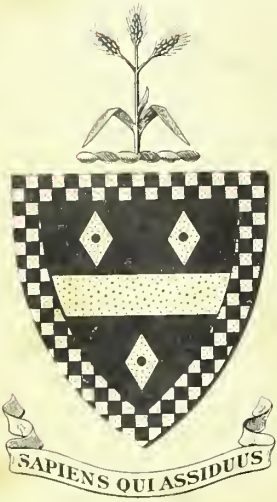

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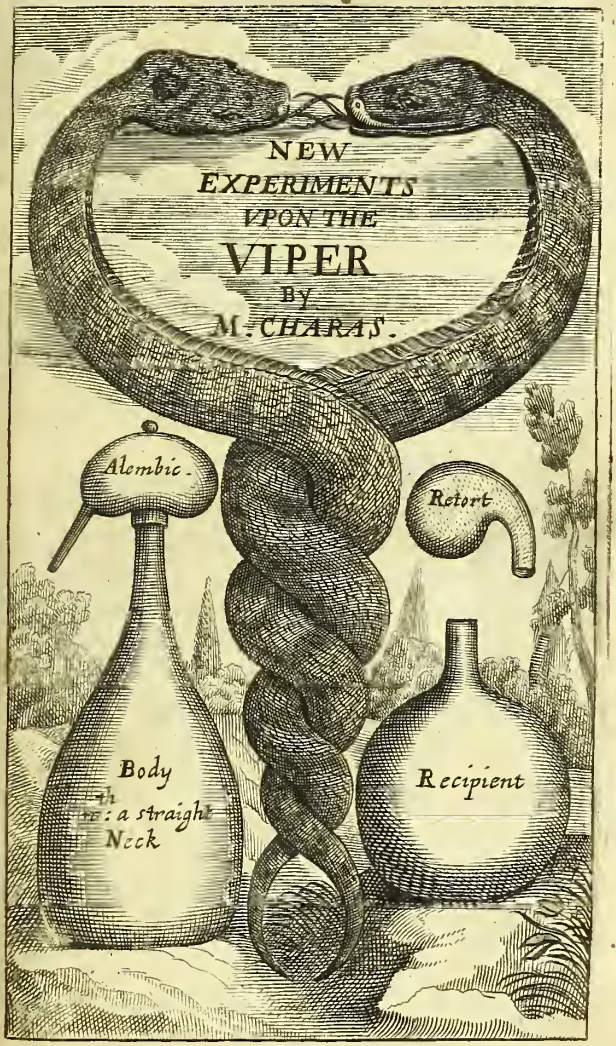
NEW
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VPON THE
VIPER
By
M. CHARAS.
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Recipient

NEW EXPERIMENTS
UPON
VIPERS.
WITH
EXQUISITE REMEDIES,
That may be drawn from them, as well for the *Cure* of their *Bitings*, as for that of other Maladies.

Also a LETTER of
FRANCISCO REDI,
Concerning some Objections made upon his Observations about *VIPERS*:

Written to
Monsieur *BOURDELOT*
AND
Mr. *ALEX. MORUS.*

Together with the Sequel of New Experiments upon Vipers, in a Reply to a Letter written by
Sign. *F. REDI.*

By *M. CHARAS.*

Now rendred English.

LONDON,
Printed for *J. Martyn*, Printer to the *R. Society*; at the Bell in S^t. *Pauls* Church-yard, 1673.

I
Charas

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THE
Preface.

Many will perhaps wonder, that after ſo many famous Authours, Antient and Modern, who have written of VIPERS, *I ſhould yet undertake to labour in an Argument, which in all likelihood they ſhould have exhauſted. But if reflexion be made on the many wonders, that are found in the Body of this Animal, it will be eaſily granted, that it cannot be inquir'd into with too much exactneſs, and that it is not a work, that can be finiſh't at one or two ſittings.*

What Obſervations have been left us by knowing men, although they be not carried to their perfection, may be very uſeful to thoſe, that are come after them, to make them diſcover what had eſcaped their diligence. And without this aid, I ſhould not have had the

confidence of undertaking this Work; in which I have propos'd to my self three main things, that may much contribute to the illustration of the History concerning Vipers. *The* first *is, to examine sundry Observations of the Antients, which have hitherto pass'd for true, though most of them are not so. The* second, *to give an accompt of other Observations, which have been unknown to our Predecessors. The* third, *to find in the* Viper, *which causeth so many mischiefs, Specifick Remedies against its Biting, which had not been discover'd before, and may serve to overcome many troublesom Distempers, which the ordinary Remedies were not able to conquer.*

The Enterprise, certainly, is bold; and, I confess, I should never have compass'd it, what hope soever I might have conceived of it, had I not been assisted by some knowing Physitians, whose light hath been very helpful to me.

Their Modesty permits not, I should here name them; it sufficeth the Publick to know, that a good part of the rare things in this Treatise is due to them. They had the kindness to meet often at my House for the space of three months, and there to se-

ma-

made exact Dissections of Vipers, *which by my care were brought to me from all Parts of this Kingdome; and to see also Experiments tryed of their biting, upon divers Animals. and to examine their Bodies immediately open'd after their death, to discover the true cause of it, and to prescribe Remedies, answerable to their Conjectures, and to take notice of the success of the same.*

In dissecting all these Vipers, *we were willing to see the parts, which Authors have taken notice of. and which have also been represented in the Books of some of them: And comparing them with the Natural ones that were before our Eyes, we found great omissions of very considerable parts, an introduction of some imaginary ones, and representations and situations of several that were ill designed, and ill enough placed. It was thought fit, I should endeavour to perform something more accomplisht: And Monsieur* Bosse, *whose skill and dexterity in the Art of Designing and Graving is known and esteem'd of all the World, in things of a farr sublimer nature than the Anatomy of* Vipers, *being happily present at one of our meetings, and taking great pleasure to oblige*

his Friends, expressed from that very time, that he was very willing to second my intentions: And having received from me a sufficient number of Subjects, hath taken the pains to design them after the life, and thereupon to grave all the considerable parts of this Animal. In a word, I have omitted nothing of what might render my Design answerable to the wishes of all Learned and Curious men.

Now as those, who, speaking of a matter that hath been often handled by others, cannot but must often repeat again, what hath been already said of it; I thought, I was not to scruple to enlarge my self a little, that I might not give an imperfect Anatomy of the Viper, *of which it was fit enough to describe as well the great number of the true parts, that have been known to our Ancestors, as the new ones, by me found after them.*

I say nothing of my way of Writing. From a person of my profession, you are not to expect the Elegancy and Purity of our Tongue. I thought it enough for me, to deliver my self clearly and intelligibly, which is, in my opinion, all that could be expected from me.

For

For the rest, I think, I am the first, that hath given to France *a* Treatise *of the* Viper *in its Native Language. Those who understand no other Languages, may think themselves obliged by it, in regard they would else have been ignorant of abundance of things, that deserve to be known.* Farewell.

THE

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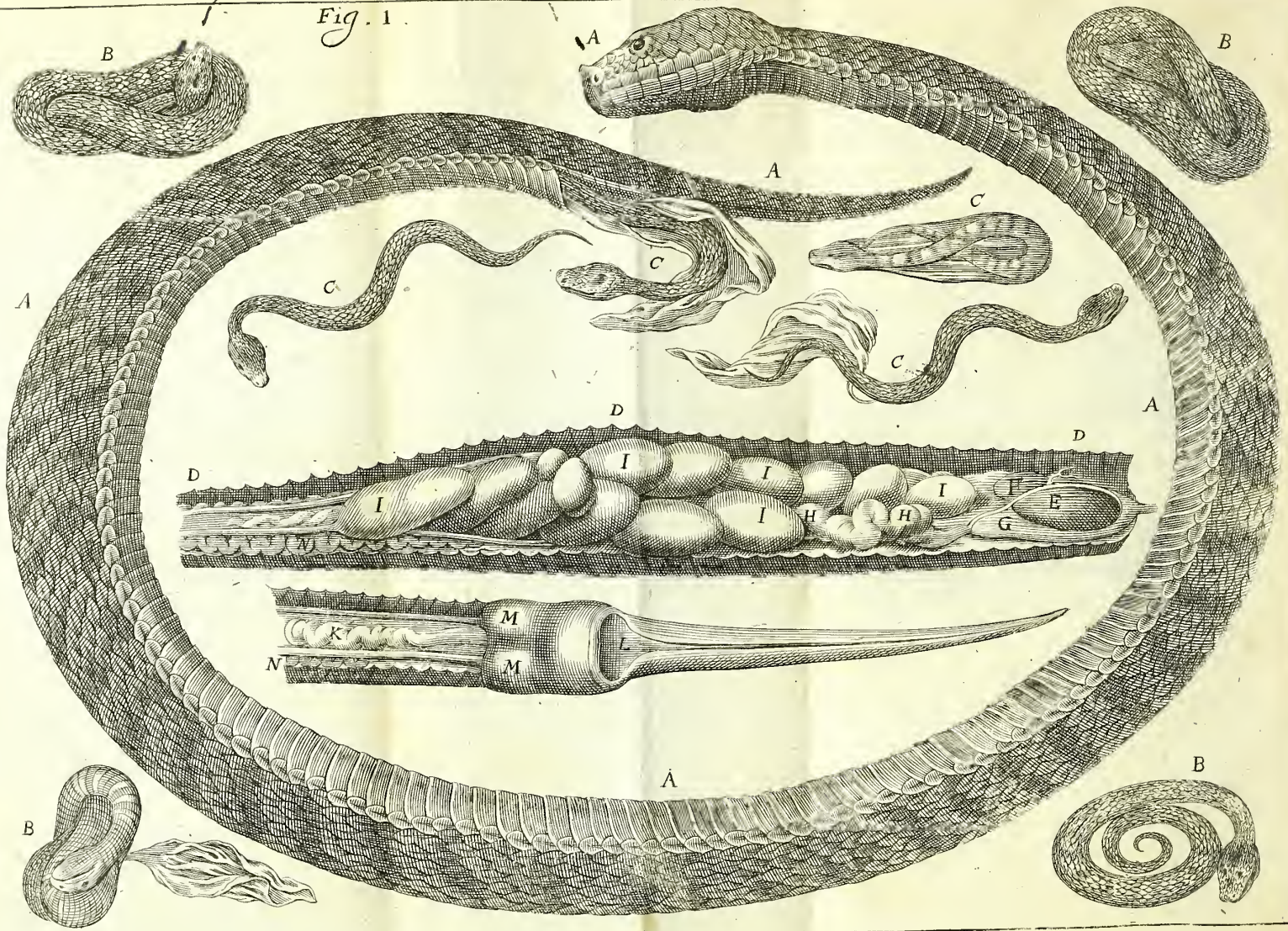
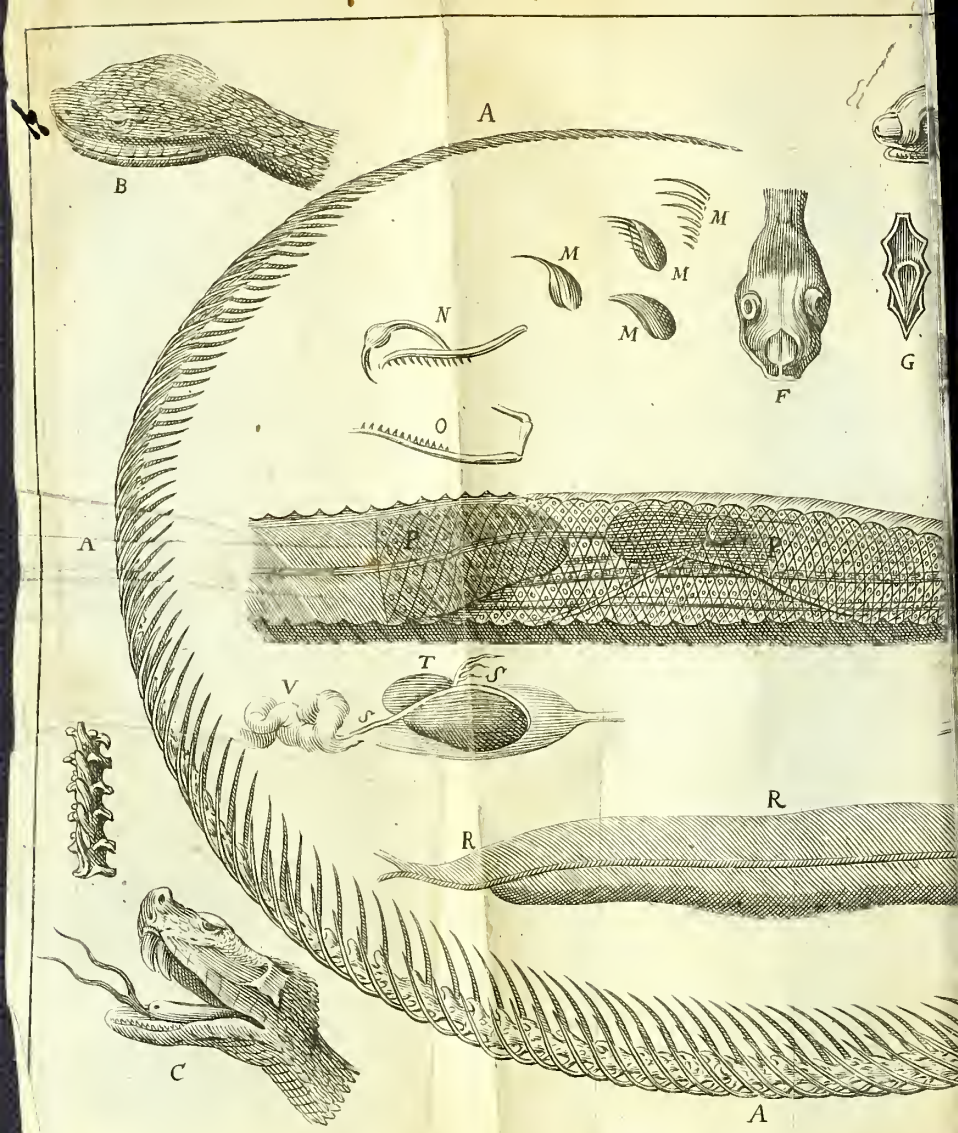
FIMIS.

