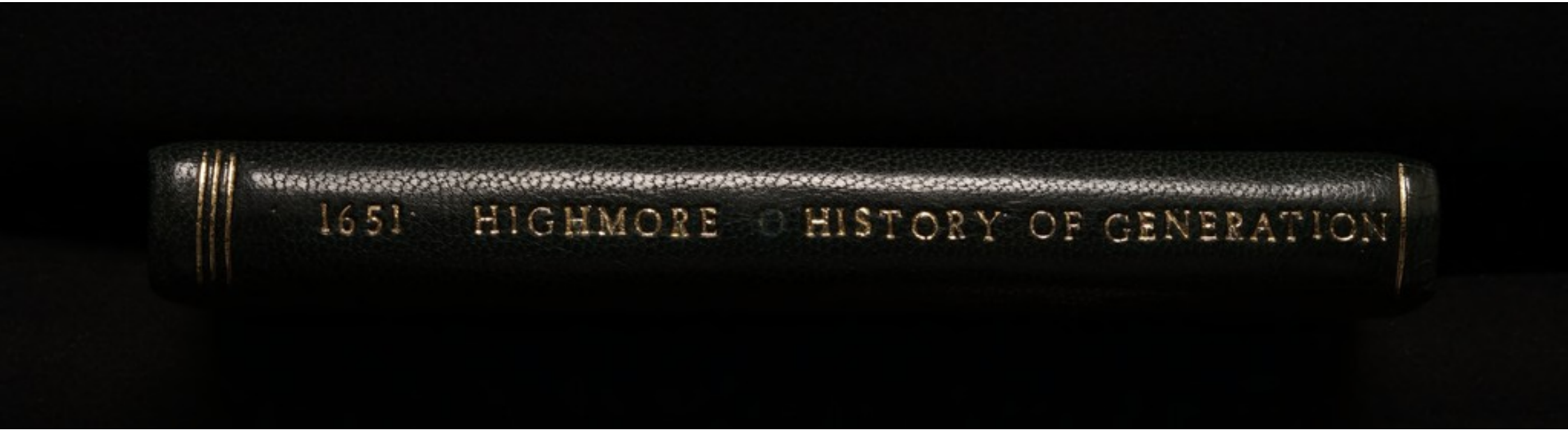
The history of generation. Examining the several opinions of divers authors, especially that of Sir Kenelm Digby, in his Discourse of bodies ... To which is joyned a Discourse of the cure of wounds by sympathy ... especially by ... Sir Gilbert Talbots powder / By Nath. Highmore.


1651 HIGHMORE HISTORY OF GENERATION

HIGHMORE, N.
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THE HISTORY OF GENERATION.

Examining

The several Opinions of divers Authors, especially that of Sir *Kenelm Digby*, in his Discourse of BODIES.

With

A general Relation of the manner of Generation, as well in Plants as Animals: With some Figures delineating the first Originals of some Creatures, evidently demonstrating the rest.

To which is joyned a Discourse of the CURE of WOUNDS by SYMPATHY, Or without any real applycation of Medicines to the part affected, but especially by that Powder, known chiefly by the name of Sir *GILBERT TALBOTS* Powder.

By NATH. HIGHMORE lately of *Trinity Colledge* in *Oxford*, Doctor of Physick.

LONDON,
Printed by *R. N.* for *John Martin*, and are to be sold at the Bell in S. *Pauls* Church-yard.
1651

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By MATH. HIGHMORE lately of Trinity College in Oxford, Doctor of Physick.

LONDON,
Printed by R. N. for John Martin, and are to be sold at the Bell in S. Paul's Church-yard.
1660.

To the Honourable,
Mr. Robert Boyle,
Son to the Right Honourable the late Earl of *CORK*,
my much Honoured Friend.

Noble Sir,

WHere Virtue ſhall bee found in conjunction with Noblity in ſuch black, the laſt and worſt times, it no leſſe invites and amazes the eyes and hearts of be-

holders, then some new Star or blazing Comet: but with this difference; the one is cause of their fear, the other gives life to their hopes and joy. You have, Sir, so inricht your tender years with such choice principles of the best sorts, and even to admiration managed them to the greatest advantage; that you stand both a pattern and wonder to our Nobility and Gentry: who in these past times many of them have so spent their precious Minutes, that they are scarce able to account for one, or spend an hour but in vice: that cannot brook Virtue, because it is not born with them; that

hate

hate all things that must be obtained by industry. Who most degenerately intrusting their wits as well as fortunes with their inferiours, have made them Master of both; a sad forerunner (I will not say Author) of these sadder times.

But you have made a better and far nobler choice, you have not thought your blood and descent debased, because married to the Arts. You stick not to trace Nature in her most intricate paths, to torture her to a confession; though with your own sweat and treasure obtained. Being ravisht, Sir, with these considerations of your worth and candor, I

ſhall not fear to throw theſe Papers into the boſom of your protection; from whom as I cannot miſſe a judicious cenſure, ſo I ſhall hope for a candid reception. They are Diſcourſes which have buſied the Heads and Pens of many judicious and learned, amongſt whom our noble Author hath not deſerved the loweſt eſteem. I ſhall not preſume to theſe phanſies with their maturer births. Yet perhaps ſomething may here be found, that may encourage others to a farther ſearch. I ſhall not deſpair of your own, which may give a better account and a plenary ſatisfaction, if it may be,

in

in theſe ſo labyrinthean works of Nature, which is all I have laboured for, and ſhall ſtill be, (as likewiſe for the preſervation of your health) the prayer of

Sherborne,
May 15.
1651.

Your Honours moſt
humble Servant,

NATH. HIGHMORE.

An Explanation of the following Figures in both Tables.

THe first Figure, of the first Table, shews the Kidny Bean opened; in which is a little crooked leaf folded up, which being displayed, shews it self, as in the second; and when, being set, it arises above ground, it is such a Plant as the third shews; with the very same leaves and no other.

The second Figure shews a Colewort seed: the first shews both leaves, with the stalk folded up, as they lie in the husk of the seed: the second shews it come up out of the ground.

The third Figure hath the small germen of an Ash; lying with his two leaves in the kernel of an Ash, both

in

in the husk incloſing them. The ſecond ſhews him ſprung up above the Earth, at his firſt coming abroad.

The fourth delineates the young germen of the Peaſe in the midſt of the grain, and its breaking forth.

The fifth ſhews the young Plant in the midſt of the Bean: with the manner of his putting forth, with the ſame leaves diſplayed in the third, which are wrapt up in the firſt and ſecond.

The ſixth Figure diſplayes the young Maple wrapt up in his husk; and how he lies, as in the firſt: The ſecond ſhews him a little unfolded, when it is taken out of the husk. The third ſhews him gotten from his ſhell, and the ſurface of the Earth.

The ſeventh Figure ſhews what progreſs the Chick hath made in his formation, in the third day after incubation.

The eighth ſhews the Chick perfectly formed in his ſhell not long before his excluſion; with the Yolk almoſt whole; deſcribing the manner of his lying in the ſhell.

The

The ſecond Table ſhews the growth of the Chick in the firſt dayes Incubation.

THe firſt Figure demonſtrates the Eggs taken from their ſhels in a diſh, with the Chalazæ, and Cicatricula: which in *A* that was never ſat on, is but ſmall. In *B* that hath endured the heat of the Hen one whole day, ſomething dilated. In ſome new layed Eggs, I have ſeen it no more altered the third day.

The ſecond Figure delineates the ſecond dayes obſervations and change in the Egg; the large dilation of the Cicatricula, with all its Circles.

The third Figure ſhews the growth of the Chick, and alteration in the Egg, the fourth day.

The

The fourth and fifth Figures, shew the fifth dayes addition to the former growths.

The fifth shews him taken from the Yolk, and White, with a delineation of all his parts, as they appear lying round together in the Egg.

An

An INDEX of the Chapters contained in this History of Generation.

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Fig: 1.a

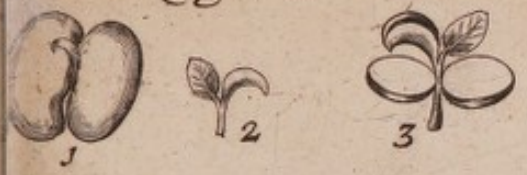

Fig: 2.a

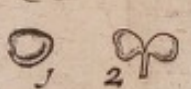

Fig: 3.a

Fig 4.ta

Fig: 5.ta

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Fig: 7.a

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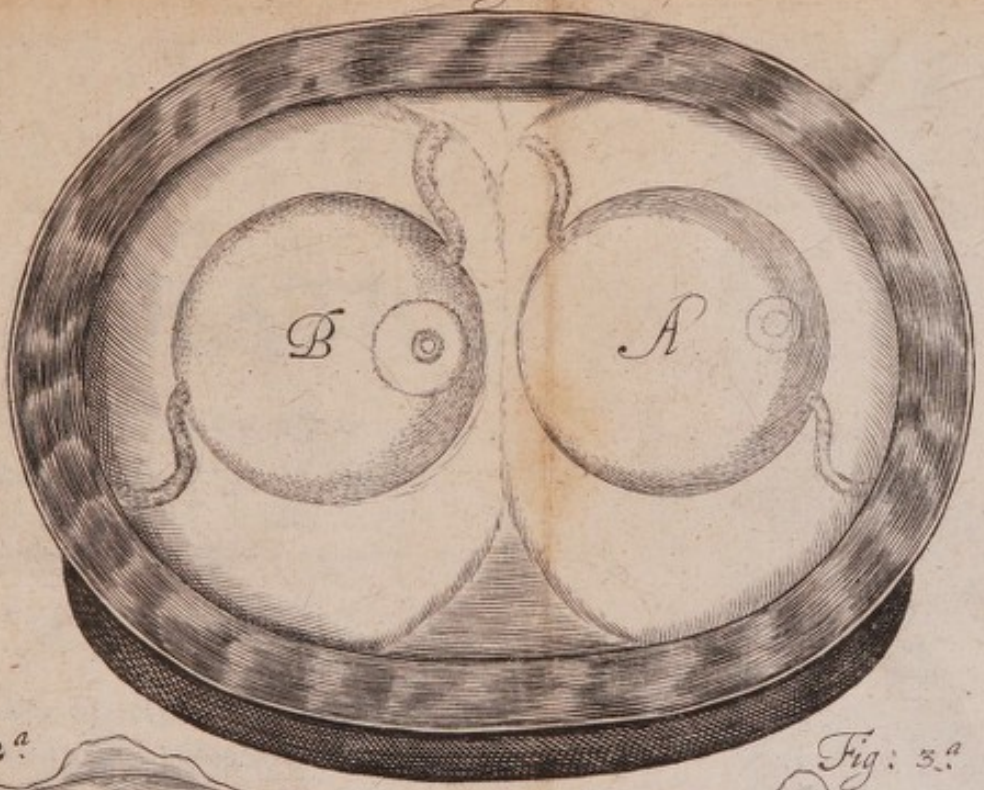
Fig: 1.ª



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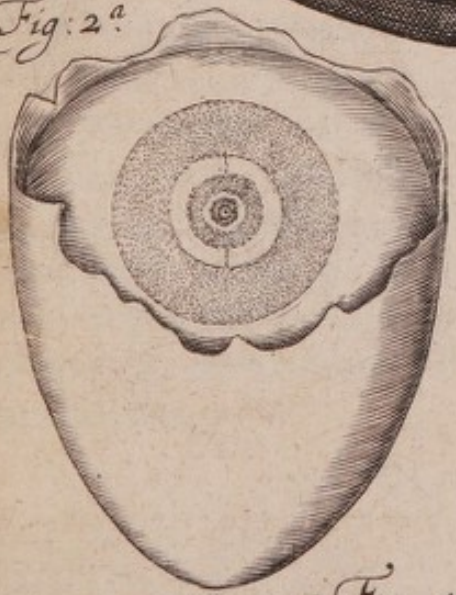

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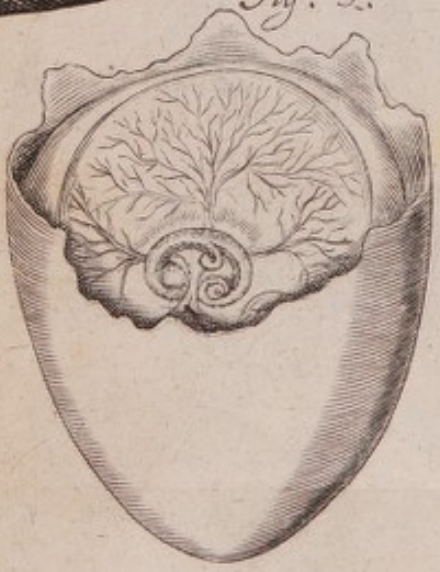

Tab: 2.

Fig: 4.ta

Fig: 5.ta

THE HISTORIE OF GENERATION.

The Opinion of Philosophers concerning Generation.

Chapter the First.

THe ancient Philosophers have taught us that all subsisting Bodies consist of two parts, *Matter* and *Form*: the first they would have us believe to be compos'd of four jarring Bodies, which they call Elements, indued with as many proper qualities, which they called *Prime*: as if from the various mixture of these did arise all other qualities.

Some later Philosophers, seeing themselves begirt within so straight and narrow bounds; and finding some effects much out-stripping the power of such a slender mixture, have told us of occult Qualities; which arise from some other Bodies not yet known or discerned in the composure.

Our Chymists assure us for certain, that in the dissolution of all mixt Bodies, they finde other Elements besides those four, we received from the Ancients. And perhaps could their separations and putrefactions be as accurate to distinguish, as Nature is in the mixing, wee might finde many more, from whence these strange effects in several Bodies should arise. For indeed how can we imagine that the complicated and reiterated mixture of heat, & cold, moisture and drought, should ever produce those ridling effects of Mercury, the Loadstone, and many others. But this discourse I shall leave to those that have largely handled it.

The:

The second part which they call *Form*, *ab informando*, they scarce tell us whence it comes; onely magisterially they teach us, (and we must believe them) that it ariseth from the power of the matter.

But how this, if rightly considered, doth agree with their own principles, seems somewhat difficult to unriddle, *viz.* How a Substance (as they grant all Forms to be) can subsist in an accident, which hath no being of it self, is no less a Riddle, then repugnant to their own grounds.

