *Womb*, as to their Firmness and Strength; the outer Part of the *Fundus*, he tells us, is not so firm and nervous as the inner, nor yet as its neighbouring Part the *Cervix* (*b*); and if we further consider, that the *Arteries* enter into the *Womb* below the *Tube* (*c*), in large Branches, that are much weakened before they reach the vertical Parts, where the *Veins* likewise are very small and weak; and that the round Ligaments, by being insert into the Lateral Parts where they spread widely (*d*), contribute very much to strengthen them, while the vertical Part has no such Advantage: We must therefore be convinc'd, that the vertical Part is much weaker than any other Part of the *Fundus*, or yet the *Cervix*, which, besides what Advantage it has by its own Composure, is likewise stronger than the *Vertex*, by being intimately

(*b*) De Graaf de mulier. organ. p. 106. (*c*) Idem, Tab. 1. L. T. V. (*d*) Idem, p. 149.

timately join'd to the Bladder and last Gut (e), as the *Vagina* is (f).

6. *Malpigi* who gives us the Structure of the *Body* of the *Womb*, without distinguishing its Parts, tells us, that there run, below the outer *Membrane* that covers it, Courses of *Muscular Fibres* linked and join'd together, so as to form a Kind of *Net-work*; whereof also many, loosely scattered, run thro' its whole Substance in irregular Courses, so as to make up the greatest Part of the Bulk of the *Womb* (g).

7. He adds, That Courses of the same *Fibres* run along its Concave or inner Side, but determines nothing of their Order (h). *Ruysch* is very particular in his Description of those at the *Fundus Uteri*, he tells us they ly in so many circular Courses round that Part, so as to make up a particular Muscle (i).

8. The Concave surface of the *Fundus* is found stretch'd and smooth without an inner *Membrane* (k), but that of the *Cervix* abounds with

(e) De Graaf, p. 94. (f) Ruysch thes. viii. p. 9. (g) Malpig. dissert. epist. ad Sponium de uteri compage in mulier. (h) Idem, ibid. (i) Ruysch adv. Decas 2. No. X. Tractatio anat. de musculo in fundo uteri. (k) Morg. Adv. IV. p. 47.

with wrinkling *Plies* (*l*), which hang down so loose that *Morgagni* calls them *Valves* (*m*), produced from the Duplicature of its inner Membrane.

9. Betwixt the Interstices of the *Fibres*, scattered thro' the Substance of the *Womb* (§ 6.), there are stretched soft yielding *Membranes*, which, as the *Fibres* themselves, must ly in very different Plans; along these *Membranes* are spread vast Numbers of large *Sinuses*, which have Passages by which they mutually correspond (*n*); these *Sinuses* occasion the Porosities so much observed in cutting thro' the Substance of the *Womb* (*o*), and are equally in the *Cervix Uteri* and the *Fundus*, but not in the *Vagina* (*p*).

10. The Spermatick and Hypogastrick *Arteries* and *Veins*, that serve the Body of the *Womb*, and these *Branches* of the Hypogastricks that serve the *Vagina* are very much folded and twisted in their Course thro' these Parts; and

(*l*) De Graaf, p. 108. (*m*) Morg. Adv. I. p. 13. (*n*) Malpig. dissert. epist. ad Sponium de uteri compage in mulier. (*o*) Morg. Adv. IV. p. 47. (*p*) Idem, Adv. I. Tab. 3.

and the *Branches* of the different *Arteries* inofculate frequently one with another, as do thefe of the *Veins* (q).

11. Both *Arteries* and *Veins* communicate with the *Sinufes*, and the *Sinufes* open into the Cavity of the *Fundus Uteri* (r): This Way betwixt the *Arteries*, *Sinufes* and Cavity, in a Subject *Morgani* examined, was fo very patent in the Ninth Month of Gravitation, that the little Finger entred the narroweft Part of it (f).

12. Most of the older Writers in Medicine had a Notion of Passages from the Blood Vefels to the Cavity of the *Fundus Uteri*; and asserted, that both the *Lochia* and *Menses* flowed by them (t): And now we have it demonstrated, that it is to the Extremities of thefe very Passages, that the *Placenta* adheres (u); which is restricted to the vertical Part of the Capacity of the *Womb*, i. e. to the Place where the circular *Fibres* (§ 7.) are feated (x); and that in all *Positions* of the *Womb* (y).

B

13. Nay

(q) De Graaf de mulier. organ. Cap. vii, viii. (r) T. Bartholin. anatom. reform. Lib. 1. Cap. xxviii. (f) Morg. Adv. IV. p. 48. (t) Fœsli Oecon. Hip. vide κοτοληδονες. (u) Morg. ibid. (x) Ruyfch Adv. Decas 2. No. X. (y) Devent. ars obſtetri. cap. ix.

13. Nay *Morgagni* by distinct and repeated Enquiries has made out, that the *Menstrua* have no Exit either by the *Vagina* or *Cervix Uteri*, but from the *Fundus* only, from every Part of whose Capacity they equally flow (2); so that we have the greatest Evidence, that the *Lochia* and *Menstrua* flow from the same Parts, and that it is to these very Parts the *Placenta* is fixed; which gives us the most satisfying Argument that these Passages were primarily designed for the Service of the *Placenta*; and it will still appear, with greater Evidence, upon considering the Circumstances of the *Ovum*, after it has arrived at the *Fundus*, by the *Tubæ Fallopiæ* from the *Ovarium*, which we are now to enquire into.

14. From the Time of Conception there is observed a gradual Change in some of the *Ova* for some Days, till at length Part of their outer Cover points outwards, bursts, and is delivered of the *Ovum*, which is immediately received by the *Tubæ Fallopiæ*, and transmitted to the *Womb* (a).

15. The

(2) Morg. Adv. I. p. 45, 46; Adv. IV. p. 48, 49. (a) De Graaf de mulier. organ. p. 310, 311, 312, 313.

15. The Part of the *Ovum* thus separated is enclosed in a double Membrane, that every where appears of a Piece (*b*); and there is left behind in the *Ovarium* its third Membrane, which is very thick, and tinged with Blood thro' the whole of its concave Surface, which discovers that the Body of the *Ovum* has been separated with Violence from its Seat; and that it is received into the *Tubæ Fallopianæ* with open Vessels, thro' the whole of its Surface (*c*).

16. Upon a compleated Act, both the *Tubæ Fallopianæ* and *Fundus Uteri* are full of the *Semen* (*d*); which seems to have much the same Properties with the White of the Egg, with which the Chick is nourished; and consequently as soon as the *Ovum* is separated from the *Ovarium*, it is engaged in the Midst of a Liquid capable to be absorbed, (by the open Vessels round its Surface, (§ 15.) or other Absorbents, which few Parts want) and at the same Time fit to nourish and distend it; and hence we may understand, why the Conception does not hold, when the Bulk of the *Semen*

B 2

comes

(*b*) De Graaf de mulier. organ. p. 292. (*c*) Ruysch Thes. VI. p. 17, 18, 25. (*d*) idem, ibid. p. 15.

comes away, as *Hippocrates* and *Ruysch's* Correspondents observed (*e*).

17. The *Ovum*, upon its Arrival at the *Fundus*, is spherical (*f*), and very little in Respect of the Capacity of the Place that receives it (*g*); and continues to float loose for some Days (*b*); whence it must necessarily follow, that it is altogether uncertain how it will fix, *i. e.* what Part of it upon fixing shall be next to the vertical Part of the *Fundus*, what Part next the Entry to the *Cervix*; and so on; and therefore it must be allowed, that in different Women, or in the same Woman, at different Times, the *Ovum* will obtain very different Positions.

18. After the *Ovum* has been for some Time nourished with the *Semen*, it turns fibrous round its Surface, and thus in every Part of it discovers the Rudiments of the *Placenta* (*i*).

19. After the *Ovum* has been somewhat longer in the Womb, and arrived at that Bigness, as

(*e*) *Ruysch Thes.* VI. p. 16. *Hip. de natur. puer.*
 (*f*) *De Graaf*, p. 262. (*g*) Compare the Ova, *Ruysch Thes.* Tab. 1. and the Capacity of the *Fundus*, as described by *Morgagni*, *Adv.* V. Tab. 3. (*b*) *de Graaf*, p. 263. (*i*) *Ruysch Thes.* G. *Repos.* III. No. VII.

to come in Contact with its Sides; (the Time of which may be determined from comparing the Capacity of the Womb (§ 4.), with the given Egg, or from the *Ovum* turning from a Sphere to a Spheroid, with a shorter and longer *Axis*, as the Shape of the Womb must determine it to be at first Meeting) (*k*); then it loses its fibrous Form at one of its Extremities, which turns membranous (*l*).

20. This membranous Part turns still larger and larger, in Respect of the Fibrous (*m*); so that in the last Months we know it is vastly larger than the Fibrous; whereas these Figures of *Ruyfch*, to which we have referred, shew, that at first the fibrous Part was by far the largest; and to these the Observations of the most accurate *Anatomists* agree. *Ruyfch* was always surpris'd at the Largeness of the *Placenta*, or fibrous Parts in the first Months (*n*); tho' the Strangeness of the Sight made him take a Notion, that it was only accidentally acquired (*o*): He further informs us, that others observed the

B 3 same

(*k*) De Graaf, p. 265. (*l*) Ruyfch Thes. VI. Fig. 2. Tab. 1. (*m*) Idem, ibid. Compare Tab. 1. Fig. 3, 5. Tab. 2. Fig. 4, 5. (*n*) Idem, Adv. anat. decas 2. p. 29. Catalog. rarior. 170. (*o*) Idem Thes. VI. p. 59, 78.

same Thing, and that they, from finding so large a *Placenta*, come away expected to find a large *Fœtus*, and thereupon gave Medicines to bring that away next, tho' it had already past invisible, by Reason of its Smalness (*p*): *De Graaf* was no less surpris'd with the early Largeness of the *Placenta*, which he found frequently in the first Months surrounding the whole *Fœtus*; tho' others were at so great a Loss what to make of it in these Cases, that they entertain'd Conjectures of its being one of the Moles that are so much talk'd of (*q*). I have examined *Placentas* my self, about the second Month, at which Time I found them exceedingly large, and as genuine as what we meet at the ninth Month.

21. We find then, that the *Ovum* is fibrous, that is, discovers the *Placenta* equally in every Part of it, till once it comes contiguous to the Womb, (§ 18.) at which Time it turns membranous at one of its Extremities, (§ 19.) which must be allowed to be the Extremity next to the *Cervix Uteri*, we finding the *Chorion* and
Amnion

(*p*) Ruysch Thef. VI. p. 59. (*q*) *De Graaf de mulier. organ.* p. 294.

Amnion always there, while the *Placenta* is at the vertical Part of the Capacity of the Womb, (§ 12.) and after this the membranous Part, tho' least at first, always increases, till it becomes vastly larger than the other (§ 20.), in the mean Time we know it was purely accidental what Part was next the *Cervix*, and what Part answer'd to the Cavity of the *Fundus* (§ 17), and therefore it must be accidental, what Part of the *Ovum* becomes the *Placenta*, and what the *Chorion* and *Amnion*, *i. e.* every Part of the *Ovum* is capable to be either, according to the Place it is possessed of, which makes us easily understand, that the Membrane that is upon the convex Side of the *Placenta*, is nothing else but a Continuation of the *Chorion*, and that it cannot be separated from the other Parts of the *Placenta*, otherwise than one Ply of a Membrane can be separated from another, as *Ruyfch* frequently observes (*r*): How they come to have such different Appearances will be understood afterwards.

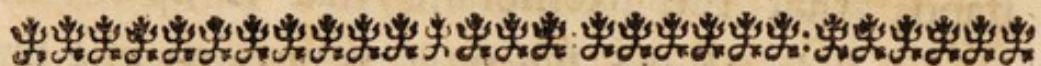
22. We further understand, from what has been advanced, that the whole Capacity of the

B 4

Fundus

(*r*) *Ruyfch* Thef. V. p. 27.