ERRATA.

PAge 13. line 6. read *seen on.* p. 29. l. 8. r. *and that.* p. 95. l. 27. r. *and the want of goodneſs.* p. 120. l. 5. r. *the bitten animal would be.* p. 126. l. 12. r. *twice through*, for, *twice in the day-light.* p. 163. l. 12. r. *adapt.* p. 165. l. 1. r. *with Salt and Dill.* p. 172. l. 1. r. *Simples be in.*

Fig. 1.

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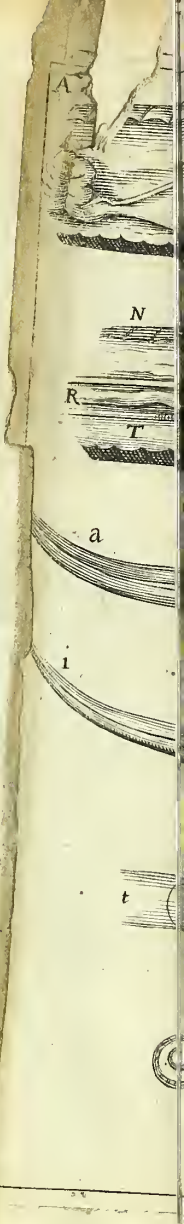
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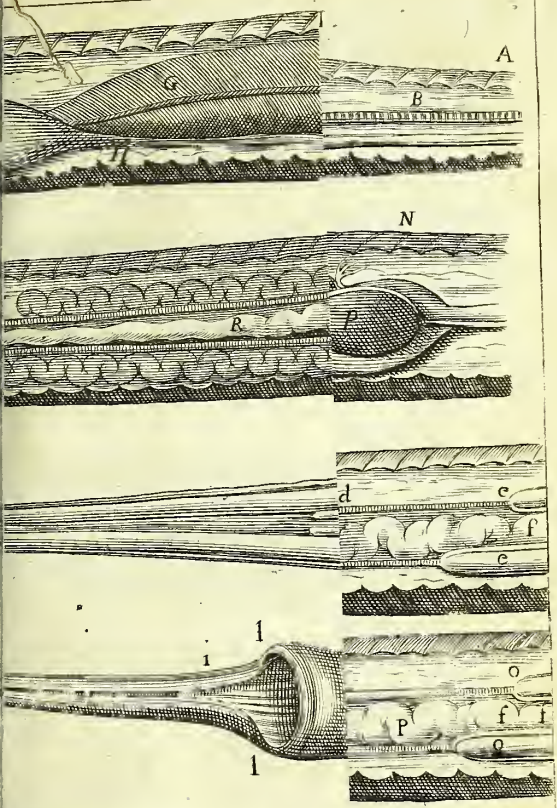
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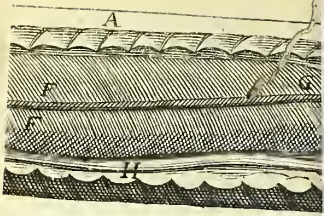
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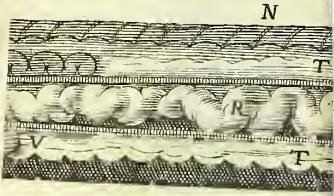
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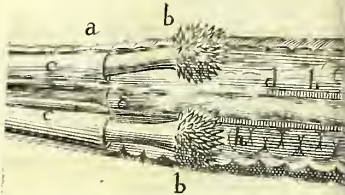
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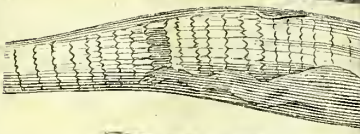

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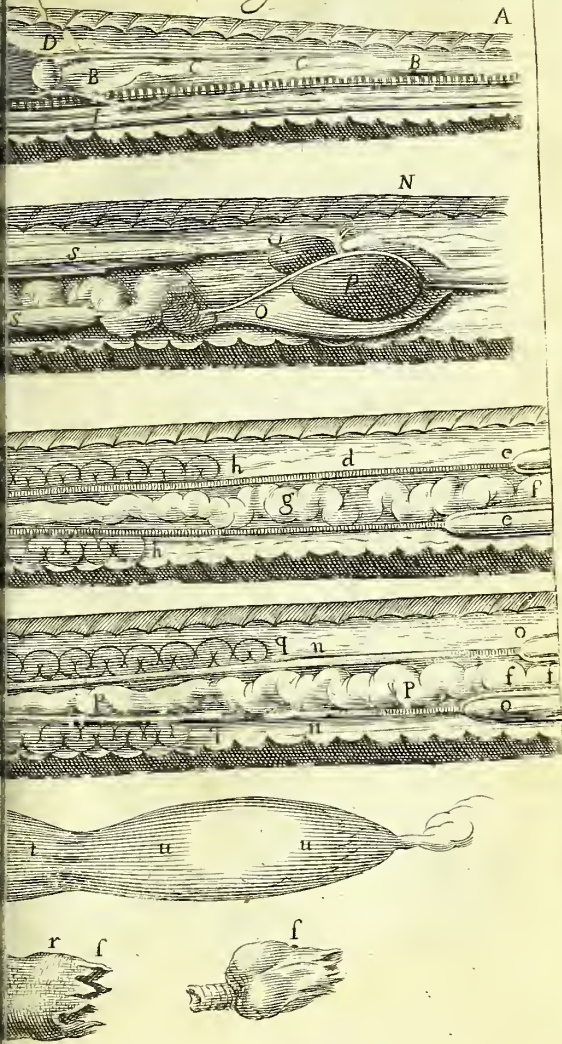
Fig. II.



THE ANATOMY OF A VIPER.

General Observations upon this Animal.

CHAPTER I.

I Know not, what ground the Antient Writers upon this Animal had, to say, that in the Copulation, the Male did insert his Head into the throat of the Female, and there emitted his seed, thence falling into her *Matrix*, where she first did form Eggs and then Young Vipers: That the Female, finding a titillation from the emission of the seed, snapp'd off with her teeth the

head of the Male, and so kill'd him; and that the Young Vipers, being ready to be brought forth, did pierce the Womb and the sides of their Damm, to make a passage for themselves; so that by killing her, they revenged in some manner the death of their Sire.

I confess, that this Story, or Tale rather, having neither reason nor experience on its side, I cannot take the part of those Authors. I esteem, that a Viper, which is a kind of creeping Serpent, is indeed procreated by the conjunction of Male and Female; but this is done by means of the Organs designed for Generation; of which we shall make a description in their proper place, and which this Animal hath common with all others, and that more in number, than most Animals.

The Viper differs from other Serpents, not only in this, that it creeps more slowly, and jumps not; but chiefly herein, that its little ones receive their perfection in the womb, and come forth alive after the usual manner; whereas the Femals of other Serpents lay Eggs, which they incubate, and hatch, either in the Sun, or in their recesses.

The

The Viper is by many taken for an Image of malice and cruelty; but in reality she is guilty of no such thing, if she be not hurt or vex'd; for, if she be, she becoms furious, and bites very piercingly: but she never assaults Man or beast, except she be angred. And if at times it happen, that she bites some person or other sleeping in the field, certainly that Body must have thrust or otherwise hit her; for else she would never have bit him.

It may very well be said, that by that means the Stratagem of *Annibal* succeeded, when he caused a quantity of earthen Pitchers fill'd with Vipers to be thrown into the Shipps of the King of *Pergamus*, his Enemy; in regard that on the one hand the Pots being broken, did hurt and anger the Vipers, and stirr'd them up to bite whatsoever was within the reach of their teeth; and on the other, the sight of these creeping Creatures, scattered about here and there in the Ships, frighted the Souldiers and disorder'd them, so that they could not fight.

Mean time a Viper attacks and kills those Animals, which she means to devour for her nourishment, as Spanish Flyes, Scorpions, Froggs, Mice, Moles, Lizzards and the

like; which she swallows whole, after she hath kill'd them with her bigger Teeth. The smaller prey she sends down whole into her stomach; the bigger she partly lodgeth in her stomach, partly in her weasand.

There can hardly be made any perfect digestion in the Stomach of Vipers, both because the heat is there not well united, by reason of the great aperture, there is at the mouth, where the Oesophagus or Weasand ends; and because they have not moisture enough to help the fermentation and the Concoction of food. But yet this hinders not * the conveyance of the Juyce and of the finest part of the swallow'd animals into all the parts of their body for nourishment: Which is not performed but in the space of many days, during which, the excrements and superfluities of the nutriment are carried into the Gutts, whence the grosser parts of them are cast out again by the mouth. This we have lately observ'd in a great part of the body of a Lizzard, which a Viper vomited up twelve days after she was taken; where we saw, that, of the head and of the fore-leggs, and of that part of the body contiguous to them, and which could

could conveniently be placed in the ſtomach of the Viper, there reſted little more than the Bones; but that a great part of the trunk, together with the hind-leggs, and the whole taile, were in a manner in a condition, as if the Viper had ſwallow'd them that day, as appears in the 2d Figure. But we were ſurpriſed, among other things, to ſee, that the parts, which could not enter into the ſtomach, and had remained in the *Oeſophagus*, had kept ſo long well, I mean, without ſuffring any alteration in the skin; although thoſe underneath had contracted ſome lividneſs, which perhaps was an effect of the venemouſneſs of the biting.

Vipers can live for many months without any food, and after they are once taken, they eat no more, living then only upon the Air, they take in. And although they be greedy enough of Lizzards, when at liberty, yet I have found, that having thrown Lizzards alive into a barrel, wherein I kept a good number of living Vipers, and leaving them there whole days and nights, the Vipers did no hurt at all to the Lizzards.

The Subſtance of Vipers is viſcous and compact, and periſheth not but very ſlow-

ly and difficultly. Their Skin is scaly, which defends them from the injuries of the Air, and maketh that the Spirits unite themselves so firmly to the body, that 'tis hard for them to quit it; and we see, that they remain yet many hours in the Head and in all the parts of the trunk, after tis flead, emptied of all the gutts, and cut in many pieces. And this is the cause, that the motions and windings so long continue in them; that the Head is able to bite, and its biting as dangerous, as when the Viper was entire; and that the Heart, even after it is pull'd out of the body, and sever'd from the other inward parts, keeps its beating for many hours. Whence it may be concluded, that the Viper, which is composed of parts so closely united together, and in which are found such perfect Spirits, can impart to Man what it hath most accomplisht and in so great abundance: So that we need not wonder, if we find the remedies, we draw from its body, are of a not-ordinary vertue.

A Viper voids not much excrement, and what she voyds is not offensive, whereas that of *Snakes* stinks much, and hath the smell of stale and corrupt Urine. Neither

ther have we ever found any ill smell in opening the vessels, wherein we used to keep Vipers alive, unless some viper or other had been dead and putrifyed. For my part, I have never received any inconvenience from any ill air, which some pretend to issue forth at the opening of those Vessels.

Vipers make no holes in the Earth to hide themselves in, as other Serpents do; but ordinarily they hide themselves under stones or old ruines, where they may be often found heaped up and wound together in clusters. When 'tis fair weather, they love to lurk under bushes and tufted plants.