This some of our later Philosophers have very well discovered; and shewed us, that those Forms w^ch they thought and taught to bee but potentially in the matter, are there actually subsisting; though till they have acquired fitting Organs, they manifest not themselves. And that the effects which are done before their manifestation, (as the forming and fashioning of the parts wherein they are to operate) can rise from

nothing else but from the Soul it self. This likewise I shall leave to the Readers enquiry, and shall follow that other way of introducing Forms, and Generation of Creatures, (as well Animals, as Vegetables,) which gives Fortune and Chance the preheminency in that work. A conceipt lately vented by the noble Author of the two Treatises, the one of Bodies, and the other of Mans Soul: Where he describes the motions that are in Plants, (which are Nutrition and Generation;) to be, by one part transmitting unto the next to it, the juice which it received from that immediately before. So that there is one constant course from the root, (that sucketh this juice from the Earth) unto the top of the highest sprig. And the passage of this moisture from one to another, is in a manner but like the rising of Water in a Still: w^ch^ by heat is made to creep up by the sides of the Glass, and so by the external cold is fashioned into that Body which at last it is. Let us hear him describing the manner of it himself,

The Conceipt of Sir Kenelm Digby *concerning the Generation of Creatures.*

Chapter the Second.

Chap. 23. *Sect.* 7. LEt us frame (saies he) a conception; that not far under the superficies of the Earth; there were gathered together diverse parts of little mixed Bodies; which in the whole sum were yet but little; and that this little Mass had some excess of fire in it, such as we see in wet Hay, or in must of Wine, or in wort of Beer: And that withall the drought of it were in so high a degree as this heat should finde no means, (being too much compressed) to play his game: and that, lying there in the bosome of the Earth, it should after some little time, receive its expected and desired drink, through the benevolence of the Heaven; by which it being moistned, and thereby

made more pliable, tender, and easie to be wrought upon, the little parts of fire should break loose; and they finding this moisture a fit subject to work upon, should drive it into all the parts of the little Mass, and digesting it there, should make the Mass swell.

This increase (saies he) of bulk, and swelling of the little Mass, wil of its own nature be towards all sides, by reason of the heat, whose motion is on every side, from the center to the circumference. But it will be most efficacious upwards towards the Air; because the resistance is least that way, both by reason of the little thickness of earth over it, as also by reason that the upper part of the earth lieth very loose, and is exceeding porous, through the continual operation of the Sun, and falling of rain upon it. It cannot choose therefore but mount to the Air, and the same cause that maketh it do so, presseth at the same time the lower parts of the Mass downwards. But what ascendeth to the

Air

Air must be of the hotter, and more moist parts of the fermenting Mass, and what goeth downwards, must be of his harder and drier parts; proportionate to the contrary motions of Fire and of Earth, which predominate in these two kindes of parts. Now this that is pushed upwards, coming above ground, being expos'd to Sun and wind, contracteth thereby a hard and tough skin on its outside, but within is more tender. In this sort it defendeth it self from outward injuries of weather, whiles it mounteth; and by thrusting other parts down into the Earth, it holdeth it self stedfast, that although the winde may shake it, yet it cannot overthrow it. The greater this Plant groweth, the more juice is daily accrewed unto it, and the heat is encreased, and consequently, the greater abundance of humors is continually sent up; which when it beginneth to clog at the top, new humor pressing upwards, forceth a breach in the skin, and so a new piece like the

main ſtem, is thruſt out and beginneth on the ſides, which we call a branch. Thus is our Plant amplified, till Nature not being able ſtill to breed ſuch ſtrong iſſues, falleth to works of leſſe labour, and puſheth forth the moſt elaborate part of the Plants juice, into more tender ſubſtances: but eſpecially at the ends of the branches; where abundant humor, but at the firſt not well concocted, groweth into the ſhape of a Button; and more and better concocted humor ſucceeding, it groweth ſofter and ſofter, (the Sun drawing the ſubtileſt parts outwards) excepting what the coldneſs of the Air, and the roughneſs of the Winde, do harden into an outward skin. So then the next parts to the skin are tender; but the very middle of this Button muſt be hard and dry, by reaſon that the Sun from without, and the natural heat within, drawing and driving out the moiſture, and extending it from the Center, muſt needs leave the more earthy parts much

ſhrunk

shrunk up, and hardned by their evaporating out from them. This Button thus dilated and brought to this passe, we call the fruit of the Plant; whose harder part encloseth oftentimes another, not so hard as dry. This drought maketh these inner parts, to be like a kinde of dust, or at least such as may easily be dried into dust, when they are bruised out of the husk that encloseth them. And in every parcell of this dust, the nature of the whole resideth, as it were contracted into a small quantity: for the juice which was first in the Button, and had passed from the root through the manifold varieties of the diverse parts of the Plant, and had suffered much concoction, partly from the Sun, and partly from the inward heat, imprisoned in that harder part of the fruit, is by these passages, strainings, and concoctions, become at length to be like a tincture extracted out of the whole Plant, and is at last dried up into a kinde of magistery. This

we

we call the Seed, which is of a fit nature, by being buried in the Earth, and dissolved with humor, to renew and reciprocate the operation described.

But a sensitive Creature (saith he) being compared to a Plant, as a Plant is to a mixed Body; you cannot but conceive, that he must be compounded, as it were of many Plants, in like sort as a Plant is of many mixed Bodies: But so, that all the Plants, which concur to make one Animal, are of one kinde of nature, and cognation. And besides, the matter, of which such diversity is to be made, must of necessity be more humid, and figurable, then that of an ordinary Plant: and the Artificer, which worketh & mouldeth it, must be more active. Wherefore we must suppose, that the Mass, of which an Animal is to be made, must be actually liquid; and the Fire that worketh upon it, must be so powerful, that of its own nature, it may

be

be able to convert this liquid matter, into such breaths and steams, as we see do arise from Water, when the Sun or Fire worketh upon it. But lest this moisture being wrought on by such an active heat, should vanish quite away; we must suppose it to have such unctuous parts, that may hold them together; so that the heat imprisoned in this viscous liquid matter, riseth in bubbles: and by reason of its solid unctuousness cannot break forth, but stretch themselves longer and longer; and every one would be as it were a little Brook, whereof the chanel would be the enclosing viscous substance, and the inward smoak that extendeth it, might be compared to the Water of it.

This liquid smoak-like substance, the Fire works on in these Chanels, he makes to be three-fold; First, Watry streams, which first flie out, settle in the remotest parts, and is fittest for figuration. Secondly Oily, which give to the other continuance, and solidity.

Thirdly,

Thirdly Fiery, which is made of the groſſer, more fixt parts incorporated with Fire, having ſufficient moiſture to keep it flowing, and is like a Cauldron of fire; and theſe laſt vapours are for the continuance of heat. Theſe three Brooks in a ſenſitive Creature, ariſe from three Sources or Fountains, the Heart, the Brain, and the Liver, and are conveighed in three ſeverall Chanels; the Arteries, Nerves, and Veins, and give unto the Animal, heat, ſenſe, and nouriſhment.

A Short Cenſure of the former Conceipt.

Chapter the Third.

HOw much this Conceipt ſubverts the antique principles of Philoſophy, I ſhall not here undertake to demonſtrate: How far it ſhoulders out Truth it ſelf, and ſo blots out thoſe indeleble Characters, fixt by the finger of

of the Creator on every ſpecies; thoſe inſcriptions on all his works, the diſtinct conſtitutions, parts, operations, and figures (which are as ſo many Buſhes, or Signes hung out, to diſcover what are the inhabitants within) will eaſily ſhew us. For if heat rarifying a ſubſtance, making it thruſt it ſelf into a larger ſpace were the ſole author of all generation; and were the cauſe why Plants grow up in ſtalk and leaves, and downwards in root: we muſt either admit thoſe differing Characters to be vain accidental chances, or elſe look out ſome other agent, from whoſe fruitful womb, this variety might ſpring forth. If we but muſter over the numerous Regiments or ſeveral ſpecies of Plants, and conſider how this grows up with a ſquare ſtalk, that with a round; ſome ſtart up hexangular, others triangular; ſome bear a fruit of one form, ſome of another: and in them faſhion ſeeds, of as differing figures as themſelves. How the

leaves

leaves also and flowers shew as much of variety, as skill in the Workman; every Plant being by them as soon discern'd, as seen. Let us call over likewise the differing numbers of Animals, Insects, and others; and examine all the starting holes, that Fire can breathe forth a stream by; all the casual compressures of cold, or external accidents; and compare them together, we shall see whether such a fruitful stock of variety in colours, shape form, vertue, and many other differing signatures, can be the issue of such accidental, and equivocal parents.

If this formation of Creatures arise from heat extending, and enlarging a small moistned lump; without any other consideration, why are not these Atomes extended circularly; and so all Bodies should be cast into the same Mould with the Heavens; and should, as they seem to us, be all spherical. But he tells us of some light parts, that, besides the power of the Fire enforcing, naturally

naturally climb upwards: and of others, which by their natural weight, are perſwaded to ſink into the Earth, to hold the mounting parts ſtedfaſt, that they may not be overthrown by Windes. But were there nothing elſe to give a figure to Plants, but aſcending and deſcending, of light and heavy parts; whence ſhould that variety ariſe in the faſhion of thoſe aſcending and deſcending parts: the weight of the parts ſhould carry them directly downwards, as the lightneſs doth upwards; and ſo all roots ſhould deſcend in one continued round, but long, lump: what then makes ſome ſpherical, others ſtretching out infinite numbers of hairy threds; ſome directly downwards, others parallel to the ſuperficies. The Author tells us the figures of them, as of the aſcending parts, are cauſed by ſome external accidents: As when the more hot and moiſt parts are aſcended, and broken from the priſon of the Earth, the cold air compreſſeth and hardneth the

the external parts, and so enricheth this sprouting upstart, with a hard tough skin; both armour and clothes to protect the interior softer parts. The hardness of the Earth, likewise compresseth the descending parts, into such forms as we finde them of. But may not the truth of this be vehemently suspected; when, if we examine the coat, we shall finde it more penetrable then the Body: and more subject to external injuries, then that inclosed? as in all Trees and Plants, the Bark and Rinde is of a more flexible, tender, and soft composure then the invested Trunk: and the hard solid shell of Walnuts, Almonds, stones of Plumbs, &c. are invironed with a very tender substance. Besides this, there is yet a greater doubt, how this external cold air should in the same place, at the same instant of time, fashion these mounting Atoms into a round stem, with a long, sharp leaf: and close by that, compress others into a square, hexangular, or triangular

lar shape; with leaves round, jagged, indented, scollopt, or the like? as may be seen in several Plants, inhabitants of the same piece of ground, under the same Heavens, inviron'd with the same Air, and heavenly influences. These distinct figures cannot spring from the cold circumstant Air; for this applying it self alike to all, and every side of these ascending parts, should equally compresse every part; and so all Plants should sprout up cylindrical, as the Trunks of Trees do.

The Fruit also and Seed, which he calls a Button, or greater quantity of those hot and moist parts collected, and dust or parts dried into the form of dust, by the external heat of the Sun, and innate heat of the Plant; are in a more orderly method framed and repos'd. For not onely in qualities, but in figure, they much vary one from another. One producing a seed inclos'd onely in a husk; another a seed of differing figure inclos'd in a fruit, and hard

ſhell. Is cold Air the fruitful Mother of this variety too? Nay, if we butt more ſeriouſly examine this duſt, we ſhall finde it orderly ſet, with navell ſtrings, affixt to ſome part of their incloſing Matrix; by which nouriſhmentt is conveighed for their growth, andd ſubſiſtance. And if we ſhall further anatomize theſe duſts, we ſhall finde laid up in them Plants; the very ſame Identical Plants, which firſt grow up, after the ſeeds are committed to the ground. In which indeed reſides the nature of the whole. And this young ſeminal Plant, we may truly call the extracted tincture, or Magiſtery of the whole Plant; as ſhall more largely appear hereafter.

Neither doth his 25 Chapter (where he endeavours to ſhew how this wonderful effect, as he calls it, is performed; how a Plant or Animal comes by that figure it hath) afford us any greater ſatisfaction. For if we examine his firſt principle, *viz.* That the ſeveral figures

of

of Bodies, proceed from a defect in one of the three dimensions; caused by the concurrence of accidental causes; we shall finde it extreamly straightning the most delightful variety of the Creation, and the infinite power of the Creator. For upon these grounds it must be supposed, that the most perfect figure is to be cubical, and all Bodies should have been cast into that mould, but that some external causes stepping in, hinder almost all from obtaining that perfection: the Creator not being able to withstand their prevalency; or by patching up that defect, could not give perfection to all that, which his own mouth assures us was good. The examples also which he produceth, teach us there is but little truth in this position; for how can we conceive the watry drops of rain falling, should suffer violence (as to be pared round) by the softer Air, which is not able so much as to hinder it from falling? The fashioning of Salts

(as he relates) doth as little satisfie. As for Alume, it is not of such unctuous parts as he reports; for how then could it so indiscernably be dissolved in Water, and so much resist Fire, which is not proper to unctuous Bodies? Besides, being dissolved and falling again, what should hinder the parts from meeting all in a lump, and conforming themselves to the fashion of the bottom of the Vessel, in which they are contained; as we see all unctuous Bodies do? As for Salt, if that should acquire his figure on the superficies of the Water as he informes us, it should be only long and broad, without thickness: whence then come those exact cubical forms in Salts, which are suffered to coagulate of themselvs. Where you shall finde the most exact Mathematician out-gone by this natural Art. Neither is this caused by the falling of parts one upon another, (as hee speaks before of Alume) ere the former are throughly hardned: for then

why

why should it not arise still in height, by the continual addition of descending parts, as long as there are any Attoms to fall, by which meanes it should not become cubical, but a long square. But we finde the contrary, while it most exactly casts it self into cubes; the angles sometimes looking upwards, sometimes transversly; which were impossible, if those squares were made, by long and broad Bodies falling one upon another. And vitriol, though calcined to perfect redness, if dissolv'd and fixt again, not onely recovers his bright shining greenness, but is squared out into various angles, looking every way, as if it had been fashioned by the hand of the Artificer.

The figure of Saltpeeter is almost neglected by him; onely he tels us, that by reason of its drinesse, it is more difficultly figured, and therefore is not equally increased. But if we examine it well, we shall finde it more unctuous, then the other two, and is more readily

readily caſt into that figure, then the other. For it doth not onely ſhoot forth preſently almoſt in water, after it is removed from the heat; but we ſhall finde it oftentimes upon new Wals ſhot forth to a great length, without the help of Water to faſhion it in. So that there ſeems to be ſome more particular agent to be found out, that immediately imprinteth theſe determinable figures; which ſhould rather work by a conceived deſigne of producing ſuch a figure, in ſuch a Body. How elſe could ſuch effects continually be wrought, (accidental cauſes working not ſtill alike) and therefore it were impoſſible to expect ſcarce a ſimilitude in the works.