Fundus is stor'd with Passages that give easy Access to the Mass of Blood (§ 11.), and that the whole Surface of the *Ovum* is stor'd with these Passages, by which it formerly communicated with the *Ovarium*, and other Absorbents (§ 15.); therefore, when the *Ovum* has arrived to the *Fundus*, and increased to that Bulk, as to come in Contact with its Sides, of Necessity the open Vessels of the *Fundus* and *Ovum* must meet, and inosculate, (except those of the Egg that ly over the Entry to the *Cervix*) after which none of them can enlarge, but in Conjunction one with another.



CHAP. II.

23. *Of the Time of the Eruption, Periods, and Stopping of the Uterine Hæmorrhagie.*

PROP. I.

THE Body stops not in its *Growth*, because its solid Parts are so far stretched that they can stretch no further, but from the Want of a sufficient *Force* to stretch them.

If

If after the Body has come to its full *Growth*, the lateral Pressure of the Fluids in any particular Part be augmented, (as always happens at these Parts that ly near Vessels, where the ordinary Course of the Blood is retarded, or altogether obstructed, while the Velocity and Quantity of the Mass is unchanged (a) we find the *Parts*, thus affected, increase considerably in their *Bulk*; thus sometimes we have the *Liver, Spleen, Kidneys*, and now one *Limb*, then another, of enormous *Bulk*, from the Blood being stopt in some of their Vessels; and therefore the Body is not fixed as to its *Bulk* or *Growth*, from the Incapacity of its Parts to yield, but from the Want of a sufficient Force to distend them.

P R O P. II.

24. **T**HE original *Communications* and *Passages* among the Vessels becoming more free, and the Course of the *Liquors* upon that Account more easy, the Body comes to its ἀκμὴ.

The

(a) Lower. de cord. Cap. 2. Causæ intestinae mutationis cordis motus Artic. 2.

The more the *Vessels* of the Body distend, the freer is the Course of the *Liquors* thro' them, therefore the whole Time that the Body is growing, the *Circulation* and *Secretions* are still becoming more and more free; and consequently the lateral Pressure of the *Liquors* comes to be less and less; *i. e.* the *Cause* that distends the Body is still growing weaker: Since then the sensible and present *Cause* of the Growth of the Body, evidently loses itself, while it exerts its *Force*, we have no Ground to search for any other Reason why at length it should become ineffectual for that End; especially since we find that upon increasing the Force upon any Part (as happens in the preternatural Cases we mentioned, § 23.) there commenceth a new *Growth* again.

25. *Schol.* Some may suppose, to evite the Conclusion I have made in this Proposition, that the Force of the Heart increases, and the *Aorta* widens so much in the Time the Branches are distending, that they can supply the Branches as fully and quick as before, and so the Circulation will be still as difficult as formerly: To answer the Objection it must be remembered,

bred, that the Number of distended Branches in a Person come to his full Growth, is greater than what it was in the Embryo, and so the Velocity of the Blood must be allowed to be then in the Branches, less than in the Trunk, in a greater Proportion, than what it was before (b), suppose the Strength of the Heart and the Quantity of Blood be allowed to be proportionably augmented as the Branches are. But in case this Argument should be still doubted, I would have these Observations considered, by which it appears in Fact, that the Force of the Blood is so much augmented by a small Stoppage of its Course, that in these Cases it always obliges the Vessels to a further Distention; so it must be the Freedom of the Circulation that prevents the further Increase of the Body; which is so true, that in these Cases, where the Resistance gradually increases, the Vessels are sure to do the same: Thus in Steatomatous Tumours, where there is a perpetual Increase of Matter in the *Foliculus*, which gradually compresses its Vessels, there is likewise

(b) Keil Tentam. 2.

wife a perpetual Increase in the Vessels; so that as the Matter increases, that compresseth the Vessels, the Vessels increase; which is a plain Demonstration, that thereby the Force of the Blood is increased upon them. From all which it is plain, that if the Circulation did not turn gradually more free and easy, there would be a perpetual Growth: Nor is it difficult to guess, how this gradual Easiness should happen, while the Body is growing; we see what a small Orifice in a Bladder does prevent it to be blown up, the same Way it is that a small Aperture in any one Vessel, corresponding with a great many other Vessels, gives such a Vent to the Liquors, as in a great Part to destroy their lateral Force: And consequently in the Time the Body is distending, and the Communications betwixt the Arteries and Veins enlarging, (by which the Blood passes more freely to the passive Veins) and some Excretory Ducts are made patent, which formerly were shut up; and these that from the first were patent made wider; we must own, that the Resistance to the circulating Blood must decrease in a greater Degree than what the Force of the Heart and the Dimensions of the

Aorta

Aorta can be supposed in an uniform Way to increase. Which is the Foundation of the Truth of our Proposition.

P R O P. III.

26. **T**HE Eruption of the *Menses* is the Cause of the Womb's coming to its ἀκμὴ.

The Womb was still increasing to the Eruption of the *Menses*, but not after (§ 4.), except in extraordinary Cases; and by the Eruption the lateral Force of the *Liquors*, or the Force that distends the Vessels of the *Womb*, is necessarily broke: So that the *Womb* gives over growing at the very Time that this natural Cause of its *Growth* ceaseth: And therefore it is just to reckon it the only Cause which then procured that Effect; especially since upon the *Placenta's* being applied to the Extremities of the Vessels of the *Womb*, (which is a new Impediment to the direct Course of the *Liquors*, and so must renew their lateral Force) the *Womb* commenceth a new *Growth* again.

27. *Schol.* The *Spermatick Arteries* that serve the *Womb*, and the *Hypogastrick Arteries* that serve

serve the *Womb* and *Vagina*, mutually inosculating (§ 10.); and the *Sinuses* that ly thro' the *Fundus* and *Cervix Uteri* communicating likewise (§ 9.); and the *Hypogastricks* and *Spermaticks* opening into the *Sinuses*; which again open into the Bottom of the *Womb* (§ 11.); it follows that, upon these *Passages* being so distended as to give Access to the Blood into the *Cavity*, not only the *Sinuses* of the *Fundus*, but likewise of the *Cervix Uteri*, will have the Force of the Blood much diminished thereby upon their Sides; as it will be likewise upon the Sides of their *Arteries*, and the *Arteries* of the *Vagina*; hence all the Parts of the *Womb* will stop in their *Growth* at once; and when a Woman is with Child, and thereby the same Impediment is procured to the Blood at the Womb, that it had before ever the Passages into the *Cavity* yielded to it; then all these different Parts must distend proportionably to their Strength; and thus we find in Fact, that not only the *Body* of the *Womb*, but the *Vagina* likewise, grows larger in a Woman with Child; the Necessity of which no Body can be ignorant of, tho' they may well admire the Way how it is so seasonably

ably procured ; but these Parts distend in very different Proportions, as shall be shown afterwards.

P R O P. IV.

28. **T**HE gradual Increase of the *Womb* is the Cause of the Eruption of the *Menses*.

From the first Frame of the *Womb* there were still natural *Passages* from its Arteries to its *Cavity* (§ 11, 36.) ; the Straitness, Length, Turns of the *Vessels*, and lateral *Sinuses*, that make up that Passage, together with the Parts that secure them, and the Freedom of the Circulation thro' the intermediate Branches ; were the only *Causes* that prevented the Blood from reaching the *Cavity* at first ; now, as the *Womb* increaseth with the other Parts of the Body, the Blood must have Opportunity still to penetrate further and further into the *Passage*, and the *Womb* continuing to increase to the Eruption of the *Menses* (§ 4.) ; we must allow that to that Time the *Impediment*, which kept the *Eruption* from taking Place, was daily removing ; so that the gradual

dual *Increase* of the *Womb* is a present and natural Cause to procure the *Menses*; and since it was still acting till they broke out, it is to be allowed the genuine *Cause*.

29. *Schol. I.* From this Proposition we see that the *Menses* appear in Course from the uniform Actions of the Body, which, besides this, must make a great many other Alterations both in its Liquids and Solids: Thus in *Infants* and *Children* we find the *Bile* and *Urine* of quite different Forms from what they are afterwards; which can be attributed to nothing but the different *Apertures* and different *Forces* which the Vessels gradually acquire; the *Emulgent*s are bigger at the Age of Fourteen than the *Aorta* was at Two; and thus proportionally the Branches will alter; from such Changes we may likewise deduce the Appearance of the *Semen* at a certain Time, notwithstanding that the *Testes* with their *Apparatus* were compleated long before, without seeking for any new *Cause* acting upon the Body to produce such a new *Effect*.

30. *Schol. II.* Since after Child-bed we find that during the whole Time the *Womb* is reducing itself, it has a continual *Flux*, till it arrives

at

at its ordinary Bigness, however much the Body is exhausted at that Time; we may therefore conclude, that when it is stretched any Degree above that Size, that the *Passages* are so open as to make the *Flux* necessary, whether the Body be *Plethorick* or not; and consequently, when at that Size, these Passages must want but a very small Degree of Distention to allow the Blood to pass them: Which Consideration sets the Circumstances of the *Womb* in a very clear Light with respect to the *Phænomenon* we are explaining.

31. *Schol.* III. The Hypogastrick and Spermatick *Arteries* that serve the *Womb* are larger, in respect to the Bulk of it, than any other of the *Arteries* of the Body, in respect to the Bulk of those Parts they serve, and they enter the *Womb* in a very direct Course; so that the *Womb* must receive a much greater Quantity of Blood, than any other Part; yet all of it is returned again by the *Veins* without undergoing any Change, except the small Quantity that is spent in moistening and lubricating the *Cavities*, till the *Menses* break out; and it is this easy Course which the Blood has by the *Veins* that diverts it

so long from the *Emissaries*; and that makes it have such a slow Progress towards the *Sinuses*; for it is certain that the Veins always increase with the Arteries, and so the Circulation by them turns always more and more easy, as the Parts increase; and thus the *Diversion* of the Blood from the *Emissaries*, increases as the Parts increase, yet these must receive an Augmentation, (they having their *Rise* in the Sides of the enlarged *Artery*, which makes their *Mouths* with the *Artery* turn larger) tho' it be very insensible, upon Account of the increasing *Diversion*: By all which we understand that the Blood may be very near the Confines of particular Vessels, at Parts which are daily increasing, and yet take a long Time to reach these Vessels; nay, perhaps it may never reach them in a regular Way: For Example, if the Veins of the intermediate Vessels, notwithstanding all the Distention that is made, are able to intercept the increasing Quantity of the Blood till once the *ἀκμὴ* of the Part happens; and such a Case, if I mistake it not, takes Place at the *Breasts*; at which, in *Infants*, upon tying the Navel-string, the *Sinuses* are filled, tho' afterwards they are never so, till the

the

the Time of Pregnancy, or that some evident Disease causes it; which Case I beg leave to insist upon, it tending much to give a right Notion of our Doctrine.

32. The first Question upon the Head is, Why the *Breasts* should swell with *Milk* two or three Days after tying the Navel-string? Which is easily solved, upon considering the Rise of the umbilical Arteries, which is either from the internal *Iliacs*, or from the Extremity of the *Aorta* (c); so that they ly very near the *Epigastricks*, and consequently when they are destroyed suddenly, as happens at the Birth, the neighbouring Vessels must receive a sudden Shock, while the Blood, that uses to pass the umbilical Vessels, is oblig'd to distribute it self among them; and so with the Rest the *Epigastricks* will be affected: Hence the mammary Artery, that inosculates with them, will either receive a Share of the Augmentation, or, at least, will be obliged to distribute elsewhere that Part of its Blood that uses to descend by them: And so by either Supposition a

(c) Morgag. Adv. IV. P. 85, 86.

larger Share of Blood will be forced in upon the *Breasts*, and thereby that Secretion of *Milk* take Place, which we observe at this Time.

33. Here we cannot pretend a general *Plethora* as the Cause; for this happens before the Child has received any Thing but the small Quantity of a Purgative, with which it is served for some Days; and the *Breasts* not being much swelled till the third Day, shews that they gradually increase after the abolishing of the umbilical Arteries; and that while the *Mass* is rather diminishing than increasing; so that this *Phænomenon* must happen in the natural and obvious Way we have explained; where, by the by, I must observe, how much easier it is for Vessels to be affected from their neighbouring Vessels, than from the Changes of the *Mass*, we having no Example of any extraordinary *Eatings* or *Drinkings*, or of the highest *Fevers*, where the Velocity is much increased, ever affecting the *Breasts*; while here we see that the destroying the neighbouring Vessels does it; but more of this afterwards.