They commonly couple twice a year, the first time in the month of *March*; and they goe with their young ones 4. or 5. months; which being perfect, come forth one after another by the common opening of the *Matrix*, and in great number, even to twenty and twenty five. They draw out with them, in coming forth, a small tegument fastned to their navil, like an after-birth, which the damm by little and little separateth with her tongue, as they are born one after another.

Vipers cast a skin every Spring, and sometimes even in Autumne: which hath

occasioned a belief, that they have a vertue, able to make young again, and to preserve the strength of those, who use them either for a preservative or a remedy.

THE DESCRIPTION OF A VIPER

CHAP. II.

Of the Parts, which present themselves first.

SECT. I.

Of its external Figure.

THe Vipers, Males and Females, that we have in *France*, being of their full growth, are in the middle of their body

dy a good inch thick; but that of Females is bigger, when they are with young, especially when the young ones are ready to come forth. They are commonly two good foot long; and there are some, that are somewhat longer. Their head, which is flat, hath a kind of border round about the edges of its upper part, and in that they differ from *Snakes*, which have all that round bared and taken down, and the Head sharper and narrower, in proportion to their Body.

The Head of a Viper is in all an inch long, and towards the top thereof it is 7 or 8 lines broad; and then lessening by little and little, it is not above 4 or 5 lines broad about the Eyes, and 2 lines onely about the end of the Nose. It is about 2 lines thick.

The Neck, taken where it begins, is about the bigness of a mans little finger. That of Males is ordinarily a little thicker than that of Females: Yet there are some of the Females, which, when full, appear to have a Neck even thicker than that of Males.

The Tail of Males is always longer and thicker than that of Females, because it contains

tains the parts of generation double; and in their Interſtices there are alſo two ſmall bladders ſomewhat long, ſerving for a reſervatory of their ſeed, which make their Tail bigger. This of the Males is about four fingers ſquare long; but that of Females not much longer than three. The upper part of the Taile of Males is, at its beginning, about the bigneſs of their Neck, and ends ſharp, as doth alſo the Tail of Females. Neither of them ſtings, nor have they any venom in them.

SECT. II.

Of the Skin of Vipers.

NO Vipers are ſeen, but they have their skin ſpotted: but the ground of the colour is different enough; for ſometimes 'tis whitiſh, ſometimes reddiſh, in ſome 'tis gray, in others yellow, in others tawny. This ground is always ſpeckled with black ſpots, or at leaſt much darker ones than the reſt; they appear like different cyphers or characters, ranged in ſpaces, even enough, and anſwering one another, eſpecially on the top and the ſides of the Body. Some of them are alſo up-

on

on the Head, and among the reſt, two in the form of Horns, which take their riſe between both Eyes, and open themſelves and reach towards the two ſides of the top of the Head, and are ſometimes 4. or 5. lines long, each of them, and halfe a line broad. Oppoſite to the middle of theſe two horns, there appears a ſpeck of the bigneſs of a ſmall Lentile, being ſhaped like the Iron of a Pike: And this is that, which is, as 'twere, the firſt and principal of all theſe ſpecks, ſeeming to guide them all along the Back-bone.

The Skin is all cover'd with Scales, the greateſt, ſtrongeſt and moſt conſiderable of which, are thoſe under the whole Body, and ſome under part of the Head. Their bigneſs and force is neceſſary for them, to fortify the Viper in the place that is feebleſt and leaſt capable of defence; beſides that they ſupport the Animal, and ſerve it, inſtead of feet, for creeping, and for carrying its Body to and fro. Theſe great Scales are alwayes of the colour of Steel, from one end to the other, and different from thoſe of Snakes, which are commonly mark'd with a yellow colour. They open, and ſtick, according as the Vi-

Viper will recoyle, or ſtop. The extremity of theſe great Scales is, as 'twere, ſow'd beneath the other litle Scales, which cover the whole Body. Thoſe under the Head, reach in their breadth towards the two Jawes; they are leſſer, ſtreighter and ſofter than thoſe under the Belly, and terminate at other ſmaller Scales, which go on to cover the whole undermoſt part of the Head, and, beginning their ranks towards the ends before, continue them at the ſides of thoſe ranks as far as towards the bottom of the Jaws.

From the begining of the Neck unto the beginning of the Tayl, there are as many great Scales, as there are *vertebraes* or Joynts of the Back-bone; and as each *Vertebra* hath on each ſide a Ribb, each Scale meets by its two ends the points of both, and ſerves them for a defence and ſtay: the ſame abuts alſo on each ſide at the end of one rank of litle ſcales, wherewith the reſt of the Body is covered, and it ſeems, that 'tis placed there to receive them. Theſe ſmall ſcales are admirably well ranged, they lying upon one another, and repreſenting each as 'twere halfe a round towards their extremity. Their ranks appear

pear always sloping, whether you look on them from the right side to the left, or from the left to the right; some what after the manner of the ranks of small Slate, that are cut in a halfe round, in some places seen in the tops of houses. These Scales are more or less great, according as the part of the Body, they cover, is greater or lesser. The Symmetry of them is always very exquisite and even; and is sutable to the great Scales, united to their ranks beneath. There are also observ'd on the top of these Scales, and all along the Back, many fine and distinct Lines, passing streight along from the hind-part of the Head unto the end of the Tayl.

The Scales, that are under the Tayl from the beginning of it to the end, are divided, and yet they appear united and ranged in the middle by a very orderly and pleasing compartment; and their bigness goes diminishing in proportion with the Tayl.

The Skin of the Head is also covered with small scales, and at the end of the Nose turned up, and so on, even round about, as far as towards the Eyes, in the manner of a swines-snout.

There are observed only six openings in the

the Skin of a Viper: the biggeſt is that of its Throat; the other four are thoſe of the two Noſtrils, and of the two Eyes; the laſt is that, which is at the lower-moſt end of the Belly, where is the beginning of the Tayl, which incloſeth not only the hole of the Gut for voiding the excrements, but alſo thoſe of the organs of Generation, as well of Males as Females. This laſt opening is ſhut by the laſt of the great ſcales, which is advanc'd in the form of a half round, and opens in falling lower at the time of copulation, as it alſo doth at the time of the young Vipers being caſt, and of the excretion of their dung. The Throat opens and ſhuts at the will of the Animal; the Noſtrils remain alwayes open, and the Eyes have Eye-lids to cover them upon occaſion. There is no aperture in the skin to give any paſſage for Hearing; Nature, it ſeems, ſerving herſelf of the apertures of the Noſtrils for that purpoſe.

Vipers ordinarily caſt their ſcaly Skins twice a year, under which they are furniſht with another, quite formed, which at firſt appears much fairer, and of a more vivid colour, than that which is caſt off. And there is alſo inſenſibly forming an other

ther new one, againſt the time it is to ſerve, when that which now covers it ſhall be ſevered from it: So that a Viper hath at all times a double skin; and all theſe skins, though furniſht with ſcales, are notwithſtanding tranſparent, being held and look't on againſt the day-light.

This *External* deſcription might be ſufficient for thoſe, who ſhall deſire no more but to know how to diſcern Vipers from other Serpents, but the *Anatomical* Deſcription of all the parts under the Skin will be much more ſatisfactory and more neceſſary for thoſe, who ſhall deſire to know exactly all the good and all the ill in a Viper.

CHAP. III.

CHAP. III.

OF the Parts of the Head OF A VIPER

SECT. I.

Of the Nose and Nostrils.

BEginning at the extremity of the Head there are the *Nose* and the *Nostrils*. The former is made up of a Bone some what Gristly, furnisht with some ends of Muscles, that come farther off, and are accompanied with some small veins and arteries. This Bone is also cover'd with the scaly Skin, turn'd up, as was said above, at its extremities. There are two pipes, in the two sides, that form the nostrils, which have each a small and round opening on the right and the left side, before, and the proper nerve, which coms down from

from the fore-part of the Brain unto their Orifice, and communicates to them the objects of smelling. The same Pipes serve also to receive two small Nerves, which issue each from the lateral part of the Brain, and serve for Hearing. This gristly Bone hath several Angles round about, and is articulated by two strong Ligaments within and about the hollow and anteriour part of the Skull; which hinders not, but that it is a little flexible in this Articulation.

Sect. 2.

Of the Skull.

The *Skull* is found hollow in the fore-part of it, and represents the shape of an Heart in this Cavity, when the Bone of the Nose is separated from it. There are two points advancing, which in part embrace that Bone; it is in the superior part surrounded with a small border, advancing in the fashion of a Cornishe; it is notch'd on both sides, where the Eyes are scituate, and there forms their round holes, of which the hind-part reaches out to a point, to which answers that before. The whole Skull in

all its parts is of a very compact and hard substance. There are three principal Sutures in the part above; the one, which may be call'd the *Sagittal*, which divides longwayes the part above the two Eyes; the second, which may be term'd *Coronal*, divides the Skull a-cross behind the two Eyeholes; the third, separates it also cross-ways near the beginning of the Back-bone. In the Surface of the upper part of the Skull may be observ'd the figure of an Heart well represented, seated in the middle thereof which hath its *basis* near the Suture Coronal, and carries its sharp end towards the hind-part of the Skull, which is sever'd by the third Suture.

There is also another great Suture, round about the nethermost lateral parts of the Skull, by which it may be divided into two bodies, an upper and lower. This latter is made in the form of a turn'd back, going longwayes, hollow in the middle, and representing the shape of a Culter, which hath a kind of little wing on its sides, and whose point advances beneath the middle of the Eyes. Its latter part descends as far as the bottome of the Palate where it hath in its lower part a point descending

descending in the form of an overturn'd hillock.

All the Sutures of the Skull are so well united in their conjunction, and so strongly connected, that 'tis very hard to distinguish them, and yet more to separate the parts of them without breaking them, unless the Skull be boyled in some liquor.

Sect. 3.

Of the Brain.

The substance of a Vipers *Brain* is divided into five main Bodies, of which the two first are oblong, each of the size and shape of a grain of Succory-seed. They are seated long-wayes between the two Eyes; and 'tis from these Bodies, that the Olfactory Nerves do proceed. The three other are in the middle part of the Skull, and under that figure of the Heart, of which we have been speaking. Each of these Bodies is near as big as a grain of the seed of *Milium Solis*, and represents almost the shape of a Pear, the point of which is turned towards the fore-part of the Head. Two of these Bodies are seated in the up-

per part long-wayes, and one on the side of the other; the third, which is a little less, is placed under the middle of the two, and may be call'd the *Cerebellum*, or little Brain.

The *Spinal Marrow* seems to be the same body with this last, although it have a separate place in the hind-part of the Skull. It is of a substance somewhat whiter and softer than the Bodies, we have been just now speaking of, and of the size of a small grain of Wheat. It produces a Body of the same substance, which extends it self long-wayes, and passing in a strait line thorough all the *Vertebra*'s or Joints of the Back-bone, terminates at the end of the Tayle.

The Bodies of a Vipers Brain are cover'd with a coat, thick enough, and sticking fast enough to them, which may be called the *Dura Mater:* It is black, whence it hath hapned, that some Authors, not taking the pains to look under this Tunicle, have affirm'd, that Vipers Brains were black. Under this *Dura Mater*, each Body of the Brain, separately, hath also a little membrane involving it, which may be termed the *Pia Mater*. There are observed some small interstices betwixt these Bodies, and

even

even in the Body of the Spinal Marrow, which might pass for *Ventricles*: And I doubt not, but that, if the Subject were a little bigger, we might observe in it most of the considerable parts, that are to be found in bigger Animals.

Sect. 4.

Of the Eyes, and their principal parts; as also of those, that serve for Hearing.

The *Eyes* of Vipers are very quick, and their aspect is exceedingly fixt and bold. They have their Nerves, Muscles, Veins, Arteries, Apple, Chrystallin, Uvea, Cornea, Eye-lids, and the other parts, like enough to those of the Eyes of other Animals.

The most considerable Nerves are the *optick*, which parting from behind both the Eyes, do meet together and conjoin laterally at the beginning of the Little Brain, and there make as it were the figure of an X, and opening themselves after this conjunction, they encompass that little Body by the sides thereof, and render themselves at

the beginning of the Spinal Marrow, which receives them.

The smallness of all the other parts being such, as that it maketh their examination difficult, and we having not been able to find any thing particular in them, I esteem, that as it would be very troublesome to make Researches thereof, so it would be to no purpose, to make a description of them.

The two upper Bodies of the Brain send each from their lateral fore-part a small Nerve, which piercing the Skull, runs along the Temples, where it joins it self to the *Salival Glands* (whereof we shall speak hereafter) and following them, it passeth under the Eye, where it divideth it self into two branches, of which the chief inserts it self into the Bone and the Conduit of the Nostrils, to serve for the Sense of Hearing, and the lesser descending towards the Teeth, called the Dog-teeth, it ends there, after it hath divided it self into several branches.