The formation of Animals affords us little leſſe perplexity. How heat ſending forth, or how thoſe vapours emitted ſhould ſettle themſelves in ſuch and ſuch method and form; ſuch variety of parts without ſome other director cannot appear. That there are

in

in all Animals three sorts of chanels, is an unquestionable truth; but that there are distinct Bodies conveighed by them, though taught us by our Masters, is not granted, nor by him received for a truth. For in the next Chapter we shall finde him applauding the circulation of the blood; and describing its motion through, and from the Arteries to the Veins, and from them to the Arteries again. Both of these chanels then must be filled with the same liquor; onely perhaps in the Veins it may be something cooler, and thicker; as our Bath waters are lesse hot in the gutters, then in the spring. That which is conveighed in the other chanel, the Nerves, we can scarce afford it the distinction of another Body; it being only the pure, and most subtile selected parts of the blood, which was conveighed in the other two chanels. Neither, if it were granted that three distinct Bodies, were continually traversing those three se-

veral chanels into the Bodies of all Animals; doth he shew us, how they put themselves into such various shapes and figures, (when they have escaped this conquering expelling heat) as we finde them wonderfully expresst in every creature.

All things arising in fumes & steams, as moist Bodies wrought on by heat will do, when they are freed from that which rarified them, return to their own nature and forms again. As Water rarified, (when those minute particles of heat that divides it into such small Atomes, and mixed themselves with it, are either lost or overcome by the watery Atomes,) returns again to water. Or if those particles remain still active, they do but further divide it; and so it becomes more like Fire by having a greater number of fiery Atomes mixed with it, yet is not made another thing, either in substance or figure. But in the generation of Creatures, it is far otherwise; where the

product or effect is much differing from what the matter or the agent were. Now how this difference doth arise, and how this change is wrought, we must enquire a little further, then what heat and moisture will lead us unto.

The true way of Generation set down in general, with the examination of some repugning Arguments, of several Authors.

Chapter the Fourth.

HAving thus far wandered in the search of a truth, examining those opinions which have endeavoured its discovery; and finding them much failing in their labours: I shall the more boldly attempt the same enterprize: hoping if I fail in so great a businesse, to passe along in the crowd, though not undiscern'd, yet favourably censured.

The

The production of all Creatures, after the first Omnipotent *Fiat* was executed; is by Philosophers called *Generation.* Which is performed by parts selected from the generators, retaining in them the substance, forms, properties, and operations of the parts of the generators, from whence they were extracted: and this *Quintessence or Magistery* is called the *seed.* By which the Individuals of every Species are multiplied; and that which the Almighty for its transgression, made to have an end; by the fertility of this Sperm, is continued to immortality.

From this all Creatures take their beginning; some laying up the like matter, for further procreation of the same Species.

In others, some diffus'd Atomes of this extract, shrinking themselves into some retired parts of the Matter; become as it were lost, in a wilderness of other confused seeds; and there sleep, till by a discerning corruption they

they are set at liberty, to execute their own functions. Hence it is, that so many swarms of living Creatures are from the corruption of others brought forth: From our own flesh, from other Animals, from Wood, nay, from every thing putrified, these imprisoned, seminal principles are muster'd forth, and oftentimes having obtained their freedom, by a kinde of revenge feed on their prison; and devour that which preserv'd them from being scatter'd.

Neither are these without their subordinate forms; for from the walls of their bodies frequently, broken by corruption, issue forth other Creatures, differing in *specie* from themselves; as whosoever will but examine the production of *Insects*, shall easily finde.

This seed consists of two parts, *Material Atomes*, animated and directed by a spiritual form, proper to that species whose the seed is; and given to such matter at the creation, to distinguish it from other matters, and to make

make it such a Creature as it is. Both which are separated, the Material Atomes from the body; the form, from the form of the generator. Which in Vegetables, and sensitive Creatures, where the forms are composed of material substances, our Philosophers are easily perswaded to believe. But how the immortal soul of man, should be communicated to these corruptible material Atomes of the seed of Man, without prejudice to its most pure nature, seems a Riddle to our Philosophers, and impiety to our Divines. I shall not undertake those large disputes *pro* and *con* about this argument, but do believe the Soul of Man may be traduced, though not generated; may spread and multiply it self into many, without fear of corruption. It being a substance incorruptible, immortal, like the Creator, the breath of his own mouth, which still retains so much of that nature, from whence it was breathed; that without the least diminution, it is

is able to communicate, and dilate it ſelf into many Millions, and yet ſtill remain the ſame entire ſubſtance that at firſt it was.

For the material part of this ſeed, there is a large diſpute, whether it be *à toto vel à parte deciſum.* I ſhall not ſtand to tell you the names of thoſe that are Patrons of the one, and of the other: nor rehearſe their Arguments. If you examine them, you ſhall finde theirs moſt rational, that affirm the deciſion from the whole body; what we finde more particularly diſcours't of by our forementioned Author, in his 24 Chapter, we ſhall take up and a little review. Where he hath truly and fully evicted the wandring phancies of ſome, that would have this compound of ſeverall parts, to be collected from every particle, ſo as paſſing by, or through every little Atome of the Parents body, in its paſſage; ſhould be impregnated, and imbued with the nature of it, and ſo retire to the reſerve

where

where it is kept for generation. And afterwards these particles being fermented by convenient heat, do take their posture and scituation; according to the posture and dispositions of those Atomes they visited in their passage, and from whom they received those imbibed natures. But this circulating our Author tells us, is impossible. I will not wrong him so much as to rank his more solid reasons with mine own. Could we finde these chanels and conveighances in the Body, by which this matter should passe; yet I might doubt of the unquestionable verity of this doctrine. For what should hinder this matter circulating about the Body, from receiving qualities, and so likewise the nature of every part it passeth by; and so every particle of this matter, should be impregnated with the natures of the whole; and every small Atome should become a living Creature, or else the Subsequent should blot out the Antecedent

Character.

Character, and the impreſſion ſhould be onely from the laſt part. We may likewiſe as truly, as ſafely conclude with our Author, that it is impoſſible for every little part to remit ſome parts impregnated with the nature of that whole part from whence it fell. This by ſome is thought to be done by that *Quaſi epilepſia in coitu*, that kinde of convulſion or concuſſion of the parts, by which is ſhook off from them ſomewhat retaining the nature, and property of every part, and theſe being joyned, make up the Seed. This ſeems to be very much befriended by our Authors relation of the Cats kitned without tails: and the Womans daughters with ſix fingers upon a hand. My ſelf alſo have ſeen a kinde of Poultry without rumps: which breeding with their own kinde, ſtill brought forth Chicken wanting that part: If with others, ſometimes they had rumps, ſometimes but part of a rump. And not long ſince I ſaw a Mungril Bitch, that had her

tail

tail cut close to her body almost, whose Whelps were half without tails, and half with tails: the next year following, she brought them forth all with long tails, as she had before the cutting off. Which though it seems to favour (as I said) this opinion, it doth no way confirm it; as may appear by the more frequent perfect generations of mutilated creatures; which beget childrem or issue with two legs or arms, though they had but one; Spaigniels, whose tails are always cut, bring forth Whelps whose tails need as much cutting, as their Dams or Sires did. Wee must therefore look out some other way, how this may be done, without the parts themselves.

Some others have supposed this decision to be made from the blood, when it is *tantum non assimilatus*; after it hath undergone all its concoctions, and received all its names christned by the *Arabians*, of *Humoris innominati, Roris, Glutinis, & Cambii*: and is fastned to

to the part, but not perfectly assimilated; and this being selected, and reposited in convenient vessels, receiving some kinde of impression from the part from whence it was divided; it retains still an imperfect signature, and delineation of them; and makes up that which we call the *sperm*. But I shall here want Anatomie to instruct me, how this Cambium, this thinner, or not yet confirmed, or hardned substance of every part, should desert its hold; and being shaken off, should be conveighed into the seminal Vessels. All which, returns to the first opinion confuted by our Author. Who hath likewise fairly cleer'd the other part of the doubt, whether this matter be divided, or taken only from similar parts alone, and so the matter of bone, should accordingly to the conveniency of place and use, become round, blady, circular, or long, and the flesh likewise, only by the help of fermenting heat.

After our noble Author hath so stre-

nuously confuted these phansies, wee shall finde him laying down his own opinion, and seeking some other meanss and course of Generation: He tels us, that the superfluous part of the nourishment, when it is drained from thee rest, and reserv'd in a convenient place, by little and little through digestiom gaineth vigour, and spirits, and becomes a homogeneal body, like to other simple compounds; which by other degrees of heat and moisture, is changed into another substance, and that againm by other temperaments into another. And thus by the course of nature, and by passing successively many degrees of temper, and by receiving a totall change in every one of them; at length an Animal is made of such juice as afterwards serves to nourish him.

But if we more seriously examine this assertion, we shall finde it to leave the truth very much behinde it. For first, if we but look on the Body to bee nourished; we shall finde it to be com-

pos'd

pos'd of many ſeveral parts, of differing natures, which would ſufficiently inſtruct us in the diſagreeing and heterogeneal particles of that which nouriſheth this heterogeneal Body. But if we more curiouſly anatomize this juice or blood, it will abundantly ſhew us, it is no homogeneal Body; neither therefore can that ſuperfluous part ſelected and drained from it, claim that priviledge.

Should we grant this, it cannot appear how heat working upon this homogeneal body, ſhould make in it a total change in the nature of it; or create it an other ſubſtance quite different from the firſt, making it leſſe homogeneal. And in every digeſtion or operation of heat upon it, it ſhould become ſtill leſſe homogeneal, until that ſubſtance be produced which wee ſee compos'd of ſo many heterogeneall parts. If we examine the workes of heat, we ſhall finde it penetrating, dividing, and mixing of ſmall particles of

it ſelf, with the Atomes of the bodies it works upon; and in progreſs of time, divides the body into ſuch ſmall indiviſible parts, that it becomes like it ſelf, in reſpect of rarity. As Fire working on, and mixing it ſelf with Water, divides it into ſmall indiſcernable Atomes, which now attains unto the ſame rarity, and lightneſſe with the Fire; and being accompanied and intermixt with thoſe fiery Atomes, flies aloft, till at laſt diſliking one anothers ſociety, being far removed from the Agent rarifying them, they part companies. And then thoſe unſeen Atomes of Water, collect themſelves again to their former temper, and bulk, no whit changed or altered either in qualities or ſubſtance, which were impoſſible, were this change total, or could this action of heat create heterogeneall parts, in this homogeneal ſubſtance. If we further conſider the power of heat, (or any other qualities) wee ſhall ſurely finde, that in no action there can any

ſubſtantial

substantial thing be given, which is not originally in the agent, or giver. Fire could not give heat, nor Water, moisture, unless it were inherent in those Bodies. Neither can heat or Fire working on an homogeneal body, give it any other heterogeneal parts then fiery ones; nor moisture, any other; then moist ones, which indeed accidentally may give hardness to bones, and softness to flesh; but how comes this bony substance in this place blady, in that round, in another long? this Muscle round, that triangular? this Plant of one form and nature, that of another? We must seek out some other agent to fashion these parts, and to compose this difficulty; and confidently conclude, this way to be lame, and imperfect; of which our Author seems to be conscious, and that makes him so staggering, and at last falling upon an opinion, which he before in part rejected, *viz.* That the blood in its circulation visiting every part, is impreg-

nated with the nature of them, and the pureſt part of this blood being extracted like a quinteſſence out of the whole Maſs, is reſerved in convenient receptacles till there be uſe of it; which is the ſeed, of which a new Animal is to be made. This imbuition of ſpecifique qualities from every part, will appear as impoſſible as the former. For firſt, there are many parts from which the blood doth not again return, as from all thoſe parts, which have attracted their ſpecifick nouriſhment from out of the veſſels; from them there is no return made. Beſides, the blood, in its circulation, is carried in veſſels of the ſame nature, from the one end of the body to the other; and out of thoſe veſſels there is not the leaſt motion in the blood. How theſe qualities ſhould be communicated from every particle, through the thick skins of the veſſels, ſeems ſomewhat ſtrange. Beſides all this, ſhould we grant this circulation through every particle, how comes

comes it to passe that receiving so many differing qualities, the one doth not confound the other, and that which is last impresst doth not blot out all the rest? These or the like difficulties being kenn'd by our Author, makes him flye to another refuge; and to tell us, that the heart of every perfect Animal, containeth in it, the specifick vertues of all the several parts of its own body; by reason of the bloods continual resorting to it, in a circle from all parts of its body, and its being nourished by that juice; so that the Heart is the abridgement of the whole, and imbueth the blood with those specifick qualities, from whence is extracted the seed. But neither can this cleer all the former difficulties. For how shall we suppose, so many distinct qualities to be impresst in so narrow a compasse, as in the heart, without confusion; or how so short a stay in the heart, could implant such a numerous Regiment of qualities in the blood; or why not dif-

fering faculties in the same particle of blood; all sliding (without distinction) through the ventricles of the heart? we shall be forc'd therefore to seek out some other way, which indeed our Author hath chalkt out unto us, though himself hath not trod in it.

A more particular Narration of the way of Generation.

Chapter the Fifth.