34. Now what I conclude from this *Phænomēnon* is, that from the Beginning the secretory *Ducts* of the *Breasts* are intire, and the *Passages* from the *Arteries* to them patent and open; but, after this, the Secretion not being favoured by draining of the *Milk*, the extraordinary Supplies of the mammary *Artery* bestow themselves otherwise, and so this *Secretion* appears no more, as in *Nurses*, after the Child is weaned, till once there be some new and sudden Shock made upon them again; of which afterwards.

35. We must own that the *Hypogastricks* ly nearer the umbilical *Vessels* than the *Epigastricks*, and so the *Womb* should be more affected, by our arguing, upon tying the Navel-string; and undoubtedly it is so, but a sudden *Force* cannot break thro' the *Passages* of the *Womb* so easily, as those of the *Breasts*; for we find a Woman is at least a Month after nursing before she menstruates; whereas the *Sinuses* of the *Breasts* are filled three Days after tying the Navel-string, or three Days after Child-bed, which shews that there is a much easier Access to them than to those of the *Womb*; and there.

fore, tho' the Force of the distributing Blood appears at the *Breasts*, there is no Reason why it should do so at the Womb, it being just to suppose that the extraordinary Share of Blood, that was oppressing these Parts, has disposed of itself by Ways that yield to it easier than those of the Womb, before it could pass there; tho' there are some Instances too of its penetrating the *Womb* about that Time (*d*); In which we must suppose the *Womb* to have been more patent than ordinary, or some other extraordinary Cause, as we must always allow in every other Case, when the *Menses* happen before the ordinary Time; of which I had one Instance in a Girl seven Years old, who, in that Age, had three regular and successive Courses of the *Menses* (but none for these four Years past) at which Time, I suppose that the *Epigastricks*, or some other of the neighbouring Vessels were compressed by some Tumour, or that some other Cause took Place, which made the *Womb* have a larger Share of Blood, so as to occasion these *Menses*, till that extraordinary Cause ceased.

36. But

(*d*) Bohnii Circul. Anatom. Progym. XVI.

36. But whatever was the extraordinary *Cause*, it is plain from such Examples, that from the *Birth*, the *Passages* thro' the *Womb* are patent to the Blood, but that, till the larger *Arteries* are much enlarged, it does not enter them in such *Quantity*, and with such *Velocity*, as to fill all the intermediate *Branches* and the *Emissaries* at once; so that the *Menses* depend upon the enlarging of the *Womb*, as we have advanced in the Proposition, and since it is always enlarging till they break out, as we likewise observed, we must confess that a Cause most natural to procure the *Menses*, was still acting till they appear'd.

37. *Schol. IV.* Here it will not be amiss to consider what must necessarily happen thro' the *Body*, and particularly at the *Womb*, and adjacent *Parts*, upon the Blood's getting into the *Sinuses* and filling them: 'Tis from this that we account for the whole Symptoms that appear at the Eruption of the *Menses*; and at these Times, when they are irregularly suppressed; which, to every *Philosopher*, should give more Satisfaction than what is advanced from a doubtful *Hypothesis*.

The *Sinuses* of the Womb being equally spread thro' every Part of it, vastly numerous, considerably large, and communicating one with another, as we took notice (§ 9.); then of Necessity, when they are filled and distended, the whole Vessels that run among them must be compressed, *viz.* the whole *Arteries* and *Veins* by which the Blood circulates thro' the Womb: And consequently, the great Quantity of Blood that uses to pass freely by the *Spermaticks* and *Hypogastricks*, will undergo a very considerable Retardment, and the Volume of the Womb it self will be enlarged some-what and stiffened: Which Reasoning I hope will be the more readily allowed, that we see the like *Phænomena* happen at the *Breasts* upon filling of their *Sinuses* (which, according to *Malpigi*us, are much of a Piece with those of the Womb) (*e*); it is then indisputable, that upon filling such a vast Number of *Sinuses*, in such a compact Body as that of the *Womb*, the Circulation, in a great Measure, must be stopt in that Part, and consequently, the Blood that uses to pass there, will be obliged to distribute

(*e*) *Malpig. de Uteri Compage in Mulier.*

bute it self thro' the neighbouring Parts, which Addition to them must oppress them not a little: Hence all the Uneasiness that is felt before the *Eruption* among the Branches of the *Aorta descendens*; the Pain of the *Back*, *Colicks*, *Nauseousness*, &c. And the more tender any of these Parts happen to be, the spreading Force will be the more perceiv'd at them. Now a great many of the lower Parts of the Body being thus harassed, the Rest, with whom they have an evident Connexion and Sympathy, must be disordered some-what at the same Time; especially the Head, which in most People is so easily affected, that the least Disorder, tho' in the most distant Parts, disturbs it: But tho' at this Time the whole Body suffers, yet it is easy to observe that the Parts adjacent to the Womb do so most remarkably; as likewise the *Breasts*, from the Connexion they have with the *Epigastrick Artery*.

38. So that upon the Blood's getting into the *Sinuses*, we see all the *Symptoms* must take Place, that were reckon'd to come from a *Plethora*, and must continue till it has forced its Way into the Cavity of the *Womb*, by the natural Passages

Passages that ly betwix the *Sinuses* and it; for which it has now acquired a very great Force, since the Course, by the intermediate Branches, is so much retarded, and so the Force of the whole Blood that enters the Arteries made to land on the *Sinuses*.

I own that much the same Symptoms might be produced from a *Plethora*; but then I would expect a much greater one than what would be occasioned by the Addition of twenty Ounces extraordinary, which is all that is pretended by those who stand up for it in this Case: It is certain, that where the Person is found, the *Symptoms* leave them the first Day of the *Flux*; that is, before a Fourth of the *Plethora* can be discharged; so that if the taking away of five Ounces, takes away the *Symptoms*, this Quantity and more being supplied by next Meal, the *Symptoms* should again be as violent as ever: Nay, let us suppose, that, after the *Flux* is quite over, and the *Plethora* of twenty Ounces evacuated, we have only a Fourth of what *Sanctorius* allows for our Food a Day, in our Blood at once, that is, two Pounds (*f*); then at that
Time

(*f*) *Sanctor. de ponderat. Sect. I. Aphor. VI.*

Time we have a Third more in our Vessels than what the *Plethorists* reckon necessary to produce the *Uterine Effusion*, and that without any Change in the Body.

39. As I have stated the Question, none of these Inconsistences have Place; but, on the contrary, all the Concomitants of this *Phænomenon* are more easily explained, and more fully, as we have seen: And how upon our *Hypothesis* the *Symptoms* should so quickly disappear again, is no less evident; for what more reasonable, if the Compression of any Vessels has produced any remarkable *Symptoms*, than that immediately they should disappear, when that Compression ceases? Which happens upon the Blood's passing into the Cavity of the Womb; as by Sucking, the Stifness and Hardness of the *Breasts* cease with the universal Distress that is raised upon their Distention: And whoever will consider what Quantity of Blood the *Hypogastrick* and *Spermatick* Arteries perpetually transmit to the Veins belonging to the Womb, must be persuaded that their Communication being stopt, the whole Body, and particularly the Parts contiguous to these Vessels, must be more affected,

affected, than if the Mass of Blood at once had been augmented by several Pounds, the *Passages* by which the *Aorta* uses to discharge it self, being now considerably lessened.

40 *Schol. V.* For illustrating of what we have advanced in this Proposition, it will not be amiss to take Notice of the Changes which this *Phænomenon* undergoes by Turns upon a Secretion of Milk at the *Breasts*, and its giving over again; the *Breasts* generally rise and fall with the *Womb*; at the first Appearance of the Symptoms of the *Menses*, the *Breasts* are found protuberant and hard; at the Eruption they fall; and at every other *Period* they still undergo the same Changes: We observed (*Scho. IV.*) that upon the *Sinuses* being filled, the *Hypogastrick* Blood must in a great Measure be detained in the *Iliacs*, and consequently the *Epigastrick* Arteries that ly next the *Hypogastrick* must have a great Shock upon them; so that the Blood will pass in a larger Quantity than usually into them, however disadvantageous the Position be; whence the Blood of that Branch of the *Mammary* Artery, that communicates with them, will have a greater Resistance in its Course;

Course; and consequently its neighbouring *Branch* that goes to the *Breasts*, must have a greater Shock upon it, as we hinted before; hence the Vessels of the *Breast* will suffer a greater Distention; all which Effects must disappear again as soon as the Blood gets a free Passage into the *Womb*, for the contrary Reasons.

41. At the ordinary Periods of the *Menses*, the Retardment of the Blood at the *Womb* taking Place for a very short Time, its Influence on the *Breasts* is not so remarkable; but upon *Pregnation*, when the *Placenta* is clapt to the Passages (§ 12.) and kept for a long Time, during which the *Sinuses* are still distended; and consequently the evanescent *Arteries* and rising *Veins* continue to be considerably compressed, the *Breasts* have all the while a lasting Shock upon them, their Vessels are gradually widened, and a Way made to their *Secretory Ducts*, which, from the cutting of their *Navel-String*, were hitherto untouched; so that in the most Part of Women about this Time, the Milk begins to make an Appearance at the *Breasts*, (a plain Demonstration the *Breasts* are affected from

from the Connection of their Vessels with these of the Womb, and not from a general *Pletbora*, since at the same Time all the other Parts about are starved) tho' in others, not till the Child is delivered, and thereby the *Womb* permitted to collapse, at which Time the *Breasts* get the strongest Shoke of all ; for in the Time of Pregnancy the Vessels of the *Womb* are vastly enlarged, and so inhance a greater Share of Blood than ordinary, by which most of the upper Parts of the Body are starved ; which larger Share must now distribute itself again, and that somewhat precipitantly, because of the sudden Collapse of the *Womb* ; in which *Catastrophe* the *Epigastricks* must get the greatest Share of the interrupted Blood, as we observed before ; and thereby an extraordinary Attack be made upon the *Breasts* : For now, not only the whole Blood of the inferior Branch of the *Mammaries* is turned in upon them, but a great Part of the *Epigastrick* Blood from the overflowing *Iliacs* ; accordingly at this Time we find the Vessels of the *Breasts* so excessively distended, as to raise some Degree of a Fever till they are sucked, which gives the

croud.

crouding Liquors Vent at the Nipples. Thus we see how upon collapsing of the *Womb*, the Way from it, by the *Epigastricks* to the *Breasts*, must be enlarged ; and at the same Time that the Resistance of the Liquors at the *Breasts* is in a great Part destroyed by the Sucking: Upon both which Accounts the Vessels of the *Breasts* get from all Quarters a much larger Share of Blood than ordinary ; and particularly they make a much greater Demand upon the *Epigastricks*, which have never been allowed to recover their wonted Straitness ; so that the Liquors continue the whole Time of the Sucking to have an easier Access, and easier Exit at the *Breasts*, which, all that Time, must make a greater Demand on the *Iliacs* than otherwise, and in Proportion defraud the *Hipogastricks*, the neighbouring Branches to the *Epigastricks* ; and this is the Reason why the Veins at the *Womb* are now able easily to return all the Blood that is brought in by the *Arteries*, without allowing any of it to pass to the *Sinuses*. And thus the *Womb* is reduced to the same Circumstances that the *Breasts* are in for ordinary, in which the Blood has no Force upon the Secre-

tory

tory Vessels: From all which we see a sufficient Reason, why upon the Secretion of *Milk* in the *Breasts*, the *Menses* should be stopt, & *vice versa*, and what Analogy there is betwixt the Means, by which the *Menses* and the Secretion of the *Milk* is procured. We find indeed in some Cases, that however severely a Woman be suckt, yet the *Menses* will break out; but it must be observed, that this generally happens in those, who have very little *Breasts*, and commonly in their first Child, when the *Breasts* are not yet fully broke, or accustomed to distend; in which Cases, fomenting the *Breasts* frequently, and keeping them warm, or according to *Hippocrates's* Rule (a), applying large Cupping Glasses to them, support the *Nurse*.