SECT.

Sect. 5.

Of the Bones of the Head, that are jointed to the Skull.

ON each upper side of the middle of that Heart, which is seen above in the Skull, there is a little flat Bone, a matter of a line and an half long, that is firmly articulated to it, which following and adhering to the same side of the Skull as far as to its hind-part, becomes to be articulated anew to another flat Bone, longer and stronger, and forming there as 'twere an Elbow. This latter Bone goeth downwards, and is strongly jointed to the inward end of the lower Jaw; in the middle of which articulation, the upper Jaw terminates, and is there jointed, but not so firmly, because it hath other articulations, which the lower hath not. These Bones, which are like *Clavicles*, serve both for a support to the Jaws, and to open and shut them; and for this purpose they are assisted by the Nerves and Muscles, which Nature hath provided them with.

There is alſo at each advancing end of the Eye-hole a little flat Bone, being about a line and an half long, which is ſtrongly articulated with the root of the Dog-tooth, and by its other end is alſo firmly jointed to the middle of the upper Jaw, as well to ſupport it, as to make it advance together with the great Tooth, when it is raiſed to bite.

The upper Jaw is divided in two, before, and is ſeparated, by the griſtly Bone, from the Noſe, where its two ends are articulated on each ſide. Theſe two Jaws are much more inward than thoſe below, and the great Teeth are ſeated without their rank, and at their ſide, tending outward, and do ſerve them for a defence. They are made up, each of one only Bone, that is about ſix lines long.

The lower Jaw is alſo divided in two. Theſe Jaws are annexed, before, one to the other, by a Muſcle, which opens or ſhuts them at the pleaſure of the Animal; and they have no other articulation but that, we have ſpoken of about their inward end, *viz.* with the Clavicle coming down from the Skull, and with the inward end of the upper Jaws. Each of theſe

Jaws

Jaws is compoſed of two Bones, articulated together towards the middle of the Jaw; that which is before, embraces above and below that which is behind, and can bend it ſelf outward in this place, when the Viper will bite, and is a little curved inwards toward its extremity; and 'tis upon this Bone alone, that the lower Teeth are faſtned.

SECT. 6.

Of the Teeth.

THE Opinions of the Antients have been very differing about the number of the great Teeth of Vipers, and moſt have held, that in this the Female exceeded the Male, and that the plurality of the great Teeth was the chief mark, whereby to diſtinguiſh her from him. I have been careful to inform my ſelf about it, and have taken pains to grovel with a great deal a patience in the gums of innumerable Vipers; but all being well examined, I have not found, as to this point, any true difference of one Sex from the other, but ſometimes more, ſometimes leſs Teeth in one and the other.

other. I have casually met on each side with two great Teeth fixed, placed very near together, and on the side of one another, as well in Males, as Females; but in most of both Sexes I have found only one, fixed on each side, cover'd, to two thirds of their height, with a Tunicle or Bag sufficiently thick, fill'd with a yellowish juyce, which is transparent and pretty fluid; and in this Vesicle, in the midst of this juyce, and under the great and main Teeth, a differing number of Teeth ill set, some longer than others, and all hooked, of which I have counted, in several Vipers, from two to five, six and seven, on one and the same side, under the self-same Tooth, and in the same Bag.

These great Teeth are only in the upper part, standing on the side, and without the Jaws of the Animal, where they are like Bulwarks. They are about two lines long, hooked, white, hollow, and diaphanous throughout, as far as to their sharp point, which is very subtle and exceedingly piercing. They have many little Cavities towards their Root, in which the other Teeth are planted. These Teeth commonly remain lying along the Jaw, and their

their point appears not but at the moment the Viper will bite; for then it raiseth them, and advanceth them jointly with the upper Jaw, drawn by the Bone, which at one end is articulated in the middle of it, and at the other, to the root of the great Tooth.

The yellow liquor, contained in the Vesicle, serveth not only to moisten the ligaments, and to make them fit for the bending of the Teeth, but also to nourish them, and to make those grow, that are there as 'twere in a Nursery, and are, if we may say so, in expectation to serve instead of the many Teeth, whether these come to fail in their force, or fall out of themselves.

All the Jaws, both upper and lower, are fortify'd with bent Teeth, that are hollow, pellucid and sharp, as the bigger Teeth, but that they are much smaller. Their number is uncertain enough, whether it be, that Nature produces sometimes more, sometimes less of them, or that that fineness maketh them apt to break. There is little difference, as to the number, in those above from those below. Ordinarily there are eight Teeth in each Jaw, but at times I have found nine, ten, eleven in each. Those

that

that advance most, are a little bigger than the deepest; and just as those below answer in situation to the Dog-teeth, that are above them, they have at the end of each side one Tooth, that is a little bigger than all those of the other Jaws, and another, lesser, at the side, at the end of the part bent inwards.

There is a great difference in the Teeth and Jaws of Vipers, from those of Snakes: for, *these* have no Dog-teeth; and although their Jaws are all divided in their foremost part like as in Vipers, yet they exceed them in the number of Jaws, and in the number of Teeth; for, they have four Jaws above, and two below; two of those above are situated all along and close to the rim of the Lip, and serve for a defence to the two other Jaws, that are seated in the same place, where those in Vipers are. Besides, I have counted 13 Teeth in each exterior Jaw above, and as many in each of the Jaws below, and 20 in each superior inward Jaw; so that I have counted of them to 92 Teeth in one Snake, and all these Teeth are bent, fine, hollow, white and transparent, like those in Vipers.

SECT.

Sect. 7.

Of the Nerves, Veins, Arteries and Muscles of the Head in general.

The chief Nerves in the Head of a Viper are, first, those of which we have spoken, namely those of the Smell, the Sight and the Hearing. Besides, there are *those* of the Taste, that which may be call'd the sixth *par vagum*, which is afterwards distributed into all the vital and natural parts; and *those*, which issuing from the Spinal Marrow are carried through the whole habit of the Body. There are also many Nerves, that go from the inferiour part of the Brain, and pass through the Skull, but by reason of their subtility and fineness, 'tis hard to follow them to their insertion.

There is yet another Nerve that is considerable, which proceeds from the Skull, behind that of Hearing, which leaves, in the space between, a small *Apophysis*, or Process, or Knot, in the Skull, and which, descending along the Clavicle, runs upon the superiour Jaw, and is inserted in its middle; then

then it goes on in the middle to its extremity, and distributeth it self into all the Teeth, fix'd there.

The Head hath also its Veins and Arteries, which coming from the Liver and the Heart, distribute themselves there into an infinity of branches, by which all those parts are bedew'd. It is also provided of many Muscles, at the sides and below the Skull, and about the Clavicles, and superiour and inferiour Jaws, that serve not only to fill up the Cavities of the Skull, and to cover the Bones that are articulated there, but to give motion to all the parts that need it: to which also the Nerves contribute their share.

Sect. 8.

Of the Salival Glands of a Viper.

THe Opinion of the Antients, That the seat of the Vipers poyson was the *Gall*, and that from thence it ascended into the Gums, by vessels odly enough fancied, hath seem'd to me too far from all probability to follow it. I therefore thought, that that particular did very well deserve

deserve a strict enquiry, and that it was of moment to discover the Truth thereof. On the other side, the curious Observations, made on this Subject by Signor *Redi*, a Florentine Philosopher, whose merit is known and esteem'd by all the Learn'd, seemed to me, as to all those that have seen and examin'd them, not only reasonable and possible, but I was altogether perswaded of the candor and ability of that illustrious person. Upon his Accompt and Relation, I never scrupled to taste often of the gall of Vipers, as well as of the yellowish liquor, contained in the bags of the Gums; and I have found in both the Truth of what he hath observed thereof, namely a great bitterness, and a great sharpness in the Gall; and the taste of a *Saliva* or Spittle sufficiently flat, and approaching enough to the taste of the Oyle of sweet Almonds, in the yellow Liquor of the Gums.

These great differences of the qualities in the one from the other, made me believe that there was a great diversity in the matter of them, as well as in their source; and I believed at first, following Signor *Redi*, that there might be *Salival* Vessels in Vipers,

pers, as there have been lately found in Man, and divers other Animals; so that after many researches, made with attention and patience enough, in many Vipers Heads, I discover'd at length such *Glands*, proper to form this juyce, and to convey it to the Gums; and after I was well perswaded of it my self, I shew'd them to divers of those knowing Physitians, that had met at my House the last Year. These persons had a mind to see with their own Eyes, and after they had well examin'd the parts which I shew'd them, they not only found them true, but they there also saw a greater number of smaller vessels, than had appear'd to me, of which some, that are Arteries and Veins, pass above the *Glands*, and others, that are *Lympheducts*, run below: so that they judged, that I could confidently assert and describe these *Glands*, which I call *Salival*, and which they had acknowledged together with me; though Signor *Redi* durst not speak *positively* of them, because he had not discover'd them, neither had they been described by any Author of their knowledge, nor by any one of mine.

These

These *Glands* are found in all the Heads of Vipers, both Males and Females; they are seated on both sides, and joining to the Skull, in the hind-part of each round of the Eyes, and at the same height with them. There are many small ones join'd together, which may be call'd *Conglomerate Glands*, which are easily distinguishable by their form and colour, which is different from the Muscles, neighbouring to them, and of which there is one, that may be call'd *Temporal*, which in part covers them by its extremity. This heap of *Glands* appears there of the bigness of the neighbouring Eye, and extending it self in length, continues its progress in the Orbite of the Eye, below, and in part behind the Eye. Each *Gland* hath its little Lymphatique Vessel, which parts from it as from a little Teat, and goes disgorging it self into a greater Vessel, that runs all along and under these *Glands*, and passeth into the Vesicle of the Gum, and terminates in the midst of the Articulation, which the root of the great Teeth maketh with the advancing corner of the said Orbite, and with the little Bone, which by its other end is articulated in the middle of the upper Jaw. This

principal veſſel, which, being conſidered alone, is very little in appearance, but is not ſo in effect, ſeing it receives the diſcharge of all the ſmall veſſels, that come from each *Gland*, empties it ſelf into the Bag of the Gums, and carries thither that *Salival* Juyce, which may have qualities approaching to thoſe of the *Saliva* or Spittle of man, or of the foam or drivel of divers other Animals.

The Nerve, which ſerves in the Noſtrils for the faculty of *Hearing*, runs for ſome ſpace along theſe Glands, which are alſo, as I have already ſaid, ſmal Veins and Arteries.

But having well conſidered the ſubſtance, quality, and ſituation of theſe *Glands*, we judged their formation not to be in vain; but that their Uſe, in all likelyhood, was to receive the humiditie both of the Brain, the Eyes, and the neighbouring parts; and that their diſcharge was very convenient and even very neceſſary to the parts, which receive that liquor, as well for moiſtening the ligament of the great Teeth, and to keep them in a condition of bending, at ſuch time when the Viper will bite, and to increaſe the

Teeth

Teeth, which Nature hath made and set in the midst of this Juyce.

For the rest, examining and tasting the *Glands* as well as the Juyce, we found a Taste altogether like that of the Gums, which Signor *Redi* hath described, namely very near the taste of the Oyle of Almonds, without any bitterness, though it leave, a while after, a little acrimony in the mouth, such as may be discerned in all kind of Spitle.

As to the small *Glands*, which Signor *Redi* hath observed at the bottom of the Vesicles that contain this Juyce, I can say, that I have with great care and diligence searched them, and that, 'tis true, I have there found the appearances of Glands, but having opened them, I saw nothing in them but small teeth which were fastned there, and are of the number of those, which I have called *Expectants*, without finding any thing of a Glandular nature there, nor that did, in the least, approach to the shape, substance or qualities of the *Glands*, which I have been describing.

The Viper is not the onely among Serpents, that hath *Salival Glands*; for I have

alſo found of them in the Head of Snakes, which Glands were heaped together longwayes, and ſcituated near each outward upper Jaw, ſerving them for a defence, in a manner, as the Dog-teeth do to Vipers.

These conſiderations, ſupported by many Experiments, made by us, and to be related hereafter, have induced me to call theſe Glands *Salival*, and to aſcribe to them the very ſource of that yellow Liquor, which hath been ſo much decryed and with-all ſo little known, and is nothing elſe, but a pure and very innocent Spittle. I hope, that thoſe, who ſhall take the pains of carefully examining, after me theſe *Glands*, and this juyce of the Gums will not ſtick to give me their ſuffrages.

CHAP

CHAP. IV.