OUr noble Author hath laid this ground for us, which I hope will easily lead us to the truth, *viz.* That it is necessary the parts should be made in generation, of a matter like to that which maketh them in nutrition. Now what that is from whence every part receiveth his nourishment, wee must search for in the blood: Which is a tincture extracted from those things we eat, concocted and separated in the Stomack,

Stomack, Liver, and Heart; and afterwards by its circulating in the Arteries and Veins, is pellicanized (as the Chymists term it) and becomes most pure, and defæcated from all its excrements, and is made a fit nourishment for every part. The things we eat are not simple, but compounded of as great a variety as the parts to be nourished can expresse. What variety of Plants goes to the making up of one piece of flesh we eat? What multitudes of differing Atomes are conjoyned in one piece of bread, or draught of drink, or Wine? The extract then sure must be furnisht with as great a swarm of differing parts; onely here they are more refin'd, more subtiliz'd, and separated one from another. But how doth this variety of parts in the blood, make it the fitter for nourishment? by comprehending in it small indivisible particles, cognate or similar Atomes, which are of the same substance, essence, and nature with the parts, to which

which they are to be adjoyned, and assimilated: and want nothing but separation, and afterwards union and conjunction with, to be part of those particles, for whose nutriment they were provided; which operation is called assimilation. For then these similar, or cognate parts, are become like to those, to which they are joyned. And this is the matter and manner of our nutrition, wch if slightly considered, may perhaps go amongst the number of falsities. But if we examine from the Creation, the product of Creatures from the confused first created Chaos; or since that time, the continual hourly decay, or expiration of every part of us, (in so much that Physitians allow us clearly a new Body every seven years,) we shall soon discover the truth of this position. How the great Architect fetcht from the bowels of this Lump, precreated particles, to supply him with fit matter for such bodies; and appropriated

How nutrition is made.

priated forms for such matter, will instruct us that there are such particles, which being brought together constitute such bodies. The continual expiration of particles from all bodies, will more cleerly illustrate it. The hourly decay is by expiration of material, the last dissolution is both of material and formal Atomes. Now as all agree that material parts throughout multitudes of (nay all) mutations, remain incorrupted; so also according to, not onely the judgement, but several experiments of knowing men, diligent inquirers into the various works of Nature, and mutations of natural compounds; natural forms themselves also do not perish at their parting from their matters; but onely are dissolved and dissipated, lying after that in their scatter'd Atomes, confused and mixt with some others; constituting perhaps a quite differing body; so that the entity of the form, continues after corruption; though not in the formality of such

ſuch a form. If it be ſo then that the matter of every particle in every body, and the Atomes of their forms likewiſe, ſtill remain, though ſcatter'd into millions of ſeveral bodies; what ſhould hinder, (when theſe Atomes are again rallied,) an eaſie union with particles of the ſame condition, and nature? and why ſhould not then the blood, which is made up of many and diſtinct bodies, be furniſht with the ſeveral Atomes comprehended in thoſe bodies: and thoſe Atomes being agreeable to our parts, be as eaſily united to them?

The way of nutrition being cleared; let us ſee now, how from the ſame matter generation is performed. This blood, that all parts might be irrigated with its benigne moiſture, is forc'd by ſeveral chanels, to run through every region and part of the body; by which means every part out of that ſtream, ſelects thoſe Atomes which they finde to be cognate to themſelves. Amongſt which

which the Testicles (destined to that office from their first creation, as the Stomack and Liver were to digest) abstract some spiritual Atomes belonging to every part; which had they not here been anticipated, should have been attracted to those parts, to which properly they did belong for nourishment. As the parts belonging to every particle of the Eye, the Ear, the Heart, the Liver, Stomack, Guts, the Hand, every particular bone, and muscle, &c. which should in nutrition, have been added (to repair the continual deperdition) to every one of these parts, are compendiously, and exactly extracted from the blood, passing through the body of the Testicles; and being in this Athanor cohobated and reposited in a tenacious matter (lest being spiritual, and very fine, they should lose their vigor) at last, passe from the body of the Testicles, by certain vessels, in which through infinite Meanders, it undergoes another digestion and pellicanizing,

canizing, (as in another place I have shown.) And from thence, being now delivered from all its excrements, and furnisht with Atomes, fit for the making of every part and particle of another Individuall; is treasured up in certain Granaries, till the seed time comes. And this is the nature, substance, and manner of collecting the Seed. This shall be further illustrated by the several wayes of Generation in severall Creatures, and first in Plants.

How Plants are generated.
Chapter the Sixth.

THese seminal Atomes are in the same manner separated by all Vegetables, w^ch^ are watered in every Region by a certain juice, or blood which they attract & suck from their Mother Earth: which is nothing else but a confus'd Mass of multitudes of forms, and substances, fitt

What the Earth is.

fit for the nouriſhment and reparation of all things In which a Plant being fixt, preſently ſends forth his Purveighers on every ſide, his roots, wch ſupply the want of hands and mouth, to bring in its proviſion; who are finely palated too, & able to make choice of that tincture, which moſt delights their palats, beſt fits their own diet, and is moſt proper to repair their decaying ſelves in every part. This juice or blood they concoct, & ſtrain through their finer parts; and ſeparate them from other earthly excrementitious particles, (or ſuch as belong to another ſpecies) till it becomes fit only for the repairing of that Plant, for, and by which they were ſelected, and ſuckt out of the Earth. From this quinteſcence, this juice, are ſelected parts of the ſame ſubſtance, nature, qualities, and form with the Plant, and agreeing with every particle of it, whoſe blood it is, and from it, is the ſpecies propagated. But not after the ſame method, in all, for

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in some, propagation is made by this juice residing in part of the Plant, pulled from the Trunk, and fixt in the ground: In others, by part of the root transfer'd: In others, by seed.

The first is done by that juice which is retained in the part taken from the Plant, which reserving parts fit for the nourishment of every particle in the Plant, from whence it was taken, hath now some parts which are vessels, for that Sprig which is to be propagated. For those Atomes which in the juice were to augment and repair the root of the Tree, being rapt from the Tree, are of no use, not having a root to adjoyn themselves unto. Being therefore not attracted by any part of the Sprig, as not cognate and fit nourishment for them, by often circulation about this beginning Plant, are at last united, (other parts being drawn from them) and by their freedom from those parts, and union, become

How a Sprig put into the ground grows.

become more vigorous, and will not be idle; but since they cannot be imployed, drawn by, and adjoyned to other parts; they will set themselves to work, and falling to their proper place, the lowest region of the Sprig, collect themselves in the same method they should have done in the root, to which they should have been adjoyned. And there finding the bark softned by the external moisture of the Earth, and fitted to give way to them; being thus setled, they thrust forth themselves into the Earth; from whence they extract cognate juice, with all sorts of Atomes fit for the augmentation and nourishment of themselves, & the whole Plant. And thus grows up a Plant of the sme kind wth the old stock.

The 2d is performed by these seminal Atomes residing in the top of the root; wch part being separated, acts in the same manner as it did in the whole Plant.

The last sort is by Atomes, selected from this juice, when the Plant is

grown to his full bigneſs, and wants no more for his further growth at that time, and laid up together in convenient receptacles: which is a more perfect operation of Nature then the two former are.

In the former wayes, theſe Atomes lye confuſed in the juice; and are not ſeparated, but by the parts to which they are to be adjoyned. But in this theſe Atomes are methodically repoſed, and laid up in ſuch forms, as they appear to be a very Plant, incloſed within a skin, with ſuch leaves as they diſcover themſelves with, at their firſt breaking the Earth. The Atomes belonging to the root, the ſtalk, the leaf are all laid together, and ſet in their right places, and make up a perfect Plant, the very ſame which firſt come up out of the Earth. If the Seed be great, they are eaſily diſcovered. In the ſeed of the Aſh, the skins being removed, in the middle of the kernel ye ſhall finde two white tender leaves lying

lying one upon another, with a ſtalk reaching to the point of the ſeed, (not that which is faſtned to the tree, but the other) to which is looſely adjoyned, as it were, a navel ſtring from the ſtem, conveighing nouriſhment to this young Plant, while it is upon the Tree: as in the third Figure of the firſt Table is delineated. In the Maple, both greater and leſſer, though the ſeeds be winged as the Aſh, yet theſe ſeminal Atomes or this young Tree, is incloſed in the round knob; within whoſe tough and harder skins, is found a ſtalk and two leaves rowled round together, which are the very ſame that firſt comes up: as in the ſixth Figure is diſcovered. In Beans and Peaſe, betwixt the kernel, you ſhall finde thoſe very leaves which firſt break the ground, with a ſtalk, whoſe end paſſeth through one of the thicker skins, and is contained onely within the outermoſt thin skin: as in the ſeveral faces of the fourth and fifth Figures is deſcribed. Which if it

be any way moistned by an adventitious moisture; presently gives way to the swelling stalk and leaves, which when they are distended beyond the capacity of the outmost skin, break forth and shew themselves. In other smaller seeds, the leaves are inclos'd and rapt round, the stalk lying betwixt them; as in the Cabbage and Radish seeds; figure the second. But when they break through the ground, they erect themselves upright, sometimes carrying the hard skin up upon their tops. The greater seeds have, besides these small plants, a substance which we call the kernel; unto which their stalk is fastned, neer about the middle of them, by two short stalks; from which substance they receive nourishment, while they are inclosed within their skins, and matter afterwards for the distention of the stalk and leaves, after they have enlarged their territories, both upwards and downwards, in root and leaves: as in Beans, Pease,

Wheat,

Wheat, Barley, Acorns, whose parts turn into a milky substance, fit nourishment for these tender Plants. That these seminal Atomes do conform and dispose themselves likewise, according to the same method they did, or should have done in the Plant, whose they were, or for which they were prepared for nourishment, will easily appear by that artificial generation of Plants, which not onely casually hath faln out, but by many hath studiously been effected. When from the powder or liquor of Plants, (as is related by *Libarius*, and others, I need not name the Authors being so common an experiment) they shall again be recalled to live, and start up stalk and leaf; which but now was dust, or liquor. I shall onely relate one experiment casually, though twice made by a learned grave Physitian, neerly related to me: which will explain the manner of this operation to the full.

Having in the evening expos'd a

decoction for a cliſter (made of Violet leaves, Strawbery leaves, Mallows, and the like) to the cold of the night. The next morning he found it covered with a ſlender cruſt of Ice, which gave him leave through it to behold in the Water, the leaves in their perfect ſhapes, of all thoſe Plants, of which the decoction was made, both in faſhion and colour; which remained in that poſture till the Ice was broken; which was no ſooner done, but all thoſe fictitious Plants preſently vaniſhed, nothing remaining but the cleer liquor of the decoction.

Now how this could be performed, unleſſe it were by the union of theſe ſeminal Atomes diſperſed in the liquor; (drawn from the other parts, by the gentle heat of the Fire acting with the Water) diſpoſing & ſetling themſelves in their right and natural places, will appear impoſſible. How could a ſlender heat in ſo ſhort a time give a form, or ſquare out ſuch a matter into that figure

figure which but now it loſt? or why when the matter is thus faſhioned, ſhould it not retain that figure and bulk when the incloſure is broken? We muſt therefore conclude, that theſe ſeminal Atomes of the Plants, which were ſeparated from the other parts by decoction, and by the ſudden cloſure of the Ice intercepted from flight; were actuated by ſome remaining particles of heat, and put in minde of their office and nature; inſomuch that every Atome began to ſeek out his proper ſituation and neighbour, to ſettle themſelves in ſuch method as they held one towards another, before they were parted from the Herbs, and ſo make up perfect Plants both in figure and colour. But the Ice being broken, and the liquor moved, theſe appearing Plants, being made of ſuch fine ſpiritual parts without cement; were ſoon ſhattered into their firſt indiviſible particles; which being again diſſolved, and the order broken, could not be by the ſenſe diſcerned.

The reason why these seminal Atoms could not then constitute a perfect solid Plant, was, because there was wanting some other more fixt parts of the same nature, and condition, with these more spiritual, to conserve them in that posture, and to cement them together; to fix and harden them into a consistence. These are of the same nature, particles belonging to every part, Atomes off Leaves, Stalks, Flowers, Fruit, and Root as the others; but are grosser, more terrestrious, which cannot act themselves; but give solidity, strength, and hardnesse to the other when they are joyned together; and are so exactly united with them, when the Plant is entire; that they cannot, but by dissolution of the whole, be distinguished. These in this decoction, were left behinde in the expressed Stalkes, Rootes, and Leaves, and therefore the Plants were not permanent.

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The consideration of these two parts in the constitution of a Plant, will give us a light of the cause of the diversity of the Sexes in Animals; whose way of generation follows next.

How Animals are generated.

Chapter the Seventh.

THe generation of Animals is as various almost as their several Species; whereof some derive their Pedegree from the corruption of Dirt, Mud, and other Animals; some arise from the funerals of Plants, and start up a moving sensitive piece, which but now grew a vegetable. Others again of a more noble Progeny, owe their beginnings to some seminal parts derived from the Genitors; but reposed in certain vessels excluded from the Females, and left without the sphear and guidance of their forms; such are all births

births breaking forth from the inclosing walls of Eggs. The more excellent Animals after their formation, are contained (till they acquire some degrees of perfection) within the precincts of one of the generators. All which, or the most of them, I shall prosecute in the following Discourse.

The first rank of Animals arising from corruption of other creatures (as Eeles from Mud; Flies and Wormes, from Beasts; the Scarabeus from Oxen; Lice from the filth of most Creatures.) These I say, grow up upon the mutual juncture of such Atomes, which before lay scattered in the bowels of some other compound; and wanted nothing but union, to fashion them into such a frame and structure: which, as soon as possible they can obtain their freedom, put themselves in rank and order, and become another living thing, differing from that Species whence it had its birth. This is seen in the Misselto, which grows upon

on other trees, very evidently; the juice which nouriſheth and conſtitutes this Plant, is drawn from the Earth, with the juice belonging to the other tree it grows from, and is perfectly mixt with, not to be diſcerned from it; till after long circulating about the ſeveral parts of the tree, it is refuſed by all as unfit for them. At laſt uniting in ſmall lumps, they diſcover their differing natures, by parting from the parts of the tree, and when they are in ſuch a proportion united; thruſt out thoſe ſtalks, and leaves and fruit, which we call Miſſelto. Theſe particles of the Miſſelto may be diſcerned united in ſmall lumps, a good way from the eruption out of the tree; where ye may finde many ſmall green drops, as it were, hardned, incloſed in whiter wood of the other tree. So theſe ſeminal Atomes, taken in with the ordinary nouriſhment of thoſe creatures, are carried up and down through their parts; but received of none,

none, to be perfectly united with any; but being dispers'd in small parcels, they cannot easily unite themselves, till a greater portion of them be met together; w^ch^ generally is at the Spring, when the Suns heat begins to contribute vigor to them; and dissolves the excrementitious humors of the Body they are incloſed in; so that they much easier obtain their freedom, and so uniting themselves in their proper method, and order, become such creatures as those Atomes can fitly constitute. These Animals too, sometimes alter their external forms, and become another thing then what at first they seemed to be; as from a Worm, the next advancing Sun salutes a Butterfly; such is the growth of all Insects, which appear first to be Worms; the Tadpoles grow to be Frogs; the spitting or eggs of Flies, to be Worms, and then Flies again; which is caused by the addition of new parts, which they themselves procure from their nourishment;

nourishment; by which these parts become larger, solider, and so discernable, which before could not be seen. As the germen or young plant in the seed, when it hath obtained a new stock of moisture and nourishment, puts out leaves of a differing form from those which first come up; as the Maple, Borage, Cucumber, and almost all plants differ in their second leaves, from their first, which manifestly appear inclosed in the seed. The other are so small and wrapt up, that until there bee new parts adjoyned from their nourishment, they are not discerned.