42. From these Considerations, we come to have a pretty clear Idea, in what Case a Woman may happen to be without any monthly Discharge, and yet be free of all Manner of Inconvenience, *viz.* if naturally she has the Spermatick or Hypogastrick *Arteries*, much less than they are in other People, while the other *Arteries* are in their due Proportions, or, if any

(a) Apher. 50. § V.

of the neighbouring Vessels should happen to be extraordinarily big, without these being alter'd: In both Cases it will be the same, as if there was a perpetual Diminution of the *Iliac* Blood, as in *Nurses*, in which the Blood does not reach the *Sinuses* of the Womb, the Veins being sufficient in them to carry back all the Blood that is brought in by the *Arteries*, as they are still at the Breasts, except in the Cases when a Flood happens at them, which is the only Time their *Sinuses* are employed; and such Cases, in which Women do never menstruate, may be allowed to be as frequent, as these wherein it has been found, that some People never have had any Snot, Tears, and other Secretions, of which there are Instances, tho' not many, and these, in my Opinion, to be accounted for after the same Manner, that we have accounted for the total Want of the *Menstrua*.

43. From our Doctrine of the mutual Dependence of the *Milk* and *Menstrua*, upon each others Suppression, it may be objected, That upon this Supposition, we should never find the *Milk* and *Menstrua* taking Place at the same

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Time,

Time, which yet is found not infrequently; to account for which I would have it observed, that 'tis only the extraordinary Share that the *Epigastrick Arteries* carry from the *Iliacs*, that can influence the *Menses*; and therefore, if this return again, the *Menses* must return with it, as usual; and if in the mean Time the Sucking be continued at the Breasts, it must force a greater Quantity from thence, than it could do before the Vessels there were overstretched, and so may keep up the Secretion, tho' in less Quantity than when the *Epigastrick Artery* encouraged it; so that now it cannot surprise any Body to find, that the *Milk* should have different Qualities, from what it had when separated from a greater Plenty of Blood: From all which Considerations, it is evident that it is not the Quantity of the Mass, but the Way and Manner in which it is shared, that influences the *Womb*; and that it is not the Loss of twenty Ounces of Blood once a Month that Nurses undergo, when they menstruate, which spoils their Milk, and makes them bad Nurses; but the Alteration of the constant Bent and Course of the Blood from the Breasts to the Womb.

44. *Corol. I.* From the Account we have given of the Circumstances of the *Womb*, it will appear, to how little Purpose the particular Constitution of Women has been so much insisted on, from *Hippocrates's* Time till now, as the Ground of this Flux: I easily allow that the Sex, for the most Part, have a different Way of living from Men; but what is that to the Purpose? How idle is it to compare the two different Constitutions to account for a *Phænonon*, that ariseth from a Part, which is proper to the Sex? But what is still more supine and inconsiderate is, That the *Partizans* of the *Plethora*, after they have spent a Deal of Time in deducing the Grounds of the *Plethora*, from the particular Constitution of the Sex, never miss to adduce *Sanctorius's* Authority, to shew that Men have the same *Plethora*, as well as Women.

45. *Cor. II.* From comparing § 24. with § 26. we find a wide Difference in the Cause that brings the *Womb* to its Stand, and that which brings the other Parts of the Body to theirs. In all the Parts of the Body, except the *Womb*, the Blood comes to have a very free Passage by

the *Veins*, and has its Force diverted from the excretory *Ducts*, before it gets an Opportunity so to distend them, as to open a Way for itself by them; but at the Womb Nature has so disposed the Vessels, that, before the distending Force be destroyed, the Blood has made its Way to the Extremity of the Vessels that open into the Cavity of the Womb, after which it cannot enlarge, except upon the Stoppage of these Passages again, which is the only Thing that can recover the lateral Pressure of the Liquors at that Part; and thus the ἀκμὴ of the Womb, and that of the other Parts, depending on different Causes, it is no Wonder that they should happen at different Times, or that the Eruption of the *Menses*, which puts a Stop to the Growth of the Womb, should happen before the Sex be fixed otherwise in their Growth, which is Fact, as we observed in our Introduction; nay, considering the Difference of Structure in every other Part, there is some Reason to think that there should be a wide Difference among them in respect of their ἀκμὴ; thus far we know for certain, that the several

Parts

Parts increase in very different Proportions at first.

46. *Cor.* III. Since the Blood penetrates into the Cavity of the *Womb*, before the Circulation betwixt its *Arteries* and *Veins* is grown so free as to fix its Growth, (which is the first Thing that makes the other Parts of the Body come to a Stand, § 24.) it is plain, that, if upon any account these Vessels which open into the *Womb* should recover themselves, and thereby put a Stop to the Passage of the Blood thro' them, without altering the Circumstances of the *Womb* any other Way, that by the same Means the Blood will recover its lateral Force to such a Degree, as to distend the same Vessels again, and penetrate into the *Womb* as formerly, since it was the free Course thro' these Vessels, that was the only Cause why the lateral Pressure was rendered ineffectual for that End (§ 26.).

47. *Cor.* IV. The Moment of the Blood at the *Womb* being made up of its Quantity and Celerity; whatever diminishes either of them, for any continued Time, will lessen that Force on which the Distention of the Vessels, or the

Flux, depends, & *vice versa*; and consequently, if these be different in different Persons, *cæteris paribus*, then the Time of Eruption must be also different; which shews what Variety this Flux allows of.

48. *Côr. V.* If the Impediment to be overcome, be different in different Persons, then, *cæteris paribus*, the Eruption will happen sooner or later in them, according as the Impediment is greater or lesser, which further brings in View what a Multitude of Cases may hence ensue.

P R O P. V.

49. **T**HE Uterine *Hæmorrhagie*, after taking Place for some Time, must stop at length.

It being from the lateral Pressure of the Liquors, that the Vessels are distended, which open into the Cavity of the Womb, 'tis plain that the whole Time the Pressure exerts itself, the Vessels must be upon the Stretch, as likewise the muscular *Fibres* that are every where dispersed amongst them (§ 6, 7.), especially from the Time that the Blood reaches the

Sinu-

Sinuses till it break into the Cavity, the greatest Distention being at that Time; but then upon the yielding of the Vessels, the Blood having no Support upon one Hand, its Influence upon the Vessels is immediately destroy'd, and thereby they have Liberty to recover themselves from the Constraint they were under, and in recovering themselves must contribute to the accelerating the Motion of the Liquors, which by this Means will have an additional Force in passing off, above that which brought them to these Vessels; and so of Necessity the Vessels must turn quite empty at length, and thus fully recover themselves: Which is the general Cause, why all Eruptions of Blood, at Places distant from the Heart, cease of themselves.

50. *Schol.* From the Way we have explained this Discharge at the Womb, it is clear, that not only the particular Quantity of Blood at the *Sinuses*, and Extremities of the Vessels upon the Eruption, supports the Evacuation, but likewise the common Mass, a Share of which is still coming, till the Vessels and muscular *Fibres* have entirely recover'd themselves;

which I reckon was the Opinion of the *Plethorists*, notwithstanding that *De Graaf* objected against them, that the Vessels of the Womb were not able at once to contain the Quantity evacuated (g).

51. *Cor. I.* Since the Elasticity or Tone of the Vessels and Muscular *Fibres* is the Cause of their recovering themselves, and of discharging the Blood that lies near to the Extremities, or that has nothing to restrain it, then, according to the Degree of the Tone, *ceteris paribus*, the Blood will be the sooner evacuated, and the new Impediment to the succeeding Blood take Place the sooner; hence Women of a stronger Constitution, and who in Consequence of that have the solid Parts of their Womb firm and active, will have a more sudden Discharge than those of a weaker Constitution; but there is no Reason to judge they should want this Flux altogether, and Experience tells us, so much of the greater Part of that Constitution amongst us; tho' there may be Examples of every Constitution that wants it.

52. *Cor.*

(g) *De Graaf* Cap. ix. de mulier. organo.

52. *Cor. II.* Whatever Cause takes off the *Action* of the Liquors from the Sides of the Vessels, will give them the same Opportunity to recover themselves as the Eruption does; and thus, if upon any Occasion the Blood that supports the Vessels after they are forced to any Degree of Distention (as happens when it has reached the *Sinuses*) (§ 29.) be not seconded, then the Vessels will recover themselves by forcing back the Blood to the Place where 'tis supposed to have no Resistance, and so the Flux will be delay'd: Which Case takes Place, when Blood is let from an opposite Part of the Body, near to the Time of Eruption (*b*): Hence the Caution ariseth not to take Blood at the Arm in this critical Time, which otherwise may be done safely; as we have observed in our Introduction; for till the critical Time the Vessels are but little stretched, and therefore, tho' the Force of the Blood be somewhat diminished upon them, yet they are not apt to refuse, a small Force being able to keep them at the Degree of Distention they have:
 And

(*b*) *Belin. Prop. VI. de miss. sang.*

And that it is from Revulsion, and not from diminishing the Quantity, that this Evacuation is disturbed about the critical Time, will be abundantly plain, when we consider, that, if instead of the Arm, we then take the same Quantity at the Feet, it will be so far from postponing, that it will further the Flux; of which Effect there are very natural Reasons (*i*).

53. But here I must further remark, that drawing Blood at the Feet may some time prevent or stop, the Flux in the *Crisis*, viz. by making the Blood in the Arteries and Veins press too much upon the *Emissaries* of the Womb, in which Case, the only Thing that can procure a Passage for it, is drawing Blood at the Arm, and that by making a Revulsion; to this Pressure upon the *Emissaries*, plethorick Bodies are most of all subject, their Veins being still overloaded with Blood, which inhibits the Progress of the arterious Blood: Now, if a Vein be open'd in such Persons at the Feet, this Force upon the *Emissaries* will be augmented still the more; whence I reckon that the Solution

(*i*) Belin. Prop. VI. de miss. sang.

lution given to the notable Case mentioned by *Riverius* in the 2d *Obs.* of the first *Century*, by the *Montpelier Physicians*, was abundantly just, and proves that a *Plethora* rather stops than procures the *Menses*. As to *Dr. Friend's* Solution of this Problem from a *Lentor* or *Visciditiy* in the Blood, I cannot see how it can be allowed, till it be shown, that drawing Blood at the Feet must confirm the *Lentor*, while drawing at the Arm dissolves it: The same Theory will suggest the Reason, why those, who are more delicate and ticklish at this critical Juncture, are then obliged to be very nice in their Diet, because whatsoever raises their Blood, gives them great Disturbance, whereas the Evacuation never goes on more regularly than with a mild and spare Diet.

P R O P. VI.

54. **T**HE *Periods* which the Uterine *Hæ-*
morrhagie observes is a necessary
Consequence of the Circumstances of the *Womb*.

Since this Evacuation does necessarily stop, (§ 49.) and since after it is stopped, the Power that procured it still remains, (§ 46.) it must
there.

therefore stop, and flow alternately, or by Periods, as long as the Womb continues in these Circumstances.

55. *Schol. I.* In this Proposition we have reckoned it sufficient to shew in general, that the *Uterine Hæmorrhagie* must be periodical, it being in my Opinion impossible to determine *a priori*, or from the Structure of the Parts, either the Moment of the impelling Liquors, or the Degree of Resistance they receive among the *Capillaries* and other Vessels of the Womb, so as from them to shew the Distance of the *Periods*; but here we are at no great Loss, that being easily known from Observation, by which we learn, that in the most of Women, the Interval is near the Time of a lunar Month; tho' the Difference of Circumstances must make in some a considerable Odds. *Vid.* § 47, 48.