Of the other Bones of a VIPER, *and the principal Parts, thence depending.*

THe great number of Bones, which reſt in the Body of a Viper after thoſe of the Head, conſiſts only in the *Vertebra*'s or Joints of the Back-bone, and the *Ribs*. Theſe Joints begin at the hind-part of the Skull, to which the firſt is articulated; the other are ranged conſecutively, ſtrongly joined to one another, and they continue to the end of the Tayle. Every Viper, both Male and Female, hath an hundred and forty five *Vertebra*'s, from the end of the Head to the beginning of the Tayle, and Two hundred and fourſcore and ten Ribs, which is the double number of the *Vertebra*'s; to each of which there are articulated two Ribs, one to each ſide, which are bent, and do

embrace the vital and natural parts of a Viper, and each point whereof rendevouſes at one of the ends of the great Scale under the belly, which is fit for both; ſo that there are as many great Scales under the belly, from the end of the Head unto the beginning of the Tayle, as there are *Vertebra*'s, conſorted by their two Ribs: Beſides that, there are twenty five *Vertebra*'s from the beginning of the Tayle to the end thereof; and thoſe *Vertebra*'s have not any Ribs, but, inſtead thereof, little *Apophyſes*, or Proceſſes, which leſſen in their magnitude, as the *Vertebra*'s do, tending towards the extremity of the Tayle.

There are four great Muſcles, very firm and very long, which take their origine from the hind-part of the Head, and deſcend, two of them on each ſide of the Spinal Proceſſes, one joining to the Spine, and the other to the ſide and a little below the firſt, which it accompanies all along unto the end of the Tayle. There are alſo two great Muſcles of the like length, which are faſtn'd to the inferiour part of the *Vertebra*'s, and accompany them from one end to the other, as well as the ſuperiour ones. We alſo obſerve, on each ſide, as many intercoſtal

tereoſtal Muſcles, as there any *Vertebra's*, ſerving for the ſame uſe, that thoſe of other Animals do, which ſever the Ribbs from the place of their root unto their point. All theſe Muſcles are alſo accompanied with veins and arteries, as well as the greateſt.

CHAPT.

CHAP. V.

Of the other Internal parts of a Viper.

SECT. I.

Of the Tongue.

THE *Tongue*, which the Viper darts out and draws in often and very quick, presents her self first of all. She is placed between the two Jaws below, and composed of two Bodies, fleshy, long and roundish, and terminating in very sharp and flexible points. These two Bodies are contiguous, and adhere to one another all along, from the place of their root as far as to the two third parts of their length. The inward half of these Bodies is of the colour of flesh, but the other half, I mean that which is often thrust out, is of colour blackish.

The Tongue may be, in all, an inch and an half long. Its root begins half an inch lower

lower than the bottom of the Throat; and 'tis firmly annex'd, below the Neck, to two tendinous bodies, which are two or three lines long.

There are some Vipers, whose Tongues have three points, and some also, that have four. These points, though often darted out, prick not, nor hurt any body; though perhaps they may frighten the ignorant. They chiefly serve Vipers to catch these small creatures, which they have a mind to devour. The Tongue is envelop'd by a kind of sheath from one end to the other.

Sect. 2.

Of the Wind-pipe and the Lungs.

The *Wind-pipe* hath its beginning at the entrance of the Throat, where it presents a hole in an Oval, raised on high, and having as 'twere a little beak in its lower part. It is composed, at its entrance, of many gristly rings, joyned to one another; which continue about the length of a good inch, and fall into the right side of the Viper, where they meet with the Lungs; and from that place you see no more but the half

half rings turn'd upside down, which being joyned on both sides to the membrans, that depend from the Lungs, and which are annexed to it below from one end to the other, being assisted by the said Lungs, serve for Respiration, and continue their rank and their connexion, as far as to the fourth part of the Liver, which lies under it; as well as the Heart. The Winde-pipe is in all eight or nine inches long; and at the place, where its half rings end, it is united with a membrane, which attracts and receives the Air, as far as to the beginning of the intestins, where it forms, as it were, a roundish bottom of a sack.

The *Lungs*, being joyn'd to the Wind-pipe, and making with it one Body, are consequently situate, as it, on the right side. They begin, where the whole rings of the Winde-pipe do end. They are made in the form of a Net; they have no Lobes at all; they are red, very clear and very vivid, of a substance fine enough, sufficiently transparent and a litle rough. They are fastned by Membrans to the upper part of the imperfect rings; being seven or eight inches long, and about one inch broad; and all over embroidered with veins and arteries.

SECT.

Sect. 3.

Of the Heart, and the Liver.

THe *Heart* and the *Liver* are also seated on the right side of the Viper; and before the Heart there is, about the third part of an inch, a little fleshy and flattish body, of the bigness of a little pea, which is filled with water; this little body is placed under the Lungs as well as the Heart and the Liver, and is suspended by the same membrans, which support it: it may be taken for a kind of *Thymus* or kernel, and may serve for the same uses.

The *Heart* is seated about four or five inches below the beginning of the Lungs; of the bigness of a small beane: it is somewhat long, fleshy, and encompassed with its *pericardium*, which consists of a sufficiently thick tunicle. It hath two Ventricles, one on the right, the other on the left side: it also hath two apertures. The Blood, which comes from the *vena cava*, enters into the right ventricle, and being passed into the left, issues thence by the *Aorta*, which presently is divided into two great branches,

branches, one of which ascends into the upper parts, and the other, passing below the *Oesophagus* or Wesand, and taking its way sloping, subdivideth it self afterwards into many other branches, which spread themselves and are carried to all the parts, to the very end of the Tayle.

The *Liver* is a fleshy part, of colour red-brown, seated half an inch beneath the Heart, and supported by the same membrans: its length and breadth are unequal enough, but the greatest Livers, I have seen, are five or six inches long, and half an inch large. It consists of two great lobes of which the right descends a good inch lower then the left. These two lobes are bedew'd by the *vena cava*, which seems to separate them all along into two bodies, and which makes even a separation in their lower half, running in their interstice, and serving to joyn them together in one body: The upper half of the Liver is continued, and cannot be divided but by cutting it asunder.

The Trunk of the *vena cava* is divided into two branches in its upper part, of which the main and biggest endeth in the Heart, and the other passeth under the Lungs,

Lungs, and from thence into the ſuperiour parts. This Vein in its inferiour part is divided into many branches, which deſcend into all the parts below.

A Viper is deſtitute of a *Diaphragme*, there being no ſolid traverſing tunicle at all, that ſevers the vital parts from the natural: yet it may be ſaid that that fine tunicle, which depends from the Wind-pipe and the Lungs, and goes down towards the Inteſtins, and there forms, as 'twere, the ſhape of a ſack-bottom, may in ſome manner peform the function thereof.

SECT.

Sect. 4.

Of the Gall, and the Pancreas, which the Antients called the Spleen.

The *Bladder of Gall* is situate an inch below the Liver, and on the side of the bottom of the Stomack, and it leans to the left side. It is almost of the shape and bigness of a small Bean lying flat.

The *Gall* is very green; its taste very bitter and sharp; its consistence approaching to that of a Syrup not much boyled.

I have found in the Bladder of Gall but one out-let by a small vessel, which issuing from the inward side of its upper part, is bent from its origine, and descending, and adhering, even in its beginning, to the internal part of this Bladder, is afterwards divided into two branches, of which the principal and directest, passing through that Body (which the Antients have taken for the *Spleen*) runs into the Intestin, which receives it; and the other lesser branch, turning about, seems to remount to the Liver, but dividing itself into many small branches, becomes so indiscernable, that it cannot be followed any longer. It

It is not here, that I will refute the opinion of the Antients concerning the Venomous quality they have ascribed to the Gall; I leave that for another place, where I shall endeavour to maintain the Balsamique quality of this Juyce, and shew, that 'tis free from all kind of poyson.

The *Pancreas* or Sweet-bread, which all Authors have called the *Spleen*, is placed near and a very little below the Gall, and on the right side of the Viper. It is of the bigness of a good Pea, of a seemingly fleshy substance, but indeed Glandular. Considering its situation, (which is close to the bottom of the Stomach and towards the entry of the Guts) together with its kernelly substance, it maketh me believe, that 'tis rather a *Pancreas* than a *Spleen*: but yet I leave the decision of it to those, who shall take the pains to examine it.

SECT.

Sect. 5.

Of the Oesophagus or Weasand, and the Stomach.

The *Oesophagus* takes its beginning at the bottom of the Throat; its situation is on the left side, and its passage directly on the side of the Lungs and the Liver, as far as to its union with the orifice of the Stomach. It is made up of one onely membrane, very soft, and easy to be extended, and which may be swell'd even to the bigness of two inches. It is this part, which first receives the animals, the Viper hath killed with its great teeth, and swallowed whole, it being proper for that purpose, both by its large capacity, and by its length, which is of a good foot.

The *Stomack*, which is next, is as 'twere sowed at its bottom, and seems to make but one Body with the *Oesophagus*; but yet is much thicker, and composed of two strong coats, one within the other, and sticking to one another. The thickness of its coats makes, that it cannot be swell'd to the same bigness with the *Oesophagus*;

for

or it cannot much exceed the bigneſs of n inch. It is between three and four inches long; its orifice is ſufficiently large, s well as its middle, but the bottom of t grows ſtreighter, and is commonly very loſe and firm, not opening it ſelf, but to ject its excrements into the Gutts. Its nternal tunicle is full of rugoſities when is empty, and in it there are very often ound little worms of the length and thickeſs of ſmall pins. The Stomach is ſeated n the left ſide, as the *Oeſophagus*; but he bottom of it is turned towards the iddle of the Body, to empty itſelf into he firſt Gut.

The length and capacity of the *Oeſophagus*, and the largeneſs of the entry of the tomach, are very well accommodated to he nature of the Viper, which ſends nohing chew'd to the Stomach, but ſwallows nimals whole for its food; and when ſome f them happen to be longer than the epth of the Stomach, part of them ſtayes n the *Oeſophagus*, untill the Stomach have xtracted and ſent away the juyce of the arts devoured, which it could hold; after hich it receives thoſe that ſtay'd in the *eſophagus*. But this requires a good ſpace

of time, in regard that the Stomach is not closed, and cannot gather any considerable heat to make a speedy digestion.

Sect. 6.

Of the Inteſtins, kidneys, Fat, and a Tunique wrapping them up below.

THE *Inteſtins* of Vipers are ſituate in the midſt of the Body, under the Back-bone, and immediately after the bottom of the Stomach. I have onely obſerved three of them, of which the firſt and narroweſt may be called the *Duodenum*; the ſecond, which is larger, and full of many windings, may be called the *Colon*; and the third and laſt, the *Rectum* which alſo is very large and very ſtreight and hath its aperture below and near the beginning of the tayle, at which the Excrements paſs away.

Theſe Inteſtins have, at their ſides, *Teſticles*, together with their veſſels, both o

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the Males and Females, and the two bodies of the *Matrix* of the latter, which we shall speak of hereafter. They contain also the *kidnys* with their vessels, which part from thence, and are accompanied of their veins and arteries, as also all vessels serving for generation; and the Intestins themselves are not destitute of them.

The *kidneys* are placed below the Testicles; they are made up of many glanduous bodies, contiguous, and ranged longwayes, one after another. They are commonly two inches and an half long, and two inches and an half large upon the round, which is a little flat. They are of a pale-red colour. The right kidney is alwayes seated higher than the lower in both sexes. They have also their *Ureters*, at which they discharge the serosities near the extremity of the Intestin.

All the Intestins, the Testicles, and the kidneys are covered with a very white and very soft *Fat*, which being melted hath the form of Oyle. At times also there is seen in some Vipers a little Fat about the heart, the Lungs, the Liver, but especially close to the Gall, and near that part, which some take for the *Spleen*, and others

for the *Pancreas*. All these parts are wrapped about with a strong Coat, that is firmly fastned to the extremities of the Ribbs, which might pass for the *Epiploon*, if the Fat were joyned to it: but as the Viper, which is a kind of Serpent, passeth not but among the imperfect animals, I shall not determine the name of this Tunique, to which the more Intelligent may give what name they shall think most proper.

CHAP

CHAPT. VI.

Of the parts of Vipers, that serve for Generation.

SECT. I.

Of the Parts of the Male.

THE Male hath two Testicles, which are somewhat long and roundish, and sharpen a little toward both ends. Their colour is white, and their substance glandular. Their length is unequal, the right being longer by an inch, than the left, and this also somewhat less in thickness. They are not thicker than the quill of the wing of a great Capon. Their situation is different; for, the right begins near and beneath the Gall, whereas the left begins about eight lines lower than the right. They are both suspended in their upper part by two strong membrans, coming from below the

Gall, and are ordinarily covered with fat, which maketh them hardly discernable, by reason of the likeness of colour they have with this fat.