These imperfect Animals spring not up alike indifferently, from all Bodies; some Animals being made of one kinde of Matter, some of another; some Plants retaining the seminal Atomes of one Insect, some of another; so that from one Plant or Animal ariseth one kind, from another, another. I shall not stay to look out their several originals.

The

The way how those Creatures are generated which owe their beginnings to Eggs.

Chapter the Eighth.

THe other two more perfect generations, are made by the conjunction of these seminal Atomes, extracted from both generators: who both of them contribute such Atomes, as being laied together in their proper places, would constitute an Individium of that Species. One of which incloses and layes up these united sperms, with a proportioned quantity of nourishment, for the growth and perfection of the Fætus, in an Egge. From which all Fowles, most kindes of Fishes, Snakes, Spiders, Frogs, and some other Creatures are brought forth. This Egg is compos'd in the Matrix of the Females, and is the product of these seminal Atomes selected from the nutrimentall juice

juice of both; the Femal adding those parts fitted for the growth and nourishment of the Fœtus, from her own blood. The yolk, the grosser aliment, is composed in the Vitellary, or Egg-bag, selected from large vessels immediately arising from the Aorta. The other part, the White is made in the Matrix, by a certain milky viscous exudation, flowing from the rough wrinkled membranes of the Womb; whose property it is to convert that blood, which by several great vessels is brought to it, into that milky spermlike substance.

Besides these seminal parts there is (I say) a contribution of nourishment conveighed with them in the same Egg, for the nourishment and growth of the Fœtus, while it is inclosed in those walls. And this is, as I said, of two sorts, agreeable to their double use, fitted for their nourishment while the Atomes are uniting, but tenderly cemented, and growing together: and this

this is the White, which is more agreeable to the nature of Sperm; and answers to the Mothers blood, which gives growth and nourishment while the Fœtus lives in the Mothers womb.

The other, the Yolk, of a more solid and confirmed substance, is for its nourishment when it hath atchieved some perfection and growth; the parts then expecting a more solid nutriment. This supplies the use of Milk in other Creatures, who for a time after their exclusion are nourished altogether by it.

Both of these, White and Yolk, are inclosed in Membranes; some of which being hardned into a shell, are excluded from the Femal daily as they grow to perfection. And that because such smal bodies as these Ovipara are, cannot contain so numerous a progeny together, as their fruitful wombs do yearly disclose.

In which none of these parts, either White, or Yolk, these seminal Atomes are:

are repoſited, is doubtfully related. Some affirming them to reſide in the Center of the Yolk. But this will eaſily be rejected, when ye ſhall ſee the whole Animal framed, and the Yolk yet entire, whole, incloſed within its own membrane: onely ſome ſmall threadlike veines full of blood ye may ſee thruſt into it, conveighing ſome of it, as nouriſhment, to the Fœtus.

Others think the White to be that, of which the Chick is framed and faſhioned; but not rightly neither; for that likewiſe is to be ſeen whole, when the body is formed.

Fabritius, who hath taken a great deal of pains in diſſections, a ſtrict enquirer into Natures ſecrets, eſpecially concerning the manner of Generation, ſuppoſes theſe parts to reſide in the Chalazæ · that part which by our Women is called the treddle But this likewiſe is falſe, for then every Egg ſhould produce two Chickens there being one treddle at each end of the Egg; which

ſerve for no other end, but for ligg
ments to contain the Yolk in an Equi
librium; that it might not by even
moving of the Egg be ſhakt, broke
and confuſed with the White. Wha
therefore I have often obſerved I ſha
here diſcover, and in it the true man
ner of their formation.

Fabritius makes mention of a litt
white Circle, or Cicatricula on the thi
Membrane of the Yolk; which he ſup
poſes to be a skar, left by the breal
ing off from the foot-ſtalk, by whic
it was faſtned to the Hen, before th
White grew about it. But if ye furthe
obſerve it, ye ſhall finde it anothe
thing. *Pariſanus* would have it to b
the ſeed of the Cock. I think it to b
the ſeminal Atomes derived from both
here repoſited; as the following Ob
ſervations will diſcover.

In the Hen, while all her Eggs ar
but Yolks, or ſmall little grains con
tained in the Egg-bag, or Vitellary
ye may perceive this white Circle o

Cicatricul

Cicatricula, which afterwards, as the Yolk increaseth to bigneſſe, doth appear more evidently.

When the Egg is perfect, if you break the ſhell at the bigger end, you ſhall finde this Circle in all prolificial Eggs; the faſhion of it you may ſee in the firſt Figure of the ſecond Table, the innermoſt Figure, A.

This Cicatricula after the firſt dayes incubation, you ſhall ſee dilated and grown wider, as in the firſt figure at B, with a little white ſpot in it, eaſily to be diſtinguiſhed from the reſt.

The ſecond day being paſt, in the third day ye ſhall finde it ſpread yet larger. I have ſeen it enlarg'd to the breadth of a Sixpence, diſtinguiſhed with ſeveral Circles within it, exactly round, repreſenting the Eye. The outmoſt round was of a much paler yellow colour then the reſt of the Yolk, and of a thinner conſiſtence, as if it had bin by the heat of the Hen diſſolved & melted. Within this was a leſſer Cir-

cle of a most resplendent cleerness through which did passe some small white threads into the outmost pail circle. This inner clear Circle was co a substance like to the white of th Egg, but clearer, and very fluid. Withi in this clear round, was another of pale yellow, like to the first; which im closed another translucid Circle with in it, in which was a clear small Body but something obscurer then the inclo sure, containing in it a little white spot, easily to be distinguished from itt which seemed to be center to all th inclosing circles. This you may see in the second figure of the second Table The inner white Circle and spot in the after discoveries, will be found to be the Carina and heart of the Chick The two clear Circles to be that liquor or humor, in which the tender Atomes of the Chick, while they are collect ing and conjoyning, do swim in; that by external motions they might not be disordered and hindered from unit

om

on. The middle yellow was ſome of the ſame matter, not yet diſſolved into that clearneſs. The outmoſt yellow Circle was ſome diſſolving by the heat of the Hen, and preparing for the making of blood, from which it now differs onely in colour; which the next day or the day following will appear in thoſe ſmall threads, conveighed to the white ſpot within: which the fourth day ye ſhall finde filled with this blood, and moving.

Towards the latter end of the third day, you ſhall finde this Cicatricula to be all clear in the middle Circles, the yellow being obliterated; and now remains onely the white Circle and ſpot in the middle, ſomewhat enlarged, circumſcribed by a larger reſplendent Circle; environed with the outermoſt yellow round; in which, by the help of Glaſſes may be diſcovered the ſmall veſſels coming from this diſſolved yellow matter, from every ſide to the middle of the white Circle; which by

a Microscope appears now to be th
Carina or back and neck of the Chick
and the heart in the midst of it: thi
is delineated in the seventh Figure co
the first Table.

On the fourth day, this Cicatricul
was spread the full compasse of th
big end of the Egg; the outmost Cir
cle whereof, was filled with veins va
riously spread abroad, and Arteriess
as might be supposed, (though by thei
coats not to be distinguished,) becaus
their Anastomases were evident; whic
being collected into four trunks from
the opposite points, passed through
the refulgent clear Circle to the mid
dle or center. Without the extrean
limbe of this pale yellow Circle, were
no vessels to be seen.

Within the white Circle in the mid
dle, which was much dilated too, ap
peared a red sparkling line encompas
sing the white spot, now red too, and
moving: whose motions plainly shew
it was the heart; as afterwards I saw

by

by the help of a Microscope, exactly shewing me the heart perfectly fashioned, with both his ears, and this red line joyned to it, running quite round in the inside of the white Circle. By the help of this Glasse, I saw the motions of the heart and ears for a long time; one anticipating the other, and continuing after the others decay. When the hearts motion was almost spent, the ears contracted themselves in due order, and after five or six pulsations of the ears, the heart would move once, and then rest again, till after such a number of pulses were performed by the ears.

The heart when it had emptied it self, by its continual pulsation, of all the blood, and was become perfectly clear, and transparent as before the blood came to it; moved a long time after, observing the same order, following the pulsation of the ears, as when it was watered from that bloody Fountain.

This Glaſſe ſhewed me the head too, conſiſting of three bubbles as it were; whereof one confeſt it ſelf to be the eye, by the manifeſt diſcovery of the Pupilla in the middle. From hence the Spina was carried round almoſt to the head again, which is that tranſparent white Circle without the red line. From whence appeared ſome ſmall obſcure clouds, faſtned in the proper places of the wings and thighs: which in the fifth dayes obſervation, appeared to be ſo indeed, without the help of Glaſſes. Beſides, from this Carina, were drawn ſome ſmall ſtreamings, which were the rudiments of the ſucceeding ribs This fourth dayes obſervation may be ſeen delineated in the third Figure of the ſecond Table.

The fifth dayes this tranſparent clear body, together with the Fœtus ſwimming in it, ſunk lower to the ſide of the Egg, then in the day before; and what was then clear and tranſparent, begins now to thicken and grow obſcure.

scure. The head is beyond its proportion grown, outstripping all the rest; as if Nature made haste in finishing that part, of which she should have most and sudden use. The eye grown almost to its perfect bigness, and discernable in all its parts, the greater divisions of the brain, and Cerebellum easily to be seen. The Carina or Spine discovers it self encompassing the red line or Vena Cava, which was now scarce discernable by reason of that clothing it had by this dayes addition, procured: the heart too, obscurely covered, almost hid from view, excepting a little in the forepart, which seemed open, or at least not so much hardned as the other, but continued tender and cleer still. The wings and legs easie to be observed, without Glasses, being much whiter then the rest. The bulk of the body hardned into a visible form and obscurer then before, yet not so darkned, but that the pulsation of the heart being red with blood

blood might be discovered through it: which after it had layen still for three hours at least, I afterwards layed it in the Sun, whose vigorous heat renewed its life and motion again. This thin body being opened, from the great vein might be seen some rudiments of the Liver, some small puttings forth of vessels, which had some blood between them hardned. This fifth dayes observation you may see in the fourth and fifth Figures of the second Table.

The sixth dayes observation shews every part more distinctly, and what before even by the help of Glasses seemed but darkly adumbrated; now begin to confess themselves by their visible shapes and actions. The three bubles of the head are much enlarged, the eyes perfected, the wings and legs grow out: the heart appears fleshy and corpulent, the rudiments of the Lungs, Liver, and Guts, appear more clearly.

The seventh day shews all more perfectly yet, and it now appears in the shape

shape and figure of a Chick, perfectly accomplisht with all its parts; wanting nothing but confirmation and hardning, which every day now increases, to the diminishing of the white; w^ch^ about the tenth day is done: there remaining little more then that thin clear liquor the Chick did swim in: the yolk entire, and appearing bigger then before; being rarified, and as it were dissolved, by the heat of the Hen: and brought into a fit condition to be by the continuing heat reduced into blood, obtaining from that gentle Furnace, colour, and fluxibility. After which time there is little observable till the fourteenth.

About the fourteenth and fifteenth dayes, the beginnings of the feathers appear, the skin being covered with little black spots, which are the roots of the feathers. The skull begins to cover the brains. The umbilical veins plainly discover themselves: of which the first that was spread through the white

white of the Egg, passes through the upper part of the Liver, perforating the Vena Cava, near the basis of the heart. The other coming from the yolk insinuates it self into the Vena Porta, in the lower part of the Liver. Which shews what difference Nature hath made betwixt these two liquors: the one, the white, concocted and fitted for present use, is carried immediately to the Vena Cava and to the heart, to be distributed into every part for their encrease and nourishment; out of which every part might select cognate and appropriated Atomes, separated from all excrements, for their augmentation and nutrition.

As soon as this is done and spent; because the Fœtus is not yet strong enough to seek his own nourishment abroad; neither is the Hen able to provide for it: Nature hath ordained another reserve of provision, which though it be not so fine, yet having another Cook to dresse it, the Liver being

being now perfected, it will by undergoing another dreſſing or concoction there, be made fit for the nouriſhment of the now hardned and confirmed parts of the Chick. And therefore Nature ſends what is melted and diſſolved by the external and internal heat, from the yolk to the Liver, by the Vena Porta, to be there dreſt and cookt again. From whence ſome excrements are ſeparated, as by the fulneſſe of the Gall, and the green excrements in the guts may appear.

To theſe two venal Umbilical veſſels are added two Arteries, ariſing from the Lumbary Arteries. Which accompanying the veins throughout the white and yolk, make a perfect circulation here, as well as betwixt the Mother and the Fœtus in Viviparis: by which means the new concocted blood mixt with this, is without trouble or danger brought to the Fœtus.

And therefore it is (I ſuppoſe) that the heart ſo ſoon before any other

part

part performs his office; that by his continual motion, driving that dissolved clear liquor, (which is found in and about his vessels, and melted by the external heat) and forcing it into the white, may melt and dissolve that too, and make it fluid, apt to be carried along with it, returning in other vessels back to the heart, where it receives new vigor, and an addition of heat. By this means the liquor being increased, the vessels are not large enough to contain it; and therefore the heart thrusting it forth with the same continued violence, hourly drives it further into the white first, and afterwards into the yolk; where it still melts more, and the dissolved circle is still enlarg'd; as by the daily observations will appear.

After this time you shall finde the white clear liquor, in which the Chick did swim, consumed too; and the Fœtus lying on the yolk, & entire yet, as on a pillow. Whose outward membrane

brane being either united to, or else the same (which is most probable) that closes the Chicks belly, and indeed clothes the whole Chick; holds now both yolk, umbilical vessels, and guts altogether. And as the yolk daily lessens by the growth and increase of the Chick; this membrane is contracted, and the guts with the yolk by degrees are drawn up into the belly, and closed up by this skin; where a portion of it may be seen after the Chick comes abroad, if by dissection it be enquired after, and serves to nourish it, even after it is discloſed. So that in these creatures there is no footstep or signe left of the Umbilical Vessels, or Navel string, as in others; but both vessels and nourishment are incloſed within the belly of the Chick: A figure of the Chick thus formed, some few dayes before his exclusion, you may see in the eighth figure of the first Table.

And now the Chick is perfectly fitted to come abroad, and seek his own provision;

provision; and indeed it is almost time, having spent his patrimony, he must now seek other food: Being straightned likewise within the prison of the shell, and wanting now the air to breathe in; for the allaying that heat which now the moisture being spent) begins to enflame; and hath so dried the shell that it becomes friable, by his continued strugling and turning round, with his sharp beak from under his wing, he breaks through those walls, which now imprison him, and were before his Castle, exactly dividing the shell in the middle.