56. I said it was impossible from the Structure of the Parts, either to determine the Impediment, or the Moment of the Liquors at the Womb; to satisfy my Readers in this, I would have the Injections of the curious *Fredrick Ruysch* considered, where, by his subtile Art, he brings such *Myriads* of Vessels in our
View,

View, of such Minuteness, different Lengths, Angles, and Subdivisions, that it must convince every Beholder, that there can no Account be made of the lesser Vessels (*k*), and so, tho' it should be allowed, according to the ingenious Dr. Keil's Calcul of the larger Vessels, (in his Essay *de Sang. Veloc.*) that there is a certain Proportion betwixt their Trunks and Branches, yet we can no-way allow of it amongst the lesser; and there is a very good Reason to be given of the Disparity; the larger Trunks serve for nothing but to make an equal Distribution of the Mass to different Parts, whereas the lesser Trunks and their Branches are modified after a thousand different Ways to procure different Secretions; every lesser *Artery* has a different Machine attached to it, not made by any general Rule of Subdivision of Branches, but by particular Laws to produce particular and different Effects; nay, we sometimes find a manifest Provision made for these particular Effects in the larger Vessels themselves, as we conspicuously see in the Make of the Spermatick Artery, where the general Rule, which

(*k*) Fred. Ruysch Responsio ad D. Abram. Vateri P. 22.

which Mr *Keil* has laid down to find the Velocity in the Branches will not hold, the Velocity of the Blood diminishing in its Progress thro' the Trunk very irregularly; and as far as we can follow the Structure of the lesser Parts, we find still such an observable Variety, so that no Method can be proposed to find out the Action of these Parts, but a distinct and particular Description of them; and as far as we can follow out this, so far we establish a certain and an useful *Theory*, which we have in a great Measure obtain'd in these Cases, where the *Phænomenon* depends upon the Action of the more compounded Parts most exposed to Observation. Thus it is, that now we have got right Notions of the most Part of these Actions that depend upon the Muscles: For Instance, we see how all the various Flexures of the Limbs are perform'd; how the Body is kept erect, how the Face plys it self so easily to different Quarters; and the Eyes are so easily fix'd upon particular Objects; and how the Air in the Cavity of the Breast is dilated and compressed successively; and the unwearied Heart receives and distributes the vital Streams; with a thousand
other

other Things that guide us securely in the Investigation of the Parts affected, in the Disorders of the Body; tho' there are twenty Things in the Composition of each Muscle that we are at a Loss about; the same Way it is, we know the compounded Parts of the Eyes and Ears by which the Air and Rays of Light are modified; tho' we cannot dive into the subtile Contrivances by which these Parts are supported; and thus, the same Way, I reckon I have illustrated what the particular *Phænomena* of the *Menses* depend upon.

The Disposition of the *Sinuses* of the Womb, and their Communication with the Blood-vessels and Cavity of the *Fundus Uteri*, (which hitherto has not been considered in our Comments upon that Head) makes all as intelligible in respect of that *Phænomenon*, as the *Sinuses* of the *Penis*, considered with the Position of the Muscles and Blood-vessels, make us know the Cause of the Erection, Flaccidity, &c. of that Member; tho' at neither of those Parts has any yet pretended to determine the Moment of the Blood; nor do I reckon it of much Importance, the *Phænomena* there being fully explain'd
with-

without it: Yet we can go thus far, as to determine that the Moment of the Blood must be very small upon those Vessels on whose Dilatation the *Menses* depend, the Interval being very long betwixt each *Period*, viz. the Time that this Force takes to open the Way into the Cavity of the Womb; and thus we may satisfy our selves, that it is a bad Method to judge of the Force of the Blood upon particular Vessels of any Part, from the Force by which it enters that Part, there being no Part of the Body where the Blood enters in greater Quantity and Velocity than at the Womb, as will appear, if we consider complexly the Number, Largeness, and Position of the *Arteries* of the Womb; yet it is plain, that none of it reached the *Sinuses*, till after a great many Years, and when it reaches them, it has but a very inconsiderable Force; as to the Cause of which, I reckon, any *Anatomist* will easily be satisfied, when he considers the great Number of Branches that go off from the *Arteries* before they reach the *Sinuses*, which necessarily contributes to intercept the Blood before it can come their Length, nay, we see, in Nurses where

where the *Epigastrick Artery* carries off Part of the Blood of the Womb, that the Veins become so far Masters of the arterious Blood, as to allow none of it to reach the *Sinuses* at all; tho' Nature has taken particular Care that, at certain Times, the whole Blood that enters the Womb shall exert its Force upon these *Sinuses*, as will be demonstrated afterwards, when we shew what they were particularly design'd for; all which taken together, will demonstrate to us, by what easy Rules in *Hydraulicks*, the Actions of the Body are made to change and ply to accomplish different Designs, as the Exigencies of the Machine require; and I hope such evident Examples as this of the Simplicity Nature uses in her Management, shall be an Argument to give up with the more intricate and obscure Reasons that are advanced by some in explaining the animal Œconomy, and keep us still a searching, till we find the plain and mechanical Reasons, which a little Pains and Patience will lead us to: But further, it being by Means of the intermediate Series of Vessels, that so little of the large Quantity of Blood that enters the Womb reaches its last Vessels;

it is evident that the Mass may be much augmented or diminished, and yet these last Vessels have no Alteration of their ordinary Force upon them. For these intermediate Vessels will be first influenced, and these being easily distended must yield to a greater Force; and a small yielding, in so many particular Vessels, will dispose of a considerable Addition from the Mass; and thus we may understand how the Force upon the last Vessels of the Womb keeps equal, tho' the Mass should be at a Time more copiously supplied than ordinary; and again, since Mr. Keil has observed in his *Aphorisms*, that the Mass can never be kept much at under by Evacuations (*Si corporis pondus evacuationibus largioribus diminuat, ad solitum pondus brevi redit, majori pabuli, vel copia, vel retentione, vel humiditatis attractione*) we must allow, that Evacuations will not much disorder the regular Procedure of the Periods of this Flux, which holds in Fact, as we observed in our Introduction; which both confirms our Doctrine; namely, that amidst all the Changes of the Mass, this Flux continues of a Piece with itself, and also the Truth of that *Aphorism* of Keil, *Si victus*
modus

modus sit debito major aut minor, tum ingesta non respondent egestis ; sive enim plus, sive minus comedimus, certam sibi normam in evacuationibus servat natura ; tho' 'tis true, these Rules are very different, as to different Secretions : For as there are Secretions, like that of the *Menses*, which the Changes of the Mass alter but little, such as the insensible Perspiration, (which, according to Mr. *Keil*, is neither alter'd by the Quantity of Drink we take, nor by Purgatives) so there are others that generally alter in Proportion to our Drink, as the *Urine*, of which Difference, no better Account, in my Opinion, can be given, than that the *Secretory Ducts* in the one Case are more immediately join'd to the large Vessels that distribute the Mass, than in the other, which *Ruyfch's* Injections induce us to believe ; With these he easily penetrates into the Cavity of the *Kidneys*, [*Thef.* III. 39.] but not to any of the different Pores of the Skin, [*Thef.* X. 4. and *Thef.* I. 19, 20.] therefore the Access to the Pores of the Skin must be very different from that to the *Pelvis* of the *Kidneys* ; By which Example we learn, how in different Parts of the Body the smaller Ves-

sels may be differently affected by the Alterations of the Mass, which is an Observation of great Use in the Practice of Medicine. From the same Observations we likewise understand, how Eruptions of Blood at the *Kidneys, Lungs, Nose, &c.* become more or less frequent, regular and copious at different Times, according as the Vessels, where the Eruption is, are more or less immediately join'd to their respective Trunks. Notwithstanding this, I own that all the Eruptions of this Kind, which happen in Consequence of the *Menses* being stopt, keep the same Times with the *Menses*; but then these Eruptions do not proceed from the particular Disposition of the Parts at which they are, but from the Shoke that is given to them periodically, as the *Menses* make their Effort; at which Time the whole Body has a new Force upon it, as we have explained above, and which will be most discovered at the weaker Parts, wherever they are: I would have it also observed, that the *Menstrua* do not always produce Eruptions at other Parts, when they are denied Passage at the Womb; but that these happen rarely, while we find Tumours on that

Occa-

Occasion frequently to arise, now in one Place, now in another, without any Evacuation extraordinary: In some again we only observe uncertain Pains attacking different Parts; all which shew a general Disorder and a spreading Force of the Blood, but give no Proof of a *Plethora*; nay, when Eruptions happen, they are seldom to that Quantity to which the *Menses* flow, and therefore cannot be reckoned as substituted in their Place; but we have been long enough in this Digression.

P R O P. VII.

57. **I**N old People the Solids turn more rigid, and have less Action upon the Fluids, than in those of middle Age.

This is what we find to take Place in Fact, in so much that in some the Rigidity proceeds to that Degree, that what was membranous and fleshy at first, is found afterwards to be cartilaginous and bony; as to the Reason of it, Dr. *Boerhaave*, to whom we owe the most accurate *System* we have in Medicine, has deduced it very probably from the perpetual Action of the Fluids upon the Solids, by which

Means many of the smaller Vessels gradually grow together ; hence the Vessels made up of these grow stiffer, and less active (a).

P R O P. VIII.

58. **T**HE Decrease of the Moment of the Blood, and Increase of the Resistance of the Solids, is the Cause why the Uterine Evacuation is suppressed in old People.

Since, by the foregoing Proposition, the Solids in old People are more rigid, and have less Action than in others ; it follows, that the Resistance to the Fluids in them will be greater, while the Moment of the Fluids is less ; upon which Account we have a very sufficient Cause, why in Process of Time the Blood should not be able to force its Way to the Emissaries of the Womb.

59. *Schol.* It is easy to deduce from the whole of our Doctrine, why People that have born Children should have this Evacuation in a greater Quantity, and keep it to a greater Age than Maidens, especially if their Womb has suffered any Violence upon Delivery ;
tho'

(a) Boerh. Instit. § 467, 415, 413.

tho' there are Instances where it has left such very soon upon some irregular Cause, which may take Place in all the Cases we have been enquiring into; but these will never be brought as Objections by any who considers, that what we have been advancing, thro' the whole of this Treatise, relates only to what happens in the greater Part of People in Health.

60. And thus I reckon, by the foregoing Propositions, I have traced the *Foundation* of the *Uterine Flux*; the *Cause* why it is so long in discovering itself; in what *Cases*, and upon what *Account* it is naturally suspended; and what at length *stops* it altogether; and at the same Time, the Necessity of its Periods, their Difference in different Constitutions; and all this by easy Consequences from the Structure of the Parts, and settled *Phænomena* of the Womb, without any Regard to a *Plethora*, or so much as asking one *Postulatum*: After all which, if it should be demanded what the Design of this *Hæmorrhagie* is, I hope my Opinion shall not be look'd upon as amusing, tho' I should maintain, that it never was designed

for any Use at all ; but that it takes Place in Consequence of these *Passages*, which are established at the Womb, by whose Means the *Placenta* is ingrafted to the *Mother*, than which nothing is more necessary in the whole *Apparatus* for propagating the *Species*.

61. This Answer naturally gives Occasion to another *Question*, viz. Why in *Brutes*, where the same *Passages* are, the same *Phænomena* do not take Place?

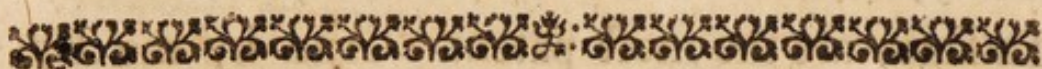
In accounting for which it ought to be considered, to what different *Laws* the *Brute* and *Human-kind* are subjected to in Generation ; we are not stinted to *Seasons* for producing our Fruits, therefore the Passages are always to be ready and patent ; the *Brute*, on the other Hand, have particular *Seasons* for that Business ; and if such a Disposition then takes Place, it must answer the Purpose, which we have Ground to reckon to be *Fact* ; for it is observable, at these critical Times in the *Brute*, that there is a great Discharge of serous Liquors from their *Wombs* (a), nay frequently of Blood, which is particularly observable in the *Dog-kind* ; so that
then

(a) Bayle. de Flux. Menstr. p. 7.

then it is certain the *Blood* approaches nearer the Extremities of the Vessels of the *Womb*, and so appears at Hand to serve the *Fætus* upon its Ingraftment, which is all that is necessary from our *Theory*; wherefore, that there is a particular Regulation in this Affair for *Brutes*, and that the Disposition depends upon a larger Aperture of the Vessels, is plain from this, that most of the *Brute-kind* are with the greatest Certainty impregnated a few Days after Delivery, such as Mares and Conies, when these Passages are the most patent. And by the By, that even certain of the *Human-kind* may be impregnated, which have never had the true and real *Menstrua*, provided only they have ferous Liquors; for this shows sufficiently that the Passages are open, which is the great Condition requisite: How far the erect Posture of Man makes, that the Blood cannot be near the Confines of these Vessels without breaking out, I leave every one to judge for himself; it is plain to me that it must contribute a great Deal; and these Considerations solve the Difficulty better than any Thing the *Plethorists* have advanced, tho' the Objection equally concerns them.