From the midst of each of these Testicles, from the inward part, one may see issue forth a little Body, long and slender, solid enough, and even somewhat whiter than the substance of the Testicles, which descends, and is fastned to them all along as far as to their lower end. It may be called the *Epididymis*. There appears at the end of each, the beginning of a small straddling vessel, that may be called *spermatique* because of its office; which is a little flat, very white, and shining enough, and commonly filled with seed, having the form of a milky juyce. This vessel is sufficiently delicate, and winds in its passage, after the shape of many Ss joyned together, very pleasant to behold. From thence it descends between the Intestin and the kidney, whose *Ureter* it follows unto the hole of the last Gut, at which the Excrements pass away. It is also accompanied of veins and arteries from one end to the other, as well as the Testicles, and it ceaseth to be winding a little before it comes to the aperture

ture of the Gut. Each of these two spermatique vessels comes to rendevouse at its proper receptacle of seed; of which there are two, that may be called *Parastates*, which are like white kernels, each of the length, bigness and shape of a grain of *Carduus benedictus* seed. These kernels are seated longways below and between the two natural parts: they are always full of a milky juyce, and altogether like that of the spermatique vessels, just now described: and to furnish for ejaculation at the time of the *Coitus*, they transmit the seed, which they contain, into the ejaculatory pipes of the two natural parts, neighboring to them.

I may say on this occasion, that those who have taken these two Conservatories of seed for other Testicles, have much deceived themselves in the opinion, they have entertained, that, there being two natural parts, there must also be for each of them two testicles: But their substance being quite different from the true testicles, by us described, and their office being to receive, and not to form, we do not acknowledge them but for *Parastates*, which by little and little receive the seed, sent thither by the Testicles, and reserve

serve

ſerve it, and keep it ready for the time of copulation, and to perform that in a moment, and ſeaſonably, what the ſpermatique Veſſels would not be able to execute ſo ſoon, nor ſo well, becauſe of their length and windings.

The Male hath two *Penes's* altogether alike, which being pulled out are each as long as the Tayl of the animal. Their origine cometh from the extremity of the Tayle, under which they are ſeated all along, the one by the other. They go increaſing in bigneſs, as the Tayle does; at the beginning of which they end, and they have their iſſue near and at the ſide of one another, and cloſe to the opening of the Inteſtin, which maketh in a manner their ſeparation.

Each of theſe is compoſed of two long and fiſtulous bodies, ſeated together one by the other, and which joyn towards their top in one body, which is environed with its prepuce, and hath its Muſcles *Erectors*, as many other Animals have. Theſe parts are within full of many ſtings or pricks, very white and hard, and very ſharp, ſo ſet as that they have their ſharp end variouſly turned; of which the bigneſs and thick-

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neſs anſwers to the place of the natural part, where they are ſet, ſo that as the top is bigger and thicker, the ſaid ſtings are ſo too; and they advance and appear not but when the prepuce, which covers them, ſhrinks down at the time of the animals diſpoſition to the coit.

Theſe natural parts are ordinarily hidden, and they ſwell not, nor come forth, but for the coit; unleſs it be, that, the animal being taken, they be forced out by preſſing them; for in that caſe one may ſee them both come forth equally, each about the thickneſs of a *date*, and of the length of two thirds thereof, and their top is altogether covered and quite beſet with theſe pricks, like the skin of a Porcupin; and theſe ſtings retire and hide themſelves under the prepuce, when one ceaſeth to preſs them.

The iſſue of theſe two parts is environ'd with a very ſtrong and thick Muſcle, to which the skin is firmly faſtned, and in ſuch a manner that it is very difficult to ſeparate it therefrom: which ſame Muſcle ſerveth alſo to open and ſhut the Inteſtin.

SECT.

Sect. 2.

Of the parts of the Female Viper, that serve for Generation.

THe Femal Viper hath two Testicles, as the Male; but they are longer and bigger. They are seated on the sides and near the bottom of the two Bodies of the *Matrix*, and the right is higher than the left, as 'tis in Males. Their Substance and colour also are very like them. The right is about one inch and an half long, and two lines and an half large; the left is something less. They have their *Epididymis*, and their Spermatique vessels, that convey the seed into the two Bodies of the *Matrix*, and which are much shorter than those of the Males. Yet I observe, that these Testicles appear not always such in all Females, especially in those that are emaciated, either by sickness, or by long keeping; for, their Testicles shorten, streighten, and dry, like as in those, whose Eggs are already great; having observ'd, that in these the Testicles are much shortned and dryed up, as also that they are descended lower, al-

although the right be alwayes found higher than the left.

The *Matrix* begins in a body pretty thick, which is compos'd of two strong tunicles, and which being seated above the inteſtin, hath in the ſame place its o ifice, which is large, and doth eaſily dilate, to receive at one and the ſame time, by the ſame aperture, the two *Penes*'s of the Male, in the Copulation. This Body is about the bigneſs of a nail of a middle-ſized finger, and is divided very near its beginning into two ſmall baggs open at the bottom, and fram'd by Nature to receive and embrace the two members of the Male in the coit. Their interiour coat is full of rugoſities, and very hard, as is that of the whole body, which we have ſpoken of; ſo that ſhe ſuffers, and alſo feels pleaſure from, the pricking of the little ſtings of the Male's members, without being hurt thereby, although their points be very ſharp.

The *Matrix* begins by theſe two little ſacks or baggs to be divided into two bodies, which aſcend each on its ſide along the kidneys, and betwixt them and the inteſtins, as farr as to the bottom of the

Sto-

Stomach, where they are ſuſpended by ligaments, which come from about the Liver, being alſo ſuſtained, from ſpace to ſpace, by divers ſmall ligaments, that come from the Back-bone. Theſe two bodies are compoſed of two tunicles, that are ſoft, thin, and tranſparent, being one within th' other, Their beginning is at the bottom of thoſe two ſmall bags, which embrace the two members of the male, from whence they receive the ſeed each from its ſide, to breed Eggs of it, and ſo young Vipers, by the conjunction of their own ſeed, which the teſticles ſend thither.

Theſe two Bodies of the *Matrix* do very eaſily dilate themſelves, that they may contain many young Vipers, unto the time of their perfection: notwithſtanding the opinion of ſome, who have affirm'd, that the *Matrix* of a Viper had but one onely body; that it was ſeated in the midle, and all along the Back-bone, and that there were in it diſtinct Bodies to hold the Eggs, and the young Vipers, which bodies were dependants of this *Matrix*. But, I believe, that the ground of their miſtake hath been, in that thoſe true bodies of the *matrix*, being very delicat and very tranſparent, eſpecially

cially when they are swell'd and distended by the Eggs, or the Vipers, by them contained, have not passed in their opinion for true bodies of the *Matrix*, and that they have taken for it the inteſtins, which are seated in the middle, and appear pretty bigg and thick, and seem to make but one and the same body with the first thick body of the *matrix*, under which the beginning of the first inteſtin is fastned and seated.

The Viper is not the onely animal, that hath her *matrix* divided into two like Bodies, equally placed each on its side, and along the Guts, which separate them; for I have observ'd the same thing in many *Snakes*, which I have open'd purposely to know the truth hereof.

SECT.

Sect. 3.

Of the Generation and Production of young Vipers.

BY the particular description, we have made of the parts serving the Viper for generation, is is easy to renounce all the Fables we finde in Books, concerning the copulation of Vipers, and the production of the young Vipers: so that I shall not trouble the Reader any further with them, but onely intimate, That by the means of the insertion of both members of the Male into the two baggs of the *Matrix*; by the ejaculation of the Seed, made of them both together, into the two bodies of the said *Matrix*, which are united at the bottom of the baggs; and by the concurrence of the Femals own seed which her testicles emit at the time of the coit; the Eggs are first formed in both the bodies of the *Matrix*: that each is covered by its little tunicle; that the Eggs of each body of the *Matrix* are altogether wrapped up in one common membrane, commonly

monly called the *Ovarium*; that all is inclosed in its proper body, the *Matrix*; that the Eggs there take their increase; that the young Vipers are there formed and perfected; that thence they come forth one after another by the same passage, where the seed of the Male went in; and that they are produc'd alive, as many other animals, without any need of the intervention of the dam's death.

We can assure the truth of all these particulars, having verified them by an accurate examination of all the parts, at several times, and upon a great number of subjects; and having seen the extension and swelling of those two bodies of the *Matrix*, even at the time when the young Vipers were perfected and ready to come forth; and lastly having seen the passage free, by which they were to come abroad, and the young ones actually produced without any danger to the Dam.

We have noted, that the right body of the *Matrix* of the Viper is ordinarily fuller of Eggs and young brood, than the left; that the number of Eggs is pretty uncqual; that at times there are twenty or twenty five, sometimes but half so many; that the young

young Vipers take their form and perfection in the Egg; that there they are seated and entangled divers wayes, and after a very pleasant manner; that they have each within their Egg a kind of after-birth depending from their Navil, by which they draw their food; that in coming abroad they train it after them, and in part are encompassed with it; and that their Dam frees them thereof, and cleanseth them by licking them when they are born.

But although we have, as exactly as we could, described all the inward and outward parts of a Viper, both of a Male and Female; yet to the end that all may be the better understood, we shall address the Reader to the following Schemes, wherin he may see the same parts, we have just now described, represented and drawn to the life, together with their explication in the *Tables* accompanying them; hoping, that he will there find satisfaction.

The

he Reader is desired to take notise, that, having on the Frontispice of this Book represented two Vipers, *a Male and a Female, conjoyned* tempore coitûs, *and there being in the exteriour part of their Body no considerable difference in the one from the other, but in their Tayle, of which the representation may be seen separately in the* second *Figure; I thought it needless, to exhibit the whole Figure of a* Male *by it self; and have contented my self to have engraven the* Female *in the state she is at the time when she produceth her young ones, which is that, which seem'd to me the most considerable for her exteriour Figure.*

He will also find no fault with the Situation, *in which the* Viper *is represented in the Cutt, at the time when her young ones come forth, since that besides the Symmetry, which hath been there industriously observ'd, it was also intended to shew therein the parts, that seem'd very necessary to me, and that could not be represented elsewhere.*

The EXPLICATION of what represented in the first Scheme.

AAA. The Female Viper, bringin forth her young Vipers, exhibiting th lowermost part of her Body; where yo may see the great Scales, on which sh creepeth.

BBBB. Four young Vipers, each in or of the corners of the Cut, appearing wre thed, and in the same posture and situatio wherein we have seen them alive and reac to come forth; two of which appear wit out cover, one cover'd with its Coat, a the other having a piece of its After-bir depending from its Navel.

CCCC. Four other young Vipers, wit in the round, which the Viper formet one of which appears creeping, and cle of its Secundine; the other having it y depending from its Navel; the thi coming forth, and training along with the Secundine; and the last wrap'd abo by it, and in the state, wherein it was, wh ready to be born.

D D. A part of a Female Viper, repre-
:nted open under the belly long-wayes,
nd turned upside down, from the place of
he Gall, unto the Orifice of the *Ma-*
rix.

E. The Gall.

F. The Pancreas or Sweet-bread, which
any have taken for the Spleen.

G. The bottom of the Stomach.

H. The beginning of the Inteſtins.

I. I. I. The Eggs contain'd in the two
odies of the Matrix, but being found in
far greater plenty in the right, than the
ft body.

K. A part of the laſt Gut.

L. The Orifice of the Matrix, and of
ie Gut.

M M. The two little Baggs, which join
the beginning of the two bodies of the
latrix.

N N. A part of each of the Kid-
ys.

The EXPLICATION of what is repreſented in the ſecond Scheme.

AA. The firſt half of the body of a Male Viper, flead, turn'd upſide down, and open under the belly from one end to the other, containing

BB. The Wind-pipe.

CC. The Lungs.

D. The Thymus or Kernel.

E. The Heart.

F. The Liver.

G. The great Vein, call'd *Vena cava*

HH. The *Oeſophagus* or Weaſand.

I. The aſcending branch of the *Aorta*

L. The deſcending branch of the ſam Artery.

M. The Stomach.

NN. The other half of the Body, i the ſame condition with the firſt, contain ing

O. The bottom of the Stomach.

P. The bladder of Gall.

Q. The Pancreas, or, according to ſom the Spleen.

RRR. The Inteſtins.

S.

S S. The Testicles, together with their *Epididymis.*

T T. The Spermatick Vessels.