From these observations of the daily progresse of the Chicks increase, we may see the manner of their generation which must be in this sort. The seminal Atomes constituting the Fœtus, collected from the blood by the testicles, and joyned together in the womb or vitellary; contract to them from the femal blood that round body which serves afterward for their nourishment,

(as

(as I have related) the yolk, which from ſeveral ſmall threadlike veſſels, receives nouriſhment from the blood, until they come to their accompliſht bigneſſe. On which (as I have ſhewn) theſe ſeminal Atomes being fixt, by the former obſervations you clearly ſee, how they daily grow up into a living thing of the ſame ſpecies. And this ſeems to be as the Germen or little plant repoſited in every ſeed; w^ch^ grows up to a bigneſſe not to be contained within the skins of the ſeeds, but breaks through that and the earth that covers them; and then ſhews themſelves in a viſible form and bulk, which before could not, but by the curious obſerver, be diſcovered.

This Cicatricula in the ſmall grains in the Vitellary, ſeems to be, nay are the ſame ſeminal Atomes, diſpoſed in their due method and places which they obſerve one towards another; as when they appear in a more viſible bigneſſe afterwards. For before they are ſate

on by the Hen, there appears in the Cicatricula some distinction of parts: there is a little white spot, in the middle of a white circle to be seen; which particles never vanish, but grow larger still, till they discover themselves what they are. The middle spot is found to be the heart, the white circle becomes the Carina or Spine; at the end whereof, three or four dayes incubation shews the head; and so the rest of the parts as Nature hath need of them grow up to their offices in their visible figures. So that these seminal Atomes as soon as they are conjoyned in a convenient place, by the due ordering and regulating of the specifick soul, put themselves in order, fall to their proper places, and make up a Chick before the Egg be perfected. As the germen in the seed of a Plant (as I have shewn) is perfectly fashioned in the seed, though it discovers not all its parts, till by addition of new particles, they grow to a bigger bulk, and become more visible. The

The first work that is performed by the Hens heat in incubation, is a dissolving and melting as it were of the finer and more spirituous parts, which are most sensible of the first and least heat; by which means the seminal particles are cleared and separated from other parts; and those finer parts appointed for his first nourishment, are clarified, melted, and made fluid, and apt to be moved and dispersed by the white spot or heart.

And this is the true way of generation of these Creatures; whose eductions, as well as those of Plants, our Author brings as instances for his equivocal generations. Which as they fail his expectation of clearing those accidentall causes, he so much depends on: so they clearly shew, that as in the seed of a Plant, there are actually such parts reposited, as do make up a Plant perfectly formed. So in an Egg before incubation, where both seeds are conjoyned, the parts of a Chick are or-

derly disposed, by the conjunction and regular disposure of these Atomes; which while they were parts of the blood, served for the nourishment and increase of that body from whence they were taken, but now serve to make up another Individuum of the same species.

Of the generation of Animals that are brought forth alive.

Chapter the Ninth.

I Have been something the longer in explaining the former wayes of generation, because as their discovery is easier; so they more plainly illustrate the way and method of Generation. Which, how fitly it may be applyed to those that produce living births, in this ensuing discourse shall be examined.

These, as the former, are the issue of a double Sex; and onely differ in this, that they are included in the female, till they are perfect. I shall not here stand im

in the examination of that doubt, whether or no the femal contributes any ſpermatical particles, towards the formation of the Fœtus, in Coition. When we ſhal obſerve what parts Nature hath beſtowed on the females; I mean teſticles, (for ſo they are, and not glanduls for I know not what uſe;) to which are derived Arteries and veins, of the ſame original with thoſe diſtributed to the Maſculine ſtones: and when in theſe teſticles ye ſhall finde ſpermlike matter, and veſſels from them to the womb. When alſo in coition ye ſhall obſerve the ſame delight and concuſſion as in Males; why ſhould we ſuppoſe Nature, beyond her cuſtome, ſhould abound in ſuperfluities and uſeleſſe parts.

The principles therefore of theſe living births, ariſe as the other, from ſome ſelected Atoms by the teſticles of both, ſhrown into the Matrix of the Female. Where being united & mixt by the fermenting heat of the womb: the ſeveral Atomes fall to their reſpective places:

the ſoul playing the skilful Workman (not laying brick where ſhould be mor ter) repoſing every Atome in his pro per place, that very ſame which i ſhould have held in the body, from whence it was ſeparated.

While this is doing the tenacious part of the ſperm, in which theſe A tomes were laid up, is now hardne into membranes, incloſing ſeveral ſub ſtances; the one incloſing the pure ſe minal Atomes which are in faſhionin themſelves, in a clear tranſparent li quor as in the Egg; the other incloſin both that, and the other parts of th ſeed from which theſe Atomes are en larged and nouriſhed.

This outward Membrane, ſtickin to, and about thoſe aſperities, or pa pillar extuberancies, which are cauſe by the orifices of Arteries, and Vein opening into the cavity of the womb gives way to the gently diſtilling blood to deſcend to theſe Atomes; to furniſ them with ſtore of cognate parts, t

be selected by, and added to them for their future growth.

But that these yet tender parts, may not be overwhelmed with too great a flux of blood, and be stifled with too much nourishment, before they are able to dispose of it: (a frequent cause of abortion) Nature suffers it to wander through a Labyrinth of an infinite number of vessels, dispers'd through this outmost membrane; from whence by one chanel it is conveighed to this new Animal. But not to remain all of it, within the limits of this little frame; but being conveighed to the heart of the Infant, by its continuall motion some is thrown into every part, according to the capacity of their vessels. And because all parts of this too, are not fit for the repair of these young Atoms, but do require a greater choice; therefore at every motion of the heart, some of this blood is thrown out of this Infant, by appropriated Arteries, back to the Mother again. So that by

this continual circulation of the blood, through this new Animal; fresh and cognate moisture is supplied to irrigate, and augment every part of it. From whence, as at the first, cognate Atomes are selected & adjoyned to every particle, until the Fœtus come to perfection; and then breaking through those membranes, it is brought forth a living creature.

It will be requisite I should here satisfie a doubt, which may perhaps perplex some in the receiving this opinion of generation, *viz.* why there should be a distinction of Sexes? and why there should be a collection of these seminal Atomes by both Sexes? and that without the admixture of both these, there could be no generation?

The reason why there are distinct Sexes, is, because one of them must supply the part, and office, that the Earth doth to Vegetables; which is, to contain, preserve, and supply it with fitting

fitting nouriſhment; which is done by the Female. But why cannot all bee done by this one? what need is there of another ſeed?

The uſe of theſe differing ſeeds, is evidenced in the former diſcourſe of Plants: where I ſhewed you, that theſe ſeminal Atomes were of two ſorts, ſpiritual, and more material; whoſe duty was to fix and cement the ſpiritual Atomes together, that they might mutually cohere the one to the other; the Maſculine, are to actuate, enliven, and to act for all the reſt: and this diverſity of Atomes, makes a difference in ſeeds, and a diſtinction in Sexes. The Maſculine ſeed having undergone concoctions and ſeparations by a greater, and purer heat, becomes more ſpiritualiz'd, & ſubtile; and is like to thoſe ſpiritual Atomes of the appearing and riſing Plants out of the ſpirits of a former Plant corrupted, as I before declared. Which contains in it all parts fitting to conſtitute ſuch a body,

body, as that was from whence it was taken: and being thrown into a convenient place, where it may have room and agreeable heat, would by the disposing of every Atome into his proper place, constitute a perfect body. But not being furnisht with those more material particles, it would soon vanish (as the appearing supposititious Plants did) these spiritual Atomes not being cemented and conjoyned together.

The feminine seed being extracted after the same manner, from the same vessels, by the female testicles, containing the same particles, but cruder and lesse digested, from a cruder matter, by lesse perfect Organs, is left more terrene, furnished with more material parts; which being united in the womb, with the spiritual particles of the masculine seed: every one being rightly, according to his proper place, disposed and ordered with the other; fixes and conjoynes those spiritual Atomes

tomes, that they still afterwards remain in that posture they are placed in.

I shall forbear the prosecution of this any further, having sufficiently cleared the wayes of generation of perfect bodies. I shall proceed to shew the causes of similitude in the Fœtus to the generators, and of mutilated and imperfect births.

How different Sexes, and similitude of the Fœtus with the generators is caused.

Chapter the Tenth.

THe conjunction of these seminal material Atomes of both Sexes, causeth this similitude of parts, and marks, with the parents that begot them. For according to the exuberancy, or power of the Atomes of either Sex, so is the Fœtus fashioned and distinguished. If the Atomes constituting

ting the Masculine parts prevail, then is a Male generated: but if the Atomes of the Females seed prevail either in quantity, or energy, over the Masculine; then is the product a Female: and those Atomes which were ordained for, and belong to the Masculine parts, being but few in number, and lesse in power, are obscured, being scattered amongst the rest, or else being of no use, and having no parts to joyn with them, to unite and cement them together, are quite lost.

This is the cause too, why the Fœtus or Infant hath parts, some resembling the Father, some the Mother, having sometimes the Mothers Lip, the Fathers Eye, &c. according to the prevalency of the respective Atomes.

Besides, by how much the more the Masculine Atomes abound in a Female Infant; by so much the more the Fœtus is stronger, healthier, and more Manlike, a Virago. If the Female Atomes abound much in a Male Infant, then is

that

that iſſue more weak and effeminate. If either parent hath any extraordinary Mark, or part more then uſual; as the Woman with ſix fingers; whom our Author relates to have born all her Females, with the like number of fingers: It is cauſed by theſe ſeminal Atomes extracted from the blood, carrying along with them Atomes belonging to every part, communicated to the ſeed, and ſo to the Infant; eſpecially if the Atomes, in which theſe ſupernumerary parts or marks reſide, prevail over the reſt. As the example of that Woman illuſtrates, who brought forth all her Males with the uſual number of fingers; all her Females with ſix upon an hand, like her ſelf. The Sex ſhewed the prevalency of her ſeed, which having the maſtery of the Maſculine, all the ſeveral Atomes contained in her ſeed, ſhewed themſelvs in the ſame poſture, as in her own body. In the Males, thoſe particles of her ſeed being weaker, ſerved onely to cement the maſculine Atomes, and no more.

The

The cause of defect of some parts, or an ill disposition of them in places they ought not to be in; may be from the avocation and disturbance of the imagination of the parent, at that time when these Atomes are in disposing and ordering by the soul of the Infant, in their proper places. This I say, is done by the imagination of the Mother disturb'd, representing to the Infants soul, then disposing and ordering these Atomes, either some other pattern by which it conforms its work; or else wholly calling it away from that operation, suffers these Atomes confusedly to unite and dispose themselves as well, as being disordered, they may; and so make up a monstrous kinde of birth. Or else the soul being disturbed, and the Atomes disordered; they joyn not to one another in their proper places, but the Atomes of the leg joyn with those of the side, or the arm, or the head. Sometimes supernumerary particles are found in the seed, which

which being many and prevalent, do unite themselves, and joyn to some others, and there put forth; so that there are seen sometimes two perfect bodies, conjoyned in one part or other; or four arms, &c. as several Histories relate of severall monstrous births. That seen amongst us of late years, being none of the contemptiblest of that kinde. I mean the young man that had a head, arms, and legs of another body growing out of his side.

But here arises a great difficulty, how this disturbance of the seminal Atomes, should be occasioned by the disturbance of the Mothers phansie? How the imagination works upon parts of the same body, Authors tell us, is by the mediation of humors and spirits: but how it should operate upon these seminal Atomes, at this time, before there is any influx either of humors or spirits from the body to them? I cannot yet finde satisfaction from any.

I should think it done by the mediation of the soul, traduced with the seeds. Which being of the same essence, and part (as I may say) of the Parents soul; it retains still the same affections and passions that it had before its traduction. Hence the soul of the Mother being disturbed, this soul of the Infant, by that consent and harmony which is betwixt them, must be disordered too: which causes that disorderly concourse of the seminal Atoms, and those monstrous births springing from it: as I before declared.

Some Arguments against this opinion proposed, and answered.

Chapter the Eleventh.

OUr Author brings in an opinion of Doctor *Harvies* to father his accidental formation upon, so much contrary to me, that I cannot baulk the relation

relation and examination of it *viz.* That the ſeed of the Male, doth not remain in the womb of the Female in any ſenſible bulk: but (as it ſeemeth) evaporateth, and incorporateth it ſelf either into the body of the womb, or rather into ſome more interiour part, as into the ſeminary veſſels, which by mediation of the Females ſeed, ſuck up the Males ſeed, and turn it into a vapour, operating in ſuch ſort as our Author before relates, in the generation of Animals. And after a certain time, ſome ſix weeks, or two moneths, (as the Doctor obſerved in Does and Hinds) theſe ſeeds diſtill again into the womb, and by little and little do clarifie in the midſt, and a little red ſpeck appeareth in the midſt of the bright clearneſſe.

The right obſervation of this experiment (under favor) in my judgement was not truly made; for this inſpection into the wombs of creatures cannot be, but by diſſection; which muſt certainly hinder that ſecond work, namely

the returning back of the ſeed into the womb: And if ſo, how ſhall it come to our knowledge, that the ſeed, which at the time of accoupling, was received into the womb, and afterwards when the obſervation was made was evaporated, and attracted by the Females teſticles, ſhall afterwards diſtill into the womb again; unleſſe the ſame Female were preſerved to make thoſe diſtinct obſervations, at ſeveral times. I ſhould rather believe the Does, or Hinds in whoſe wombs the Doctor found no ſperm after the accoupling, were barren, and ſo never received the Maſculine ſeed into their wombs, or at leaſt never retained it; or elſe had not then coupled with the Male. And that after the two moneths, he met with ſome others that had conceived, in which he found that reſplendent clearneſs and red ſpot. All which will not amount to a conſiderable argument, to ſupport this change of ſubſtances by accidental cauſes.

Not

Not unlike to this is that opinion of *Fabricius*, asserting that the seed of the Cock is not cast into the womb of the Hen; but into the beginning of the Matrix, and there by an irradiating influx fœcundates the Hen, and makes fruitful all the eggs that shall for a long time after be produced, without any admixture of the seeds at all. This opinion of his is grounded upon the impossibility (as he supposes) of the entrance of the Males seed into the Females womb; the inner orifice being so closely shut, that from without it is impossible to receive any thing. Besides in dissection, he could never finde any part appointed for the ejaculating the sperm into the womb. The Penis *or Prick* being wanting in the Cock; so the seed cannot be thrown further then the entrance into the womb.