As

As to the weighty Problems that use to be agitated concerning the Qualities of the Matter deposited, which amuse, and sometimes not a little distract the Fair, I industriously leave them for Entertainment to Nurses, and to the grave Speculation of that Set of People, who in all Things were too superstitious; while we look on the whole Contrivance as noble, and altogether indispensable in the Animal Economy.



C H A P. III.

Of the Increase of the Ovum and Distention of the Womb after their Ingraftment.

62. **I**N the fourth *Scholium* to the fourth Proposition we observed, that upon the Blood's entering and filling the *Sinuses*, the Circulation betwixt the Arteries and Veins was considerably stopt, and that this occasions many troublesome Symptoms, which of Necessity continue till the Blood gets Vent into the Cavity
of

of the Womb: Now this Relief cannot be had for a long Time after the Womb is impregnated, the *Passages* from the *Sinuses* to the *Cavity* being shut up by the Ingraftment of the *Ovum* upon them (§ 22.), and therefore, upon that Emergency, the Symptoms will continue till the Way betwixt the *Sinuses* and *Placenta* is so free, that the Blood, which uses to return by the Veins of the Womb, can freely pass this Way to the *Fætus*, which is the first Relief it can have, since, after Pregnancy, the *Sinuses* are always more and more distended, and consequently the Communication betwixt the Arteries and Veins, always more and more stopt, which lets us see how admirably the *Sinuses* have been contrived for the Use of the *Fætus*, it being by their Means that the Blood, which before Conception circulated idly thro' the Womb, is now determined to the *Placenta* and *Fætus*, and that more and more, the longer the *Fætus* has been in the Womb; so that in a great many Women the whole Blood comes at length to pass by the *Fætus*, which formerly passed by the Veins, at least so far, as to prevent the bad Symptoms, which arose from the
first

first and sudden straitning of the Passage by the Veins.

63. This Observation gives us a clear Idea of the new Force, which makes the Womb to distend so remarkably upon Impregnation; and if we add to this some other Observations, that relate to the Distention of the Womb, we shall be enabled plainly and easily to conceive the whole Procedure of this Affair, which hitherto has been so mysterious.

Upon Pregnancy, after the Blood has reached the *Sinuses* in its ordinary Course, without being allowed to pass to the Cavity of the Womb, it must distend them more than ever was done before, and so compress the Vessels more that ly among them; hence the Blood that enters by the *Hipogastrick* and *Spermatick Arteries*, which is very considerable, will be much impeded in its direct Course along the Vessels, and be made to exert the most of its Force upon the Sides of the *Arteries* and *Sinuses*, to which it has an easy Access, but difficult Exit; and these being every where scattered thro' the Womb, every Part of the Womb will have a Share of this new Force upon it: And consequently

quently every Part of the Womb must distend more or less in Proportion to its *Strength*; and the outer and vertical Part of the *Fundus* which is remarkably weaker than the other Parts (§ 5.), will yield the most; and the more it distends, it still turning the weaker, (tho' it may perhaps appear of an equal Thickness from the distended Vessels being kept full) the Proportion by which it distends more than the other Parts will still increase; which is a just Account of what *Deventer* and *Ruysch* observe, *viz.* that the small Part of the Womb betwixt the *Tubæ* on the upper Side, increases much more than all that is below them (*a*), in the Time of Pregnancy.

64. It is not so easy to find by what Proportions the inner Side of the *Fundus* distends, tho', I hope, to make it out by a careful collating of Observations.

We observed formerly, that the whole *Ovum*, except the Part that lies over the Entry to the *Cervix*, was join'd with the whole inner Side of the *Fundus*; and that this Part was the Rudiments

(*a*) *Devent. ars obstetr. Cap. vii. Fig. 4. Ruysch Thes. vii. p. 8.*

ments of the *Placenta*, while that which lay over the Entry to the *Cervix* became the *Chorion* and *Amnion* (§ 21, 22.); this being the first Condition of the *Ovum* in respect to the *Fundus*, the Question ariseth, How, after the Womb has come to its utmost Stretch, the *Placenta* should be found only surrounding the vertical Part of the Womb's Capacity, which is possessed by *Ruyfch's* Muscle (§ 7)? To which I answer.

65. 1st, That the *Ovum* inclosed in the Cavity of the *Fundus*, will upon all Sides be urged with the same Force with which the *Sinuses* and *Arteries* are (§ 63.), since it is contiguous to them; and being thus squeezed, it must be forced towards the vertical Part which then is yielding (§ 63.), and carry up with it the inner Side of the *Fundus* to which it is attached, while all the outer Parts below the *Tubæ* are kept firm in their Place by the neighbouring Parts to which they are joined, as are likewise the outer Parts of the *Cervix*, which will make them likewise immoveable, tho' its Inner-side, contiguous to the Inner-part of the *Fundus*, and which is very loose (§ 8.) will allow to be drawn up with the *Ovum*; so that we find,
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upon the yielding of the outer vertical Part of the Womb to the increased Force of the Blood, the *Ovum* is determined to follow it, and draw along with it the Inner-side of the *Fundus* and *Cervix*; and that in Fact it is so, is evident from this, that, after Pregnancy, the *Os Internum Uteri* recedes from the *Os Externum*, while the outer Parts, to which the *Cervix* is joined, do not alter (*b*); and again, while the external Parts of the *Tubæ* are carried a good Way from the *Vertex* (§ 63.) their Mouths open still into the vertical Part of the *Fundus*, or the Middle of the *Placenta* (§ 12.) as *Fallopian* observes (*Observ. Anat.*); which is a certain Argument, that the Inner-side of the *Fundus* does not distend in Conjunction with the Outer, but in the Way we have shown.

66. 2dly, Now, the vertical Part of the *Fundus* yielding, and the *Ovum* following it, that Part of the *Ovum* next the *Cervix* must recede so far from the strong Sides of the *Cervix*, which meeting here, did support it on that Hand (*c*), and consequently will be altogether defence-

(*b*) Ruysch. Catalog. rarior. P. 118, 119. (*c*) De Graaf de Mulier. Organ. Tab. IX, X.

defenceless, while the other Parts of the *Ovum*
 are much strengthened, by being kept close in
 Contact with the Sides of the *Fundus*; where-
 fore the contain'd Fluid, which is urged on e-
 very Side, except this, will shew its Force prin-
 cipally on this Part, *viz.* it will still stretch this
 Part of the *Ovum*, so as to keep it contiguous
 to the meeting Sides of the *Cervix*, while the
 other Parts follow the yielding Part of the
Fundus, and thus, this Part of the *Ovum* must
 stretch in Proportion to the stretching of the
 outer vertical Part of the *Fundus*: In the mean
 Time, the Blood from the Womb immediately
 entering that Part of the *Ovum* which is joined
 to it, will have a considerable Force upon it,
 and make its Vessels enlarge, as the Quantity of
 Blood passing to the *Fætus* increases; which ac-
 counts for the Thickness of the *Placenta*, at the
 same Time that we see it is much confined
 from spreading to any great Breadth as the other
 Part does; so that of Necessity it is little, thick
 and vascular, while the other Part, which was
 very inconsiderable at first, enlarges itself much,
 and keeps membranous, the Force of the Blood
 being very small in its Vessels, and the Force

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of the Fluid furrounding the *Fætus*, very strong upon it.

67. And thus we have discovered by what Contrivance it is, that any Part of the *Ovum* indifferently can be *Placenta*, and any Part of it *Chorion* and *Amnion*, as we observed to be Fact (§ 21.), and which is still more confirmed by a common and familiar Observation, *viz.* that we seldom find in two *Placentas* the umbilical Cord insert into the same Part, now it is at the Center, now at the Circumference, and in others at different Parts of the *Area* (*d*), which is a plain Demonstration, that it is uncertain how that Part of the *Ovum* fixes, where the umbilical Vessels are insert, and consequently the Position of all the Parts of the *Ovum* in the *Fundus* must be uncertain, which confirms our former Reasoning (§ 17.).

68. Since the *Ovum* at first takes up the whole Bounds of the *Fundus*, and inosculates thorowly with its Sides, then, if there are two or more *Ova* impregnated at once, they will be confined to the same Bounds, and of Necessity must be

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(*d*) Ruysch. Observ. Anat. XCVII. Catalog. rarior. Reposit. 3. N^o. 11. Thes. VIII. P. 14.

contiguous one to another, which shews the Reason why the different *Placentas*, when there are more than one Child at a Birth, are always united together, according to *Deventer's* Observation (*e*); and in these Cases where more than one *Ovum* is impregnated, it is evident, if, after their Ingraftment, one of them should drop off, that then the *Menstrua* will take Place; but otherwise in a Woman with Child the *Menstrua* can never take Place, except, that by some Chance, or irregular Make of the Womb, the *Ovum* should miss some of the Passages that open into the *Fundus*.

69. By this Time, I reckon the Consistency and Simplicity of our Scheme will appear; and whoever reflects maturely upon it, cannot be at a Loss to find out the Design of the whole Contrivance, as we have explained it; one particular Cavity being fitted for the *Ovum* makes its Ingraftment certain; and if after the Ingraftment the whole *Ovum* and *Fundus* had distended regularly one with another, the whole Invelopement of the *Fætus* would have
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(*e*) Devent. ars obstetr. Cap. XII.

been *Placenta*, its Vessels been spread thro' a great Bounds, and its Separation at length been attended with great Difficulty; whereas by the Method that takes Place, we see that the whole Blood which enters the Womb, whether at the *Vagina*, *Cervix* or *Fundus* (§ 10.), has Access to the *Ovum*, and is brought within a small Compass, and so must arrive at the umbilical Vein, and thence to the Liver, with a just Force and Warmth.

70. It is very observable what *De Graaf* takes notice of amidst all the Changes of the Womb, *viz.* that the *Collum* or *Cervix* scarce undergoes any Change at all, while the *Fundus* increases at such a Rate (*f*); so that it is certain that no Part of the *Fætus* enters the *Cervix* till the Time of Delivery approaches; by which Abortion is very much prevented, the *Fætus* by that Means being kept at a great Distance from the *Vagina*; but when the *Fætus* has come to that Bulk with its Fluid, that it takes up all the Bounds of the *Abdomen*, and has incroached much on the *Midriff*, and brought

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all the Parts about to such a Distention, that it requires a greater Force to distend them further than what is requisite to dilate at once the Cavity of the *Cervix*, then the *Cervix* hitherto secure, is made to yield; which it can do now with more Ease than at first, because that all its Parts are larger from the Increase of its *Sinuses*, tho' this Increase is noways considerable, and hitherto served rather to shut than enlarge its Cavity, since the more the Sides of the *Cervix* are enlarged, the nearer they meet, and so secure more and more the Passage of the *Ovum*, and afterwards of the *Fætus* from the *Vagina*; but when Matters come to that Pass, that the enlarging *Fætus* gets not Room to dispose of itself in the *Abdomen*, and the *Midriff* bears close upon it, then the whole Force lands upon the *Cervix*, and presses it open, till its Cavity yields, and thereby suddenly enlarges the Bounds of the *Fætus*, which hitherto was confined to a certain Posture, it being kept always compact in its Seat, but when the Space about it suddenly enlarges, and there is a sudden Run of the Fluid to the widening Space, the weighty Head falls forward the same Way, and

and wedges itself into the *Cervix*; at which Time, Women very sensibly find the Upperpart of their Belly turn less, and take it for a good Sign of a regular Birth; in the mean Time the Bulk being so much increased in the lower and straiter Part of the *Pelvis*, the last Gut upon the one Hand, and the Bladder upon the other, is much compressed and irritated; hence a *Tenesmus* and *Strangury*, and a great Disorder thro' all the neighbouring Parts connected with them, which increases to such a Pitch, that all begin now to be convulsed around; the Muscles of the *Abdomen* and *Diaphragm* exert their utmost Force, which never miss to be affected together with the *Intestines*, and with no small Hubub and Alarm bring upon the Theater, one of the Lords of the Earth.