V V. The Kidneys.

a a. The Tayle of a Male, to which are annext the parts that follow.

b b. The two members of Generation, as they come forth at the time of the Coit.

c c. The two *Parastates*, or Conservatories of the Seed.

d d. The two Spermatique Vessels.

e e. The two Testicles.

f f. The two Epididymes.

g g g. The Guts.

h h. The two Kidneys.

i i. The Tayle of a Female, to which are join'd the parts following.

l l. The Orifice of the *Matrix.*

m m. The two small Baggs.

n n n n. The two bodies of the *Matrix.*

o o. The two Testicles with their Epididymes, and Spermatique Vessels.

p p. The Intestins.

q q. The two Kidneys.

r r. A great part of the body of a Lizard, of the same length and bigness, it

was vomited up by a Viper, many dayes after this had been taken.

s s. The rest of the Head, and the rest of the Fore-legs of the same Lizard, cast up at the same time.

t t. The *Oesophagus*, that had contained the said great part of the Lizard.

u u. The Stomach, that had contain'd and by little and little extracted the juyci substance of the rest of this Animal' body.

The EXPLICATION of what is exhibited in the third Scheme.

A. A whole Sceleton of a Viper.

B. The Head having its Throat close represented with a part of its Neck.

C. The Head having its Throat in pa open, flead on its side, and there preser ing the *Salival Glands*, together wi their *Lymphatick* vessels, above the gre Teeth.

D. The Head without Neck, represer ed with the Throat open.

E. Another Head without Neck, m open, and distinctly shewing all its inter parts that can be there represented, a

whi

which may be easily understood in reading the places, where I speak of them.

F. The whole Skull of a Viper.

G. The inferiour part of this separated Skull.

H. The conglomerate *Salival Glands*, represented with their *Lymphatick* vessels, a little bigger than the natural, to make them the better to be understood, and as well as their smallness permits.

I. The same *Salival Glands*; the two Eyes with their Optick Nerves; the five bodies of the Brain, and that of the Spinal Marrow, adhering together, sever'd from the Crane, and represented by the face above.

L. The same bodies joined together, represented by the face below.

M. Divers great Teeth, some by themselves, some in their bag, others accompanied by the Teeth *Expectants*, which are set beneath them in the same bag.

N. The upper Jaw articulated to a small bone, which by its other end is articulated to the root of the great Tooth.

O. The lower Jaw, consisting of two bones, and articulated to the lower bone of the Clavicle bent like an Elbow, which de-

pends from the posteriour lateral part of th
Skull.

P. The Lungs with the Wind-pip
without the body.

Q. The Heart in its *Pericardium* or in
closing Membrane.

R. The Liver separated in two Lobe
by the *Vena Cava.*

S. The bladder of Gall, with the vesse
that carrieth its juyce into the Intestins.

T. The *Pancreas* or Sweet-bread, whic
some take for the Spleen.

V. The Intestins.

EXPERIMENTS

EXPERIMENTS ABOUT VIPERS.

CHAPT. I.

The Biting of a Viper, hapned to a Man.

IN the Month of *June* of the year 1668, I procured a great number of live Vipers, Males and Females, to put the design in execution, I had purposed to my self; Which was, to know in truth all the good and all the evil, a Viper was capable of. I was happy enough in exciting the Curiosity of many intelligent Persons, and amongst others, of some Phy-

Phyſitians of my acquaintance, very knowing and ſagacious, who were pleaſed to take the pains of coming to my houſe every day, to aſſiſt in theſe experiments, and to impart to me their directions.

The firſt Meeting of all proved a ſad one by a ſurpriſing mis-fortune. A certain Forrainer, drawn to ſee our Experiments by his own curioſity, felt in his own perſon, contrary to his expectation, a great part of the grievous accidents, which may be cauſed by Vipers, and furniſht us, ſore againſt our wills, with an Experiment, which was followed with circumſtances too conſiderable to be ſuppreſſed; and I thought my ſelf obliged to recite them firſt of all, becauſe it was not onely the firſt, but the onely, that hath furniſht us with more remarkable things, than all the reſt.

This Gentleman, of 25 years of age, had been by chance the day before at my houſe, when five or ſix douzen of Vipers were brought thither. He would needs ſee them immediately, and I, being deſirous to ſatisfie his Curioſity, drew out of the Veſſel one of the Vipers. He was not contented to ſee her, but took her in his hand.

hand, and kept her there for about a great quarter of an hour, suffering her to turn and winde herself about his hand and arm, the Viper not so much as offering to bite him: Then he tyed her about her neck, and so having hanged her, pulled off her skin, and emptied her of her Guts to examine them. I am assured, that he would have been soundly bitten at that time, if the Viper had been vexed; but not having been so, and being pleased to breath another air than that of the Vessel, where she had been long shut in, she let herself be tyed, after which she could not do that mischief, which certainly she would have done, if she had not been tyed.

But this proved quite otherwise the next day; for this stranger being come again to my house at the hour of the Assembly, he saw one of the Vipers upon the Table, which had been held a long while between Pincers, and was much angred. He would take her with his naked hand, though he was earnestly warn'd to forbear, it being represented to him. that he had been too bold already the day before. He had no sooner taken her in his hand, but she turn'd her head to bite him, and with one of her

great

great bent teeth, she laid hold on the lateral inward part of his right thumbe, a little above the situation of the nail. The pricking appear'd no more than that of a pin; and it seem'd to us not deep, and on the surface we only saw a very small hole with a very little redness; so that it was not discernable but by its colour. There was not *upon*, nor *about* this litle hole, any sign of that yellow liquor contain'd in the baggs about the great teeth, and which is wont to be shed upon the wound, when a Viper biteth deep; yet the pricking caused some pain to him at the very first, but the finger swell'd not of it, no intumescence appearing but some hours after, as we shall relate more amply in the sequel.

It was found proper to scarify the part wounded, and to make strong ligatures above the place bitten, both to stop the effects of the Venom, and to discharge the wounded part of the same; but the Patient opposed these means, not believing them necessary; and he could very hardly be perswaded to endure any scarification; after which, he endured also an iron spatule very hot and heated over and over again, held very near to the prick't

place;

place; which was done, to keep the pores open, and to fetch back and draw out some part of the poyson: Mean while, we made the Patient take two drachms of Theriaque in half a glass of Wine.

In less then half a quarter of an hour after the pricking, the patient felt some debility, and call'd for a chair; he wax'd at the same time very pale, and his pulse was found very low, very quick, and even interrupted. These accidents were followed by convulsive motions, and by a stiffness of his whole body, and chiefly of his neck, and the muscles of his head: he then also complain'd of a very great pain towards his Navil; and there appear'd a coldness in his extreme parts, and in the whole face, which was covered with little drops of cold sweat: his lips also were swell'd, especially the lower. And finding himself urged by the pains about his Navil, and a disposition to go to stool, he rose, and having voided some excrements, he vanish't away, and at the same time vomited not only all the Theriaque he had taken, but all he had eaten at dinner, which was yet un-digested. We made haste to succour him, and found him so fee-

ble,

ble, that he was not able to goe up again to the chamber, whence he was come down. And in regard his pulse continued weak, low, quick, and unequal; and his swoundings frequent, as well as his cold sweats, it was thought seasonable to give him a drachm of Viper-powder in *Theriacal* and *Carduus Benedictus* water, and to apply to him a great Plaister of Theriaque upon the Heart and Stomach, but he soon rejected what he had taken. One also came to give him some of the *Orvietan*, mixt with new powder of Vipers, but he vomited up that also, and desired to be put upon a bed, and to have other help administred to him. During all which time, he neither wanted his senses, nor the use of reason, notwithstanding all the feebleness of his Body; and he had had great aversion to the *Orvietan*, having no faith at all in it, and not consenting to take it, but out of respect to some of those that were present, who had pressed it upon him.

This vomiting not giving time to the remedies to convey and communicate their vertue to the noble parts, it was judged very proper to have recourse to the Volatile-

tile Salt of Vipers, becauſe that being very volatile and exceeding fit to be quickly conveyed to all the parts, even the moſt remote, the Patient might thence feel the effects with more ſpeed and efficacy, than from all the other groſſer remedies, which having been rejected as ſoon as they were taken, had not had time to be made effectual by the ſtomach, nor to impart their vertue where need required.

We therefore cauſed to be diſſolv'd a drachm of this volatile Salt of Vipers in Theriacal and *Carduus* water, and gave him about a quart of this mixture; he kept it a little while, and then caſt up a part of it, mingled with ſtore of phlegme very viſcous. We made him take another like quantity of the ſame mixture, which he alſo kept for ſome time, and then vomited up, what might have remain'd of it in his Stomach, and amongſt it much phlegm. We continued to give him ſtill more of the ſame compoſition as faſt as he vomited it up; and there were alſo given him ſeveral Clyſters, to appeaſe the violent and ſtubborn pains, which he felt about his Navil.

His lips remained ſtill ſwolne, his pulſe naught,

naught; and his ſweat cold, as well as his faintings continued very long; but having perſiſted in the uſe of the Volatil Salt of Vipers, his vomiting ceaſed, and he kept the eighth *doſe* in his belly, which was given him about four hours after he received the miſchief: the ſymptoms leſſen'd from that time, the cold began little by little to retire, and gave place to the natural heat, which appeared ſufficiently about five hours after the pricking; his pulſe returned, and was even and ſtrong, but ſomewhat high.

It was about ten of the clock at night, that the moſt troubleſome accidents diſappear'd, the Patient was happy in his unhappineſs, in being ſpeedily and rationally ſuccour'd. I left him not, before his mortal accidents had ceaſed; and then he was carried to his lodgings, whether I accompanied him, and he was put to bed; and by the advice of thoſe perſons, that frequently viſited him during his diſtemper, I made a mixture of one drachm of Confection of *Hyacinthe*, and of as much of the Confection of *Alkermes*, and of one ounce of Syrup of Limons, and of four ounces of *Carduus*-water, which was giv'n him

im at three times, from three hours to ree hours. There were given him Cions to ſmell to, and from time to time me ſlices of them ſugred. He took good oths, and drank ptiſan made with *Scorzonera*-roots, and the ſhavings of Hartsorn, mingled with Syrup of Limons, he ſo drank ſometimes a little wine, and here was diſſolved of the Confection of *Alkermes*, ſometimes in his broth, ſometimes in his ptiſane.

This is a thing remarkable enough, that uring all the great accidents, his finger as not changed, and there appeared not y ſwelling upon it, but that began, hen thoſe accidents ceaſed. In the mean me, the pains about the navil continued, hough they were in ſome little degree aated; which obliged the Phyſitians often o preſcribe him Clyſters. His belly was little ſtiff, but not ſwelled; his tongue as whitiſh, but not dry; his eyes faint and an; his countenance pale, and his lips ill ſwelled.

The ſwelling of the finger extended it lf that night over the whole hand; which as often anointed with the Oyl of Scorions, compoſed by *Matthiolus*, and mixt

with the *Queen* of *Hungarie's* water, b
notwithstanding this anointing, the tum
past'd onto the arm the next day, with p
and redness, and advanced to the Eye.
was thought fit to apply fomentatio
made with the roots of *Angelica, Im*
ratoria, Carlina, and *Aristolochia,* and w
the tops of *Scordium, Centaurium, Wor*
wood, St. Johns wort, Calamint, boyled
White wine, and withal to continue t
anointing with the said Oyle of Scorpic
among these fomentations. Although t
was done with great care, yet there appe
ed no great effect upon it; the Patient w
squeamish, and once vomited up even
broth; but this vomiting continued n
He alwayes used the same internal and e
ternal remedies, and the same food; b
although he found his other limbs in
good condition, and his pulse very equ
and moderate, nor had any drought, he
or pain in the rest of his body, yet was th
of the Navil obstinate; and the swelli
and the redness of the hand and arm s
increased; and from the beginning of t
third day, it had seised on the shoulder
the same side, and descended to the ar
pit, upon the whole breast, and all the neig
bouri

ouring parts, and even the whole region f the Liver, notwithstanding the continual se of the fomentations, and the Oyle of corpions.

All these considerations, joyned to the ot season, wherein we were, made us aprehend, lest the gangrene should strike to nose parts. It was believed, that, since ne outward remedies which had been judged most expedient, had proved successs, recourse must be had to internal ones; hich induced the Physitians to give him, the evening of the third day, a drachm the root of *Contra-yerva* in powder, dissolv'd in cordial waters, with as much conction of *Alkermes:* but we saw no abatement of the redness, swelling, or pain; on ne contrary, we observ'd, that the swelling em'd to seize on the left side.

After we had well examin'd all things, we und it very necessary to return to the use our first inward remedy, which had uck the great stroke, and had had a maest good operation; I mean, the *Volatil Salt of Vipers*. This was in the morning the fourth day after the biting. So we ve him half a drachm of that Salt, dissold in four ounces of *Carduus* water, and

we order'd that he ſhould be well covered to make him ſweat. This medicine di work according to our expectation and de ſire; for the Patient not onely did ſweat a bundantly, but found a very conſiderab amendment in all the ill Symptoms th had remain'd. His pain about the nav was almoſt not ſenſible; the tumor of h Lips, and that, which was in the regio of the Liver, Breaſt, and under the Arm pits, vaniſh't; and that of the ſhoulder, Ar and Hand was much abated, as well as th redneſs and pain.