Whether or no there be a present union of the material parts of the seeds, after every coition, which impregnates the Females; former observations

have not fully discovered. Those which are casually made by dissection of Females, at, or neer the usual time of coupling, may easily deceive us. For if nothing be found in their wombs then; we may as safely and conclusively argue, that either that Female never coupled with the Male, or never retained his seed as to say it is impossible for the seed to enter, because I never found it there. The experiment ought to be made on some creatures, under the continual view of our observation; and presently after copulation, if we see nothing reflowing again; then to search where that seed lyes, will undoubtedly discover the truth to us.

That observation of Doct. *Harvies*, related to us by Sir *Kenelm Digby*, (though I confesse his curious eye, seldome takes any thing upon trust, or slightly passes by what is observable) seems to presuppose a conception; and on that supposition to ground his opinion, that the Males seed is not retained

tained in the womb, but evaporated; becauſe in his diſſections of thoſe creatures he ſuppoſed had conceived, (becauſe done at the uſual time of coupling) he never found it: till after, ſome two moneths, meeting with others whoſe pregnant wombes diſcovered ſome rudiments of a growing Fœtus; he concludes, thoſe creatures, he two moneths before diſſected, would have ſhewn then, the fertility of their wombs in the ſame manner We may as truly argue (I ſay) they had not conceived, at the time of his diſſection; neither (had they eſcaped his knife) would they, without a new coupling, have had that red ſpot, in the midſt of that clear body.

But when wee ſhall conſider the great quantity of ſperm, emitted by the Male in every coition; and ſee that quantity retained by the Female, if by that copulation ſhe conceives; and finde no other part capacious enough to keep it, but the

womb: when we ſhall finde the mate-rial parts of the Male, copied out to the life in the Fœtus; even his marks, which never came under his ſight or knowledge peradventure, to be brand-ed on the young one: we muſt needs acknowledge ſomething more then an irradiation, or fœcundating quality, impreſt on the womb by the Maſcu-line ſeed; and more then phanſie in the Females to produce ſuch effects. A Hen trod by a Pheaſant, though in a dark room, that ſo ſhe could never ſee his proportions or colour, brings forth Chickens, reſembling both her ſelf and the Pheaſant. A Bitch lined with ſeve-ral kindes of Dogs, though in the dark, where her phanſie could not o-perate to the aſſimulating of her births, brings forth her whelps faſhioned and coloured, like to all thoſe ſhe coupled with. The Horſe leaves ſome material impreſſions of himſelf, on the Mule, which he begets on the Aſſe.

That ſtrict cloſure of the womb's orifice

orifice in the time of dissection, cannot exclude the seeds entrance. For wee know in the time of coupling in all Creatures, those parts, all of them are much differing from themselves, at other times, dilated, and swollen up by a more then ordinary heat, encreased by an extraordinary afflux of blood to those parts, at that time. Which heat not onely increaseth the desire, but dilateth the cavities and pores: that those parts will now be open, which before were shut. The Hen, and Does in coition elevate the Velabrum, which at other times closely shuts that passage. So it will be no marvel, if the straight orifice of the womb in coition shall open, to admit that guest she so much desires; and moves it self directly, to receive what is thrown into it by the Male.

As for his second ground, that the Cock wants that part which should ejaculate the sperm into the Matrix: dissection will shew us that, though it be

not so conspicuous as in other creatures; yet at the termination of each ejaculatory vessel, close by the Orifices of the Ureters, may be seen small extuberancies; which if compresst will be distended to a greater length, emitting seed from their terminations. In coition we cannot but beleeve them much extended, as in all other creatures; which afterwards are flaccide and contracted. So that if we may believe dissection (the surest guide) we shall see Natures bounty to this creature; whose salacity exceeding others, Nature hath bestowd two parts, whereby he may satisfie his desire. And indeed it was necessary so to be, for having no common receptacle, to receive the sperm from both testicles; as the Prostata in other creatures: one Penis could emit but from one stone; therefore are there two, that in coition either by turns, or together, he may emit these seminal parts, from both testicles. The defect of this part

part then will bee no argument to prove *Fabricius* his irradiation only.

I must here take away one stumbling-block more, which our Author hath laid in my way, in confutation of that opinion, favouring the actual existence of all things, in all bodies. Which because it may something reflect on this my opinion of the way of Generation; I shall a little review it.

He to confute this way of Generation and nutrition, furnisheth us with an example to illustrate his Argument; which bears the weight and vigour of his Argument, and may seem very much to infeeble my foregoing Discourse. Suppose (sayes he) a Man, a Horse a Cow, a Sheep, and 500 more severall Species of living Creatures, should make a meal of Lettice: to avoid all perplexity in the Argument, let us allow, that every one did eat a pound; and and let us conceive another pound of this herb to be burned;

as

as much to be putrified under a Cabbage root, and the like, under five hundred Plants more of divers Species. Then cast how much of every pound of Lettice is turned into the substances that are made of them, or that are encreased by them: as how much ashes hath been made by one pound, how much water from another by distillation; how much a Man hath been encreased by a third, how much a Horse by a fourth, &c. And when you have summ'd up all these several quantities, you will finde them much to exceed the quantity of one pound; which it would not do, if every pound of Lettice were made up of several different similar parts actually in it, that are extracted by different substances of the nature of those parts: and no substance could be encreased by it, unless parts of its nature were originally in the Lettice.

In answer to this, we shall return this confession, that if it were certain that

that all of so many distinct Species, that have altogether different parts one from another, did, or could from the same quantity of one Plant or thing, receive a valuable bulk of nutriment; his Argument would remain exceeding valid and considerable. But when it cannot be made appear, that every one takes something of the quantity, and is nourished by it. Nay, when the contrary appears, that all are not nourished by the same food: Some choosing one sort of meats, some another; one feeding on, and living by that, which kills another; this growing fat by that, which starves another. It will appear that there is a choice and election of Atomes in that which nourishes, appropriated to the Species for which they are provided: and as well a selection of those Atomes again, to constitute a new Individuum of that Species. In distinct Regions we finde several sorts of Plants and Animals, which are the proper off-spring of those

those countries; which are nourished by things peculiar to that countrey. If they be transferr'd, they either degenerate, or die, wanting their proper aliment; but seldome or never propagate their kinde.

Non omnis fert omnia tellus.

Besides, if it can appear, that many Species are fed with the same thing: it will be found likewise that they are those Species, that have many or most parts resembling one another. And then no doubt in the same aliment, they may every one finde particles fitly applicable to those corresponding parts: and no lesse able to constitute their members, then anothers.

It may yet be objected; If the seminall Atomes do so dispose themselves in their due and natural orders, as to make up a body resembling the Species; or at least to lay the first foundations, and rude draught, as it were, of a Body. Why are they not

not thus disposed, and setled in the seminal vessels of both Sexes, as soon as the sperm is made? There wants neither heat nor life to actuate them.

To this I shall answer; first, that perhaps if these seminal Atomes had convenient room in those vessels, they might be conjoyned in an orderly method. And therefore Nature hath so ordered these vessels, that the parts, both separating and containing these Atomes, should not be one continued cavity as the Matrix is, which receives them in coition; but should be a glandulous and porous body; in which the particles or Atomes of the seed lie scattered, and parted one from another by the substance of the glandule. For first, these Atomes are separated by the testicles, a glandulous body; next, they are conveighed to the Prostata, a glandule too; in which they are reserved until the time of use. In the Ejaculatory vessels, their passage

passage betwixt the testicles and Prostata; though they circulate through divers Meanders, and Cavities; yett there they cannot rank themselves in order, because they are in continuall motion, (the subsequent particles still driving on the former) which hinders their conjunction; rest being the Mother of Union. Those seminal vessels, which in dissections are found joyned to the Prostata, having many Cavities, and full of thin liquor, do not contain these seminal particles, but the Prostata, (as I said) and from thence in coition are they emitted. The liquor that is found in these seminal cavities, supplies perhaps (besides that other in coition) the office of the thin transparent liquor in the Egg, in which the Chick swims, and by which the finer parts are nourished at first, that is first concocted into the blood.

Besides, these Atomes in their ordering must (I said) be regulated by the soul, traduced with them; which is not

not fastned to the seed, while it remains in the seminal vessels, more then to the blood, or other humours in their chanels, on whose losse or preservation the soul doth no way depend.

Neither in all emissions of sperm, is the soul conveighed with these seminal Atomes, that in any place it may constitute a body. In all involuntary emissions, the soul is not communicated to the seed. But then onely, when the generators soul by a voluntary act, intent on propagation and multiplying her self into another Individuum, diffuseth her self into the now parting sperm, then only is it prolifical. Which coming into a convenient receptacle, where these Atomes may repose; being moved onely by that soul which accompanied them, and from which they received their orders and commands, are soon setled into their proper places, and become a perfect Individuum of that Species.

Thus have I discovered the wayes of generation;

Generation; which being cleared too of all those doubts, that could be raised against it; will easily pronounce, that phansie of our Authors, to be butt the issue of an acute wit, not the birth of his maturer judgement. If in this Discourse I have erred, I shall nott marvel at my humane frailty, but hope to finde as favourable a Censure.

FINIS.

A DISCOVRSE OF THE Cure of Wounds BY SYMPATHY.

OR,

Without any real application of Medicines to the part affected; but especially by that Powder known by the name of Sir *GILBERT TALBOTS* POWDER.

By
NATH. HIGHMORE Dr. of Physick.

THE Sympathetical Cure OF WOVNDS.

THese universal and general Laws of Nature being laid down, and rightly understood, the Cure of Wounds without Topical Application of Medicines, to the part affected, will soon appear an unquestionable Truth, and not a Magical deluſion, as hath bin ſuppoſed: and by ſome, whoſe laborious Pens have endevoured a conviction, moſt unjuſtly bin ſtiled diabolicall.

1. Firſt, it is abſolutely true, and an unqueſtionable law of Nature, (if, prejudice laid aſide, right reaſon takes

her place,) that all actions and motions are performed by *Atomes*, or ſmalll bodies, moving after a different manner, proportionable to their ſeveralll figures; and not by I know not whatt qualities, (which have onely a notional ſubſiſtence,) acting without thee bodies to which they belong, and leaping from one ſubject to another, without changing their forms.

2. There is a conſtant *Effluvium* or expiration of ſuch Atomes from alll bodies: cauſed by a compreſſion of other Circumjacent bodies; driving thee parts cloſer together; or elſe by thee intion of other Atomes crowding into the porous parts of that body; diſturbing the repoſe and quiet of the formerr inhabitants, and thruſt them out, to wander about in the air, till they meett with ſome other body of the ſame nature, or return to the ſame body fromm whence they were driven, where theyy may obtain their deſired reſt a while,, which is but very ſhort.

Thiss

5. This expiration, ſome by the help of Glaſſes, have ſeen in the form of a miſt to flow from a Loadſtone, and other bodies whoſe aporcheas are more plentiful: In bodies that are actually hot, this Effluvium is ſenſibly apparent to the ſmell, eſpecially to Creatures of an acuter ſenſe; whoſe expirations hanging in the air, or upon the ground; are as ſure a guide to the perſecuting Dog, as if they were continually in his eye. *Sanctorius* teacheth us too, that they are no leſſe ſenſibly diſcovered by weight, who affirm, a Man in one nights ſpace to be lighter by three pounds weight, then he was at the beginning of the night, cauſed onely by this inſenſible expiration.

3. Theſe Atomes are not of one Figure, nor of one magnitude or groſſeneſſe: ſome being ſo ſubtile and ſlender, that they admit of no oppoſition, but continue their courſe through all mediums: and whatever may ſeem

to oppoſe them in their way, ſuch are not diſcovered by us, but by their effects; they penetrating, and acting what their Figure can do, before we are ſenſible of them: ſuch are the contagious Atomes of bodies infected with the Plague, or other peſtilentiall diſeaſes; which are not only communicated to others, by their harbouring in the viſitants clothes; but being diſperſt in the air, are conveighed to remote places and perſons, on whom they exerciſe their tyranny, not diſcovered till they break out into open violence. Others again are groſſer, and cannot ſo eaſily paſſe by, or through others of the ſame or greater groſſeneſſe: and are therefore driven by the ſtrongeſt, and inforc'd from their intended voyage; and ſometimes beaten into the pores of other bodies. And ſuch Atomes are apprehended by our ſenſes, as heat, cold, ſmels, colour, &c. & move more ſlowly then the former. Some are ſo groſſe that they

move

move ſolid and fixt bodies out of their places, as the winde; and many others that are driven to and fro by the winde, as it moveth, they change their place. Theſe Atomes we are ſenſible of, and ſhall without much difficulty, be perſwaded to confeſſe their being and activ ty. The magnetick effluviums, and influences of the Planets, the ſubtile expirations of all bodies, eſpecially thoſe which are not raiſed by the attenuating of much heat are to be ranked in the firſt Claſſis, and have been heretofore Chriſtned by the name of *Occult qualities*. The others have been ſtiled prime qualities, vapors, exhalations, or the like.

4. It is another general Law of Nature, that all bodies deſire reſt; and would continue in their own proper places, if they were not diſturbed by an intruder: Reſt being the Mother of union, which is the deſire of all natural bodies.

5. There are ſome places more fit

for the receiving and holding of ſome bodies, or Atomes, then others; in which they may better and longer reſt. And that in reſpect of the faſhion and form of the pores receiving them; being proportionable, and more agreeable to the figures of the Atomes. As ſome Atomes are Angular, ſome Cylindrical, branched, ſmooth, ſharp, rough. There are in bodies pores agreeable to theſe figures; ſo that ſome Atomes ſhall bee received into pores proportionate to them, others excluded; as the fire, ſharp and penetrating Salt, creep into the pores of a Stone; which the Atomes of Water, cold, and light, cannot: the infectious Atomes of that peſtilential diſeaſe amongſt beaſts, called the *Murren*, inſinuate themſelves into Cows and Swine, not into Horſes, or Men, as the infection of the Pox or Meaſils in Men, is not communicated to Beaſts, &c. This agreement betwixt the pores and the Atomes, makes that, we call *Cognation*.