71. And thus we find from the Description I have given of the *Womb*, and the Observations relating to it, such an Agreement as makes up an uniform and coherent *System*, which takes in more Particulars than ever came within the Verge of any *Theory* before upon the Subject. In maintaining of which, I ask no more Favour, than

the getting a thorow Hearing, to have the *Facts* examined, and the *Conclusions* freely criticised; it being my Opinion, that no Sentiments can be too much tried; and that nothing at present is a greater Scandal to the Profession, than the Trust that is given to Authors; the Bulk of us, like School-boys, dote upon great Names, and bring the Characters of Persons into our Arguments; whereas there are few Debates in our Business, whereof every one that is diligent, may not become a competent Judge.

72. I had persuaded my self that Physicians of this Age, who had seen the Performances of the greatest Genius's successfully called in Question, even the Descriptions of *Anatomists*, without Regard to the *Autopsia* which they plead, should not have been much startled to find any Manner of Writings criticised: Lord *Verulam* says, *Nemo reperitur, qui in rebus ipsis, & experientia moram fecerit legitimam*; and again, *Nonnulli qui experientia undis se commiserunt, & fere mechanici facti sunt, tamen ipsa experientia erraticam quandam inquisitionem exercent (g)*: There are

(g) *Verulam præfat. ad novum organ.*

are very few Experiments but what allow of revising; and the Reviser acts a noble Part when he does it out of Love to Truth; which he can do, and, in the mean Time, shew all Regard to the *Subject* and *Author*: For my Part, however free I have been with *Sanctorius's Aphorisms*, I still retain the greatest Veneration for him, and reckon his *Invention* of such Importance to Medicine, that his Name deservedly is inroll'd amongst the Worthies of the *Æsculapian* Family; but shall we lose the Advantage of the *Invention* by blindly subscribing all he asserted about it? In my Opinion we do him the greater Honour to cut off from his Works, what would make After-ages be offended at them; at least we must be allowed to be greater Friends to our common Profession, which must suffer by every wrong Sentiment.

73. Since my first venting, what I wrote in my Introduction, I find some not a little chagrined upon my calling in Question *Sanctorius's* Authority concerning the monthly Accumulation; what Temptation, say they, had the Man to ly? How could ever such a Thing have come in his Head without seeing of it? I

don't pretend to give the Rise of all the unaccountable Opinions of *Authors*, tho' I don't reckon my Conjecture improbable I made upon this Head in my Introduction; and I think it as reasonable a Question for me to ask, how Dr. *De Groter* the *Dutch* Experimentator should have mist observing such a remarkable *Phænomenon*? And if it be not more reasonable to trust *Keil's* Tables, where the Experiments themselves are set before our Eyes, than *Sanctorius*, who gives us no formal Experiment at all, but only a Medley of Opinions, some of them built upon *Experiments*, others upon *Fancy*? Nay, I reckon the monthly *Accumulation* very inconsistent with *Sanctorius's* other Aphorisms; for Example, he makes a Change of *Air*, in one Day's Time, stop a third Part of the usual Perspiration, *Sect. 2. Aphor. 9.* a bad *Digestion*, in one Night, near one half; different *Meats* now to increase it, now to decrease it, by a fourth or third Part, *Sect. 3. Aph. 1, 8, 24, 25, 69, &c.* Nay, *De Groter*, finds, from *Sanctorius*, Thirty two different *Causes*, to which we are exposed every Day, that diminish the Perspiration after the same Manner; besides which there are a great

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great many other Causes that affect it otherwise; and at the same Time the other Secretions of the Body are much given to Changes; considering which it is impossible to conceive how there should be any equal or certain Accumulation; or that Matters should be any otherwise than as *Keil's* Tables represent them; by these we find, as we observed in our Introduction, that the Body is in a most uncertain State as to its Weight, one Day being one Pound heavier, and the next Day two Pounds lighter, and so on without any Rule, tho' most agreeable to the Circumstances of the Body.

74. But in case there be something reckon'd still doubtful in my arguing here, I must bring under Consideration some other of his *Aphorisms*, that seem more directly to contradict that One of the monthly *Plethora*. *Æstate temperata corpora sunt minoris ponderis quam hyeme tribus libris circiter. Sect. 2. Aphor. 23. Ab æquinoctio autumnali ad solstitium hyemale qualibet die minus libra circiter perspiramus, inde usque ad æquinoctium vernale incipimus liberius perspirare, Ibid. Aph. 41.* When we take the Consideration of these two Aphorisms together, we must allow, according

according to *Sanctorius*, that tho' the other *Evacu-
ations*, by being enlarged, compensate somewhat
a diminish'd *Perspiration*, yet they do it not to
that *Degree*, but that it contributes to support
the *Weight* of the Body; thus we find that by
the *Perspiration* being lessen'd from the *Autum-
nal Equinox* to the *Winter Solstice* (*Aph.* 41.),
that the Body increases Three Pounds in its
Weight (*Aph.* 23.), which is a Pound more
than what *Sanctorius* makes precede the month-
ly *Crisis*. Pray, now, how is this quarterly In-
crease, towards the Winter, and Decrease, to-
wards the Summer, consistent with a monthly
Increase, and the Body's Return again to the
same Weight?

Whether or not again, from *Sect.* 1. *Aph.*
10. is it manifest, that none can have the
monthly *Crisis* after the Manner *Sanctorius* as-
serted, *Sect.* 1. *Aph.* 65. without falling under
a bad *Habit*. But I have been long enough
in shewing that *Sanctorius's Aphorisms* allow ve-
ry well to be criticised, and particularly that
one, which is the great Support of the modern
Hypothesis of the Cause of the menstrual *Flux*.

75. I had designed to have concluded this Treatise, with some Observations for the Investigation of the *Diseases* of the Womb and their *Cure*; but finding that the very mentioning of a new *Theory* of the *Menses*, after it seem'd to be so satisfyingly adjusted, was look'd upon as an idle Amusement; and so presaged a very bad Reception of it; I persuaded my self to stop here for some Time, till I should learn something of its Fate; and therefore, I shall only make this general Observation upon the Head, that whatever was advanced upon good Grounds, in explaining the Irregularities of the *Menses*, and for accomplishing their *Cure* by the *Plethorists*, may the same Way be deduced from our Doctrine, having shown that all the *Phænomena* of the *Menses* on our Supposition were much the same as if produced from a *Plethora* (*b*), tho' there be a great Difference betwixt the *Plethorists* and us in this, that they assert an Augmentation of the Mass which we deny; and consider nothing of the unequal Distribution of the Mass, which we make the Foundati-
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(*b*) Vid. Sect. 37, 38.

on of all the Symptoms that happen, and produces a real *Plethora* in certain Vessels, tho' not in the Mass; to carry off which we can have no other Indication than to get the *Emiffaries* of the Womb made patent, which is the only Means, by which the *Plethorists* pretend to diminish the Mass in these Cases; and so at whatever Distance I have hitherto kept from the *Plethorists*, I now most willingly join them; tho', it must be allowed, that from the particular Account I have given of the *Womb* and its *Alliances*, there can be form'd a more particular History than from the bare Hypothesis of a *Plethora*; which History at the same Time must contribute a great Deal to the Understanding of the *Symptoms*, and their *Cure* that happen upon Conception, Gravitation, at the Time of Delivery, and in Child-bed.





APPENDIX.

IT is not a little surprising, how, since *Harvey's* Invention, and other modern Discoveries, by which it is found out that the whole Body is but one Concatenation of Vessels, more or less, immediately join'd to the *Aorta*, that there has been so little Pains taken to shew the Consequences, of the *Proportion* of these Vessels being changed, from the *Laws of Hydraulicks*, which seems to be the first and most natural Attempt that one, acquainted with the human Machine, should make : The ingenious Dr. *Lower* made a glorious Second to the great *Harvey* in this, and one wou'd have reckon'd that his observable

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Success should have engaged a great Deal more in the Method; but it has fallen out otherwise, we finding very little done this Way since his Time: It is owing to this Neglect, in my Opinion, that our Moderns have attached themselves so much to that intricate Affair of knowing the Deviations of the different Liquors of the Body, and accounting from them, in a very arbitrary Way, for its *Diseases* and their *Cure*, by which they have engaged themselves in an infinite Work to very little Purpose: I must own my Dulness to be so great as hitherto not to have been able to find out any Thing certain in the Performances of that Kind, and have brought my self to believe that the most Part of the *Symptoms* that are ordinarily attributed to the *Humours*, may be accounted for from the Changes that happen among the Solids: I gave a great many Examples of this in my former Dissertations; and I persuade my self, the Account I have given of the Womb, where I have not considered the Qualities of the Liquors at all, shall suggest a great deal more: My Attempt was certainly very bold to explain the whole Effects of the Cold upon these Principles;

principles; but the more I observe about them, I am still the more persuaded, that what I advanced upon the Head was just; and that I may satisfy others about it, as much as I can, I shall beg leave to make a further Representation of that Affair.

Of the Cold.

§ 1. **A**FTER *Sanctorius* found out that the insensible *Perspiration* was not so plentiful in *cold* as *warm* Weather, *Physicians* insensibly came into the Opinion that *Coughs*, *Distillations*, *Stitches*, &c. which happen upon some Part of the Body, being unwarily exposed to the *Cold*, was owing immediately to the *Perspiration* being diminished; tho' *Sanctorius* himself had observed the *Perspiration* considerably diminished from that Cause, without any such Effect, [§ 2. *Aph.* 9.] and no where else attributes them to such a Cause: As for *Dr. Keil* he argues very much against it, and shews it to be a very inconsistent Hypothesis (a); nay he shews, in two Instances, where a *Cough* was

(a) *Disquis. prima ad med. static.*

was produced by *Cold*, that in Fact the *Per-
piration* was not diminished (*b*); and again,
that one Half of the Night's *Perpiration* was
retain'd without Harm (*c*); and therefore
reckons, that of Necessity a *Cough* must proceed
in these Cases from the *Qualities* of the *Air*
that penetrates our Body, as *Sanctorius* seems
likewise to do (*d*); Dr. *Keil* indeed reckons it
to be done by some *Virtue* of a Piece with that
which turns Liquors into *Ice*, *Sanctorius* by a
Virtue that turns the *Perpiration* into *Ichor*,
tho' none of them shews, supposing their Hy-
pothesis to be true, how the Effects should
follow, nor can it be easily fathomed.

2. In what I have now to add, I shall pro-
pose some Objections against Dr. *Keil's* Opinion
of the coagulating *Power*, or any other *Ma-
lignity* of the *Air*, being concerned in these
Effects we ordinarily attribute to the *Cold*; and
then, some further Considerations to confirm
the Opinion I formerly gave of the Way the
Body was affected by the *Cold*.

3. Besides the Arguments I advanced against
the *Malignity* of the *Air*, as a Cause of these Ef-
fects

(*b*) Aph. 34. (*c*) Aph. 32. (*d*) Sect. 2. Aph. 6.

fects we ordinarily attribute to the *Cold* (e), I must ask why the same malign *Quality*, that must necessarily mix itself with our *Food*, does not with it promiscuously reach every Part of the *Body*? Or since all Manner of Humidity produces these Effects equally, when applied to the *Body*; how came it, that in the Case where Dr. *Keil* observed eighteen Ounces of *Humidity* to be drawn into the *Body*, in one Night's Time, from the *Air*, that none of the Symptoms of the *Cold* were observed? Or how comes it that in the Use of the warm Bath, of which a great Deal is drawn up into our *Body*, never any such Thing happens; tho' a Colar dipt in the same Water and kept *cold* about the Neck affects it? If it be said, that the *Warmness* of the *Liquor* in the one Case prevents it; then I would argue, that the *Malignity* should never shew its Effects deeper than the Mouths of the *Absorbents*, because it cannot pass them without being warmed, and so should never affect the *Glands*, or any other Part beyond the *Skin*; But besides, since all the *Absorbents* are allowed to communicate with the *Veins*, it is

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(e) Differ. 3. from § 47. to 52.

evident that the *Malignity* would first shew its Effects there, and thence would be carried to the Heart; so that, at this Rate, the *Arteries* or *Glands* that are appended to them, could never be affected by the *Malignity*, but as it came from the *Heart*; and therefore all the *Arteries* and *Glands*, most distant from the Place where the *Cold* was applied, would be promiscuously affected, which is contrary to Fact.

4. If a like Difficulty should be proposed to me to solve, *viz.* why, in going to wash in Sea, River Water, or the cold Bath, where there is both *Cold* and *Humidity*, the Effects of the *Cold* are not produced as in the other Cases; I must desire the Difference of Circumstances to be considered. In the Case that we put, there is but one *Place* of the Body affected, so that its Influence upon the Mass of Blood is inconsiderable; in the Case of Bathing, the whole muscular *System* is at once affected, and hence the Force of the Blood is considerably augmented thro' every Part of the Body; so that, tho' upon our first going into the Bath, we feel the Effects of the *Cold*; we shake, shiver, and pass Urine; yet immediately after, the Muscles
and

and muscular Fibres of the Vessels agitate the Blood so, that its Force is observed at the most superficial Vessels of the Body, tho' opposed by the cold *Medium* that surrounds them; they are kept in the full Distention, and the Blood circulates thro' them in due Proportion; hence, on a Sudden, the whole outer Superficies of the Body glows with Warmth, and turns red like a Lobster: Yet if we stay in the cold *Bath* beyond Measure, we shall find the *Muscles* languish and turn weary, by being kept too long on the Bend, and then it is the *cold Water* begins to produce these Effects, which it does for ordinary, when applied to the Body so as not to augment the Force of the Blood equally in every Part of it.

5. I must further ask those, who alledge the Attraction of *malign Vapours*, as what produce the Effects of the *Cold*, whether or not the Face, Breasts, and Limbs, that in some are much exposed, attract as the other Parts do? And if they attract, why we don't perpetually see the Effects of that Malignity? The Difficulty is easy answer'd upon my Hypothesis, since we find that the *Proportions* of the *Solids* in any

Part of the Body can be changed gradually without any *Harm*, but not on a Sudden. Thus in the preceeding Treatise we found, that the *Womb* gradually enlarges to a vast Bulk, and the same Way upon *Delivery* contracts again; but if a *Surprise*, or any violent *Passion*, or sudden Touch of *Cold* should come upon a Person immediately after *Delivery*, and thereby the *Muscles* of the *Womb*, that were gradually contracting, made at once, to reduce themselves, and so stop the *Lochia*; in this Case the Blood is made so precipitantly to distribute itself, that not unfrequently the neighbouring Parts, especially the *Epigastrick* Region, are inflamed, a Fever and Delirium produced; whereas, if the *Womb* had been allowed gradually to contract itself, and in the same *Proportion* the Blood, that formerly had passed to the *Fætus*, been allowed to enlarge the neighbouring Vessels to the *Womb*, in a few Days it would have provided a *Retreat* for itself, without any Inconvenience. It is the same Way, by which the Proportions of the Vessels that are exposed to the Cold do alter; if any Part be gradually exposed to it, there the outer Vessels contract and

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turn stronger, and by the same Steps their neighbouring Vessels turn somewhat wider, and allow a greater Quantity of Blood to pass them than in another Case; and this they do, when exposed to a Degree of Cold, which, if applied to another Part of the Body, where the natural *Proportions* of the outer and inner Vessels had not been alter'd, would have produced all the Effects, which a sudden Flood does, when sent in upon any of the Vessels of the Body.

6. But further, I would ask what supports a *Cough* in a Person for some Months and Years together, tho' after the first Attack he is carefully guarded against a second? Does not this argue a Loss of the *Tone* in these Vessels that received the Force of the Blood that was beat from the Place where the *Cold* was applied? And don't we see these *Symptoms* carried off by Blistering, Bleeding, Cupping, even without Scarrification, nay, frequently by a Piece of Woollen-Cloath kept upon the Part affected, and other such Methods of Revulsion, where we can suspect no specifick Dissolvant, if applied before the oppressed Part has lost its *Tone*, which makes it incapable to recover itself.

7. It is to be observed, to form a better Notion of our Doctrine, That the Parts of the Body are the easier affected by the *Cold*, the more complicated the Vessels are at them : Thus the glandular Parts are easier affected than the rest : And according to our Hypothesis the Reason is obvious ; in Parts where the Vessels are less complicated, they yield easier to the urging *Force*, and so allow the Blood to pass in a greater Quantity without Difficulty : And to confirm this Account of it, it will not be amiss to observe, that if a *Tumour* should happen at any Part of the Body whatsoever, and thereby the Bounds about be straitned, and made less capable to receive a greater Quantity of Blood, that then the Cold will influence it easier than it does the Glands themselves, suppose the *Tumour* be in Parts that otherwise are very insensible of the Cold ; thus we find all *Tumours* in the Arms and Legs, as in the other Parts of the Body, to enlarge much by being exposed to the *Cold* ; and the Glands are still more easily affected when swell'd, than otherwise : Now since all the Variations that are observed upon the different Circumstances,

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in which the *Cold* is applied, are so easily accounted for from our *Scheme*, with such Evidence and Simplicity, Why shall we contrive obscure and unintelligible Causes to explain the Effects of the Cold by, from whence we can take no Indications of Cure, while the other Accounts for the most successful and established Practice? This constringing Force, we have all along attributed to the Cold, is as manifest as any Thing can be that is exposed to the Eyes; no sooner we rise from the Fire, with our Veins turgid and swell'd, and go into the open Air, but they collapse and shrink; Persons troubled with swell'd and knotty *Veins* find a great Change upon them in Summer and Winter, in hot and cold Weather; the lax and white *Swellings* about the Joints can scarce be safely treated, but by pumping cold Water upon them; I have seen a Nurse's Breasts, tho' lately suckt, run out in passing betwixt the Fire and Bed, after having cast herself loose, and so exposed her Breasts, which used to be covered; I have known likewise Women menstruate upon going in to the cold Bath, which is a very extraordinary Effect of it; but it is to be

observed, that that they who were so affected by it, menstruated frequently in the Space of a Month, which to me was a plain Indication that the Vessels of the Womb were very lax; it being certain that the cold *Bath*, used at the critical Time, does stop that Flux, for the very same Reason that *Surprises* of any Kind do it; the muscular Fibres of the Womb (which at that Time are stretched beyond their ordinary Tone) with the other muscular Parts of the Body, are made suddenly to contract by such Causes, and the Contraction at the Womb necessarily stops the Flux; it is very much otherwise when the Womb is weak and lax, for in that Case it is passive, and gives Admittance to the Blood, which every other where is strongly agitated: And thus we see how the Cold at different Times may produce very different Effects.

8. I went the Length, in accounting for the Effects of the Cold, likewise to account for the Rheumatick Blood, which is so familiar to People with Coughs, Stitches, Tumours, or who upon any other Account have the Blood retarded, at whatever Part of the Body
it

it is; as I explained at large from Paragraph 37 to the 46, in the Treatise upon the Cold: I shall now confirm the same by three Examples; *First*, In a Gentleman who, perfectly well, strest his Back by missing a Stroke at Golf. In a *Second*, who got much such another Stress upon missing a Step of a Stair; and then in a young Lady, who got a Stress at the Part where the Middle of the *Musculus Cucularis* lies upon the Right Side, in catching at a greater Weight than what she was able to support. In all these Cases, the Pain and Stitches continued for some Time, and were always eased by Bleeding; nor was the Blood less *Rheumatick* than in a Pleurisy, tho' there could be no Suspicion of any acquired *Malignity*; the plain Account of the Mischief in these Cases is, that the Muscles are contracted with such a Violence to support the tottering Body, or superior Weight that the Blood-vessels among them are strongly squeezed, and their Blood hurried upon the serous Vessels, which thereby lose their Tone, and so continue inflam'd till the Tone be recovered again; and it is the slow Motion that the Blood has among the serous Vessels, or
the

the Vessels they compress, when dilated themselves, that occasions its acquiring the Rheumatick Appearance; so that Inflammations may have their Seat in the dilated serous Vessels without coagulated Matter, as frequently happens in the *Tunica Cornea* and *Adnata Oculorum*, which naturally have no Blood-vessels, and yet by tying one's Colar too strait, they at once inflame: So that we see, whatever forces the Blood upon the serous Vessels inflames them; and the Way we treat these Cases with Success, argues much that there is no other Thing in the Case but a preternatural Distention of the Vessels; we use Evacuations for Revulsion, and apply topically stimulating and astringent Medicines to recover the Tone of the Vessels, as the Practice of the most successful Physicians evidenceth in managing Inflammations of the Eyes, Tonsils, *Uvula*, and in the Rose, &c. tho' relaxing Medicines be found most successful when applied to the Neighbourhood of the Vessels affected. Besides, I must notice, that a Fever is not always a concomitant of Inflammations, we finding those of the Eyes, Tonsils, &c. frequently without it; which Observation

is

is of great Use to investigate Pains of the Stomach and Intestines when fixed to one Part, for these are seldom without Inflammation, and may come and go as those of the Eyes do; but nothing is so certain a Remedy for them as Bleeding, tho' they have no Fever along with them, which some have made the only Indication of Bleeding in these Cases; nay, I have seen Bastard Pleurifies with strong Rheumatick Blood continue for some Months without the Pulse being raised; for which, the only Relief was Bleeding, Blistering and Fomentations. One Thing was observable in those Patients, that when bled, upon the first Attack of the Disease, which for some Time was epidemical, that it left them immediately; but if neglected for eight Days, as was done in some, who finding the Stitches supportable, put off the Bleeding as long as they could, then it turned very obstinate; by which it is plain that the Vessels were weakned by the continued Force of the Blood upon them, and so, tho' the Revulsion was made, they had not Strength to recover themselves, and restrain the Blood for the future; besides, it is to be remarked,

that

that all Manner of Drink taken cold raised the Pain; which must be allowed to have proceeded from the Contraction of the Vessels near to which it passed at first, by which the Blood was forced in upon the affected Part; and not from affecting the Part it self with its Coldness, since of Necessity the Drink would turn warm before that was reached; by the same Way it is we account for cold Drink affecting the Breasts of some delicate Nurses so very sensibly. This Way of accounting for such surprising Effects is, I am suspicious, too simple and obvious to be regarded by those who are taken with nothing but what is mysterious; they seem to have trode very little in Nature's Ways; instead of dissecting the real Compositions that Nature has provided for the Subject of our Speculations, they first fancy Things, and then make Commentaries upon them: But I shall not inlarge upon such Reflections, only I must take upon me to recommend my Lord *Verulam's Novum Organum Scientiarum* to our present Improvers and Students in Medicine, that they may be taught the different Ways by which natural Philosophers are seduced and fall into

Error,

Error, and acquire a just Notion of the Rules that are successfully to be followed in all the Parts of natural Philosophy. In the mean Time, I shall make my Exit in his Lordship's Words, which all along I proposed to conform my self to, however unsuccessfully. *Non ullam aut vim, aut insidias hominum judiciis fecimus, aut paramus; verum eos ad res ipsas & rerum fœdera adducimus; ut ipsi videant, quid habeant, quid arguant quid addant, atque in commune conferant. Nos autem, si qua in re, vel male credidimus, vel obdormibimus, & minus attendimus, vel defecimus in via, & inquisitionem abruptimus; nihilominus iis modis res nudas & apertas, exhibemus, ut errores nostri antequam scientiæ massam altius insciant notari & separari possint.*

F I N I S.



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 however unsuccessfully. Non illud est cur, aut
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 verum est ad res ipsas & verum facta adhae-
 runt; ut sit eadem, quae habent, quid arguant
 quid adhaerent, atque in ratione constant. Non
 autem, si qua in re, vel male creduntur, vel obor-
 trantur, & minus attenduntur, vel deservunt in
 via, & indignationem utriusque; nihilominus in mo-
 dia res nuda & aperta, exhibentur, ut error
 nostri autem spiritus nullum alium rationem no-
 tam & separari possunt.

F I N I S