No

6. No Atomes reſt any where, but in thoſe cognate or proportionate pores. They may be driven into other bodies, or may accompany other Atomes, into pores that do not exactly correſpond with their figures, but cannot reſt there; being ſtill thruſt out by thoſe that do better fill up that place, and correſpond with the capacity and proportion of thoſe pores; and hence ariſeth a natural inclination and tendency towards thoſe bodies where ſuch pores are. For being once diſlodged, and thruſt out of thoſe cognate places, they are ſtill ſhouldered out, and preſt to give way for thoſe Atomes, whoſe figures claim a right to thoſe pores they are now wandring in: being thus thruſt out, & preſt on every ſide by other diſlodged Atoms, they are inforc'd to move that way where they finde leaſt crowding, and where the violence leaſt urgeth; and that is on the ſide where theſe pores are, and perhaps from whence they were firſt diſquieted. For other Atomes not finding entrance

entrance into the pores of ſuch bodies, rebounding back, cauſe other behinde them to ruſh into their place, to give way for them rebounding; who likewiſe not being entertained, return too, thruſting others into their room: till at laſt it comes to the turn of thoſe cognate Atomes: who being violently thruſt on by thoſe behinde them, are alſo now by theſe that were before them, returning; are preſt upon theſe proportionate pores, who in reſpect of their cognate figures, finding admitance by their entrance, make way for others of the ſame proportion to follow them. So that there is a conſtant neceſſitated motion of ſuch Atomes this way, forc'd by the impulſion of other Atomes. Which motion is natural too, in reſpect of the cognation betwixt the place and the Atomes, though in reſpect to other Atomes, and the force impreſt by them, it be violent and forc'd. And this is that motion which they ſay is cauſed by *Sympathy*. Such are all magneticall motions,

motions; amongſt which likewiſe may be ranked theſe Atomes curing at a diſtance.

7. No diſtance hinders the motion of theſe Atomes towards their natural places. For no pores agreeing with their figure, but their own, that are proportioned to them, they will ſtill be thruſt out by thoſe Atomes which are fitted for thoſe pores in which they are: ſo that being enforc'd by the preſſure of others to move from one place to another, they will ſtill keep on moving that way whither they are thruſt, till they come to a place proportionable to them where they may be freed from this violence. So that as the large ſphere of magnetical motions may not ſeem wonderful, ſo neither rightly can this ſympathetical motion of theſe curative Atomes be accounted magical, if they cure the part they ſeem not to touch.

8. The nearer theſe Atomes approach to their deſired home, the reſiſtance is ſtill leſſe on that ſide, and the preſſure greater

greater on the contrary, and therefore their motion is ſwifter, in a ſhorter diſtance, and alſo ſlower at a greater.

9. There may be, and oftentimes is a Conjunction of Atomes, which in their Pilgrimage, flie on the back one of another, and may and do operate together: as the Winde doth carry with it many infectious Atomes, and ſometimes rare and comfortable ſmels.

Theſe things premiſed and layed as foundations of truth, which can (if examined with an unbiaſſed judgement) appear no other; they will demonſtratively illuſtrate this way and cure of wounds without any topicall application. It remains therefore that wee explain the manner of this operation; what the Medicine is, and why it workes more effectually at a diſtance, then if applyed to the part.

Firſt, the Medicine is made of a Zaphyrian

Zaphyrian Salt, calcined by a celeſtial fire, operating in Leo and Cancer, into a Lunar complexion. The heat muſt bee ſuch, that it draws out all adventitious moiſture, leaving it intenſly dry, and in this condition it muſt be kept. If at any time it meets with any moiſture, it loſeth its energy, and muſt to the æthereal fornace again, it muſt be ſuch a proportioned heat, and not a greater; for by exceſſe of heat, all the volatile parts and fineſt Atomes, which onely work this cure, will bee evaporated: and onely the groſſer ſaline parts remain, which neither can be raiſed to accompany the Atomes of the blood: neither if they could, would they cure; but by their ſharper angles, grate the orifices of the capillary veins, and ſo procure an efflux of blood, and not a conſolidation of the wound.

The ſubſtance of this medicament being joyned w^th^ other unctuous bodies, is

applyed

applyed to the wounds themſelves, in moſt cicatrizing and drying emplaſters. Which when the ſharp angles are blunted by the unctuouſneſſe of the adjoyned medicaments, doth dry up, and unite the wounded parts moſt effectually, as in the emplaſter called Diapalma, &c. Much more effectual then muſt the finer active volatile particles be, when they are ſeparated from thoſe more earthy, clogging parts; and conveighed into the remoteſt pores of the wounded part, by the help of the bloody Atomes returning home: upon whoſe ſcore they finde a far greater and more welcome entertainment, then if they came alone, or joyned with any other Forrainers.

The manner of applying the medicine is in this faſhion. The blood, or bloody matter taken from the wound on a cloath, muſt be lightly covered over with this powder, kept very dry; and afterwards wrapt up cloſe from the air, and ſo kept in a temperate heat; neither

neither muſt it finde any mutation to either exceſſe; the wound in the mean time muſt be kept clean, and clothed up with drie clean clothes. If it hath been an old ſore or ulcer, that Nature hath found a convenient paſſage to vent the burden of her excrements that way, and there be a tumor, (as neceſſarily there will be) the firſt dreſſing doth moſt violently drein this Fountain, and you ſhall finde the wound to run moſt ſtrangly: afterwards when the matter is leſſened, and is reduced to ſuch a proportion as nature and the medicine may conveniently buckle with it, then it turns it into laudably concocted matter, which every day leſſens, and the wound cloſeth. But if the wound be freſh, the applied medicine preſently ſtoppeth the blood, and hinders an afflux of humors to the part. So that there is nothing to be done, but the uniting the ſevered parts, which this medicine doth in a wonderful ſhort time.

The way which theſe balſamical Atomes

tomes of the Medicine, applyed to the blood, take to come to the wounded part, is next to be ſhewed. All action being performed *Applicando activa paſſivis*, either by a real or virtual (which indeed muſt be reall too) contact, it muſt needs make this cure ſuſpected; becauſe the medicine being applyed only to the blood, there appears to be no kinde of contact, & therefore it ſhould follow, that there is no operation or action upon the wound; eſpecially when the wound is at ſo great a diſtance from the medicine.

But if we ſhall review the former Laws of Nature, the contact will ſoon appear to be as real, as that made by the Sun darting his beams into any of theſe inferiour bodies, though thouſands of miles remote from it. The medicine therefore being a body conſtituted of ſeveral particles, it will neceſſarily follow, that there is an effluvium, or conſtant expiration of Atomes from it, by the ſecond law of Nature, And by the ninth

ninth rule these may be conjoyned with the Atomes of blood extravenated, and accompany them in their flight. Nay, they must joyn with them, for the Medicine being a Salt, when it comes to imbibe the moisture of the blood, is (as all Salts will be) dissolved, and perfectly mixt together with it; which being kept in a constant continued heat, are continually breathing forth insensibly Atomes from both. Being thus united and exposed, the particles of blood being most, and most active, they carry their companion along with them. Who by the sixth and seventh rules, must of necessity be driven to the wounded part, though remote from it a very great distance.

When these companions the Atomes of the extravenated blood,

and the Medicine are come to the wounded part, the Atoms of the blood are received, finding an eaſie entrance at thoſe cognate parts thoſe proportionate pores; with which covertly ſlips in the other of the Medicine; who meeting there with more moiſture, preſently delivers up its ſaline part to bee conjoyned with thoſe new moiſt parts; which by the addition on of theſe newly reſolved ſalt particles, become more fluid and looſe, fitter to bee driven out which is ſuddenly done. For beſides this looſening the ſuperfluous matter in the wound, the Medicine hath ſuch parts as contract the ſolider parts neerer together and ſo ſhuts the orifices of the veins, that the efflux of blood and humors thence, is preſently ſtayed; and the pores being leſſened this ſuperfluous moiſture which hinderes

hindered the union of the parts, is preſt out, ſo that the wound is more eaſily ſoadred up. Which worke is quickly performed by Nature her ſelf, when there ſhall be nothing to hinder the appoſition of ſuch fitly prepared particles, as ſhee hath provided in every part for their nouriſhment and augmentation. This double work of the Medicine, the looſening and diluting the fluid parts, that diſtend the pores of the wound, (which cauſes that pain, which is an inſeparable companion of ſeparation of continuity) as likewiſe the conſtriction of the pores, and joyning the more ſolid parts neerer together; is demonſtrable in all Salts, when they are laid on bodies retaining any quantity of moiſture in them. For Salt layed on meat, cauſes firſt a great quantity of bloody water to flow

from it; after which you ſhall finde the fleſh harder, and ſhrunk cloſer together: and at laſt, if it continues long, the moiſture is clean dreined out of it. So in the making of ſome Syrups, if upon Limons or Apples ſliced thin, you ſtrew Sugar (which is a kinde of Salt) it will drein out all their moiſture, and leave them dry and hard. This being done by ordinary Salts, wee muſt expect a far greater & ſpeedier operation from this, whoſe parts claim a greater activity in binding up and cloſing, then any Salt, as every tongue will ſoon confeſſe that toucheth it, either before or after its preparation. It will be no wonder then, to ſee ſo large an efflux of Matter from an Ulcer, till all bee conſumed, after the firſt dreſſing of the cloth; or to ſee ſo ſudden a ſtop given

given to the blood flowing from the wound.

The cloth in which the blood and Medicine are kept, muſt bee wrapt up cloſe, and kept warm in a temperate heat, not declining to either exceſſe. Firſt, becauſe the cold doth prohibit the expiration and breathing forth of theſe Atomes, ſo that the wounded part is for that time deſtitute of thoſe balſamical Atomes, which ſhould drein forth the ſuperfluous humidity, and reſtrain the afflux of blood, and other humors to the part. So that the blood flowing to this weakned part, diſtends its pores, and veſſels again beyond its natural and accuſtomed limits, and rends aſunder what was almoſt united before And this is that which cauſeth that pain, occaſioned by expoſing the clothes

to

to the cold air. Besides, this hindring the efflux of these aporrheas from the cruentated cloth by cold, there may bee some extraneous Atomes; (as those of cold or icy parts, whose activity in penetrating of bodies, I conceive to bee little lesse then those of fire,) which being conveighed along with these Atomes from the cloth, more slenderly now transmitted; may disaffect the wound, according to the figure and nature of the Atomes: as may appear by that story of Sir *Kenelm Digbies* usage of Master *Howels* cruentated Garter, heating it over coals in a dish of Vinegar; which put the lame Gentleman into extream pain and torture; but upon the removall of those, and the fresh dressing of the Garter, hee presently received ease, and in a very short time a perfect Cure.

The

The other extream, *viz.* of heat, doth as much exasperate the wounded part, as may appear by this story, as well as by another, from a very credible Reporter, who in the cure of some Scrophulous Ulcer by this powder, had almost perfected the Cure; the Father still keeping the Cloth in his pocket; but being to lodge abroad one night, left the Cloth with this Gentleman; who dressing the Cloth, as before, in the morning put it up in his owne pocket, and kept himselfe by a great fire all that day; and at night, laid it in his bed, under his sheet onely, and so kept it extreamly hot. The Child which had before continued in very good ease since the first dressing, all that afternoon and the night following was extreamly tortured, and slept not at all. In the

morning when he came to dreſſe the Childe again, hee found the wound had bled much, and was very ſore: but dreſſing the Cloth again, put it up in his own pocket; and ſo returned to his good fire; the Childe continuing in extreamity of pain, they ſent their ſervant to acquaint him with it; who preſently apprehending, that the change of the keeping of the Cloth might bee the cauſe of it, gave the Cloth to the Boy to put it in his pocket: who following his imployments, came not to the fire at all, and in a quarter of an hour after, hee found the Childe playing, and in very good eaſe. The reaſon of this was not onely becauſe there were many fiery particles joyned with theſe Atoms, which inflamed the wound; but becauſe the extreame heate working on the matter and Medicine

dicine in the Cloth, in an unuſuall manner, raiſed a far greater number of theſe ſaline parts then uſually; which when by the ſanguineous Atomes they were introduced, did by their ſharp angular parts ſhave and corrode the ſmall orifices of the veines; and gave way to that efflux of blood, and by their ſharpneſſe lay continually pricking and dividing the tender parts, which was occaſioned by ſome of groſſer and more fixt parts.

This Cure, by this Atomicall energy wrought at a diſtance, is more ſudden, then any the moſt excellent Balſame could perform, or then the ſubſtance of the Medicine it ſelf, applyed to the part could do. For firſt, as I ſaid, the Medicine being a calcined Salt; the ſharp part of it would erode

erode the orifices of the ſmall veſſels, which in all wounds are divided; and would prove rather corroſive then curative. But being thus tranſmitted with the united Atomes of blood, they ſteal in undiſcerned, and by the vertue of that cognation betwixt the Atomes of the blood and the pores they are to enter, they are more freely entertained, and admitted to paſſe and inſinuate themſelves farther, then if they came alone; whoſe diſproportioned Atomes would ſcarce finde an entrance there, without the other. Being thus freely admitted into every pore, and being but the finer volatile particles, whoſe angles though keen, yet have not that hardneſſe to fret off the tender mouthes and termination of veins: Firſt, they dilate the ſuperfluous humid parts,

and

and make them fit to bee expelled : then by their more then ordinary reſtrictive power ſhrink together the pores, and ſqueezeth out that humidity, and glew together thoſe diſunited parts. And thus in a very ſhort time is the cure performed.

The eaſing of the Toothach by this Medicine too; is performed by its Atoms, repelling thoſe humors which were flowing to, and diſtending the thin, and moſt accuratly ſenſible membrane, including the Marrow of the Teeth. Which is done by cloſing and ſhutting the pores, that the already imbibed humours muſt be expreſt, and others that are flowing, are prohibited from entering.

Thus

Thus have I cleared what to Philoſophers ſeemed one of Natures Cabbinet-Secrets, but to others, that condemn all they underſtand not for Magicall, it hath ſeemed, and been accuſed to have been done by ſome diabolicall compact. There have nott been wanting ſome, that have laboured to undeceive mens underſtanding, and to clear the proceſſe of this cure: but upon principles, I confeſſe, of as much difficulty, and that require as great a portion of faith to believe them, as the thing it ſelf. Their misfortune hath occaſioned mee to look ſomething more narlowly into the true principles of Nature; which though I ſhall not beg to bee granted mee gratis, yet I ſhall appeal to every mans reaſon (by which Rule I would have

have them examined) whether they do not truly agree with the uſuall wayes of Nature, by which ſhee conſtantly workes: if upon any ones juſt tryal they ſhall appear to be erroneous, it ſhall not grieve me to become his convert, recanting my miſtakes.

FINIS.