We thence judg'd, that we ſhould certai ly cure the reſt; and to compaſs it, we ga the next morning to our Patient a like do of that Volatil Salt of Vipers, which ma him ſweat again very largely; the pain the Navil ceaſed altogether; the ſwe ling of the ſhoulder was wholly gone; a that of the whole arm and hand was y much more abated, as well as the redn and pain. And not to leave the cure i perfect, though the patient found himſ exceedingly amended, we gave him t next day another ſuch doſe again, and t day following one more, whereby t whole ſwelling, all the redneſs, and all t

pa

tin of the arm, hand, and the finger it-
lf, were dissipated; Mean while there
as applyed to the finger a little plaister
o cicatrize the incisions, that had been
ade there, and which were healed three
four dayes after. Which did not hin-
er the Patient to goe abroad, and to doe
is business, as well as if he had never been
tten by the Viper.

Those that shall read this History, and
xamine all the circumstances of it, the se-
eral and surprising accidents of the bi-
ng of the Viper, which we saw, and the
fectual operation of the remedies, em-
oyed to remove them, will therein find
mple matter to exercise their reasoning
pon, and will soon judge, that we had
use, accurately to inquire, as we have
one, into all the parts of a Viper, *to*
now them well, and what they can doe;
make a great number of Experiments
pon all its parts, and *to* apply ourselves
o the preparation of the excellent reme-
ies, that may be drawn from the body of
his Animal.

The Extraordinary effect of its Volatil
alt, in stopping and in overcoming, first
f all the Venome, which so violently ex-

ercised its tyranny over the natural heat and all the noble parts, and which doubtless would have altogether triumphed over them: the activity, penetration, and force of the same Salt, going to find out the poyson, and expelling it from the remotest parts of the body, where it had fortified itself, and whence it endeavoured to regain the place it had lost, and where, in the mean time, it seem'd to despise the ordinary most powerful remedies. All this, I say, is sufficient to make it to be wondred at; and men will, doubtless averr, that the ill, which Vipers are able to cause, and which every one may easily avoide, is nothing in comparison of such a remedy, as the same Vipers can furnish and which may serve, not onely to heal their bitings, but also to overcome many other obstinate diseases, against which the ordinary remedies perform nothing; not to speak of many other good preparations made of Vipers, which we intend to describe hereafter.

EXPE

EXPERIMENTS
Of the Biting of Vipers, upon other Animals.

CHAPT. II.

Experiments upon Dogs.

THE effects, that are surprising, are wont sensibly to touch the Minds of Men; and they are they, which excite the Curious to inquire into the Cause of them; and although *this* do always precede *those*, yet it would not be known, and we should not so much as be aware that it was, if the effects thereof did not first appear. Being therefore to treat of the Biting of Vipers, we hope, it will not be thought amiss, if we begin with the recitation of the Experiments, by the Examples of its effects. And not

to be tedious to the Reader; having re viewed all that hath been experimented a my houſe, both the laſt and this year, ſhall confine my ſelf to what I think de ſerves moſt to be communicated, what ſer veth moſt to our purpoſe, and what ma give moſt ſatisfaction to the Curious.

One of the moſt conſiderable Exper ments was made on a *Dog*, which was bit ten by an angred Viper at the upper lipp The dog was not much moved at it at firſt but little by little grew ſad, and his ja began to ſwell: a little while after he vo mited up the laſt food he had taken, an dunged. Then ſome bread, fleſh, an water being offred him, he would touc none of it, he remain'd in a proſtrate po ſture without complaining, the place o the pricking waxed livid, and this livid neſs extended it ſelf to the neck, and a far as the breaſt, as did alſo the ſwelling At length he dyed, but not till fourt hours were paſt after the biting. His bel ly appear'd not ſwoln, and without w obſerv'd nothing extraordinary but th tumour and lividneſs in the part prick'd and thereabout. The Dog being opene after his death, we found in the tronc o th

the *vena cava* a little bloud curdled, and we noted, that the reſt of the bloud, in this place, in the heart, and every where elſe, was of a dark colour, and of a very ill conſiſtence, as if it were blood in part diſſolv'd and corrupted. The Stomach appear'd of a darkiſh colour, but the Meſentery and the Gutts were darker. We found no alteration in the Heart, Liver, Lungs, nor the Spleen; all theſe parts being of a very fine colour, and in their natural condition.

The Biting of a Dog at the Ear.

THis Dog howled from the time he felt the biting, and continued his howling for half an hour; then he ceaſed to howl and to complain. The place prick't wax'd livid, and ſwell'd, as alſo did the Neighbouring parts. This dog vomited not, but voided ſome excrements, which ſeemed natural. He would neither eat nor drink, no more then the firſt, and he ſoon dyed, having liv'd no longer then twenty four hours after he had

had been bitten. We saw outwardly nothing un-common, but the lividness and swelling at the neigbouring part, and thereabout. But having opened him, we found all the inward parts in the same condition with those of the former dog. 'Tis true, we did not finde in this dog any coagulated blood, neither in the heart, nor the *vena cava*, nor else where, but it was of an obscure colour, and of an odd consistence, and in a visible disposition to coagulate.

Another biting of a Dog.

WE had a Dog bitten by an irritated Viper at the tip of his Nose, the dog howled, when he felt himself bitten, but was soon appeased, falling to lick the place prick't, and to scratch it with his paws. He lay not down, but continued for some time in that exercise, and went up and down in the chamber. The place bitten became somewhat black and blew, but swell'd not; and a little while after the dog drank and eat, as if he had never been

been bitten: The lividneſs diſappeared little by little, and the Dog was as well as ever.

The Biting of a little dog.

A Yong Puppy, but 7. or 8. dayes old, was bitten in the leg by an enraged Viper; the dog began to howl as ſoon as he was bitten, and ſo continued till he dyed, which he did one hour after. The part pricked was ſwelled and livid, as in the former, and the animal being open'd, we found nothing extraordinary in his body, ſave onely ſome lividneſs in the Stomach and Gutts, and ſome blackiſhneſs and ill conſiſtence in the bloud, as in the others; for all the other inward parts appear'd to us very ſound.

Another biting of a Dog.

WE cauſed alſo another Dog to be bitten under the Belly by another an-

angred Viper. He howled presently, but that lasted not long. The place bitten swelled much, and was very livid, and the tumor and lividness reached over all the natural parts. This Dog drank often, but would eat nothing, and was alwayes in this condition without growing worse. Two dayes after, to be more certain of the thing, we caused him to be bitten again, and that twice, near the same place, where he had been bitten at first. He again howled much, and the swelling increas'd, and extended it self over the whole belly, as well as the black and blew colour; but it went no further; for the dog often licked his wounds, and drank store of water, and at last fell to eat, so that without any other remedy, but his tongue, all the swelling and blew colour vanish't in five or six daies. And the dog was in the same condition, he had been in before he was wounded.

Another Dog bitten in the Tongue.

THis Dog gave us some trouble; for he defended himself a great while, be-

before he would let out his Tongue; but yet at last he received therein a deep bite by an enraged Viper. At first he howled extremely, so as to be heard afar off, and so continued, tossing and tormenting himself for half an hour together, and then dyed. We opened him also, and although the Heart, Liver, Lungs, and Spleen were in a very good condition, his tongue was exceedingly livid; his mesentery cover'd all over with black spots, some of which were blacker then lentils, under which there was coagulated blood; the Stomach and Guts were also blacker than those of all the others. The bloud very black, and beginning to coagulate in the heart, and in the *vena cava*, being also of the consistence of bloud curdled and corrupted.

This last Experiment gave us great satisfaction, informing us fully of the effects of the venomous biting of a Viper, and shewing us, that the poyson goes not directly to the noble parts, seeing we never observ'd any alteration therein, but that 'tis chiefly the bloud it works upon, since it corrupts the substance thereof, coagulateth it, or separateth its parts, disturbs

its

its circulation; and at the ſame time hinders the communication of the Spirits through the whole body, depriving the noble parts of them, as well as of the pure bloud, which was sent to bedew them, and deſtroying them indirectly, by cauſing this privation of Spirits and of the good liquor, whence depends their ſubſiſtence.

We alſo found thereby that the progreſs of the venom of a Vipers biting principally depends from the place bitten, and from the bigneſs of the veins or arteries, which the teeth hath lighted on. For, the tongue of the Dog being full of veins and arteries, 'tis no wonder, if the Venom, meeting with them, and finding in them a large way, very ſhort and very free to triumph over the bitten animal, did ſoon produce its effects, and cauſed death much more ſpeedily, than that, which met only with ſmall, ſlender and winding branches, by which its way was ſtraighter, more about, and longer; though it failed not to do execution at laſt; which it would have done ſooner, if the paſſage had been freer.

We may judge by the effects of the venom

nom of the Vipers biting in those dogs; and especially in the last, that the vomiting, and the extreme pains about the Navil, which befell the Gentleman, above discoursed of, proceeded partly from the bloud which was coagulated or disposed to coagulation in its course, and which could not freely circulate; and partly from this, that the spirits, which accompany the bloud in the circulation, finding obstacles in their passage, endeavoured to make way for themselves, and to that end, doing violence to the lateral parts in their way, caused in those places the extreme pains, which the Patient felt there; which might also be augmented by the bloud, that probably was coagulated out of the great vessels, and might be dispersed in the form of spots in the Mesentery, or elsewhere, just as in the body of the Dog.

We may conclude also, that the cold sweats, the convulsions and the faintings, wherewith the Patient was molested, came from nothing else, but the defect of the ordinary commerce of the spirits with the noble parts, and from the goodness and purity of the bloud destinated to bedew them.

Con-

Concerning the ſucceſs of the remedies employed to cure the ſaid Gentleman, we ſhall declare our thoughts thereof in the ſequele of our Experiments, after we ſhall have given proofs ſufficient to ſupport them.

As to the Dogs, that were cured by licking the wound, I think that that was a good means to recall and draw back the venom; and I am much of their opinion, who believe, that if the perſon bitten, or ſome friend for him, ſhould for a good while and ſtrongly ſuck the wound, it would be cur'd, provided that the teeth of the Viper have not lighted upon ſome great veſſel, whereby the progreſs of the venom may prevail over the force of ſucking. I am alſo perſuaded, that theſe ſucked and recall'd Spirits are incapable to annoy him who ſucks them, partly becauſe they have been weakn'd by the action they have been upon, partly becauſe they are then deſtitute of the inſtruments proper to convey and ſecond their action, to wit, the teeth of the Viper.

CHAP.

CHAPT. III.

XPERIMENTS

)f the Biting of Vipers, made upon Pigeons and Pullets.

THE Experiments made upon *these* Animals have likewise been very useful to us, to know the effects the Biting of Vipers, which have been ry like in both.

We caused a *Pigeon* and a *Pullet* to be ten by a vexed Viper, almost at the same ne, in the most fleshy part, namely in at under the breast. We soon after ob- ved in both a very thick and extraordi- ry beating of the heart, which went on ll increasing, and in such a manner, that th Pigeon and Pullet were dead in less en half an hour. We soon opened them, d found in both of them a little bloud agulated in the heart and the *vena ca-*, and all the rest of the bloud blackish, sposed to curdle, and as 'twere turn'd and

corrupt; but the Heart, and Liver, and a
the inward and outward parts of a ver
good colour, and in a very good condit
on, save that a little lividness appear'd upo
the place bitten.

We have frequently observ'd the sam
thing in many Pullets and Pigeons: But
will not be amiss, here to relate the diffe
rent success in two Pigeons, we caused t
be bitten equally and in the same place b
an angred Viper. One of them we mac
to swallow the weight of about half
crown of Theriack, a moment before it w
bitten, giving nothing to the other. Th
former being bitten, went to and fro in th
room, so as not to shew any sign of illnes
but the latter was dead in less than a qua
ter of an hour We afterwards caused th
former to be bitten again in the leg; an
then it grew sick by little and little, an
dyed half an hour after. We found th
place of the first pricking much more l
vid, then that of the Pigeon, which dye
in a quarter of an hour; and even mo
then the place of the leg, which was bi
ten afterward. We judged, that the v
xed spirits unable to penetrate into the bo
dy, defended by the Theriaque, ha
wroug

vrought upon the outward part, and ound about the place bitten, where they ad coagulated the bloud, and cauſed the ividneſs; whereas the like ſpirits, having net with no reſiſtance in the other Pigeon, ad gained and wrought upon the inner arts, having left and as 'twere deſpiſed he place, at which they were entred. We lſo wondred not, that the Theriaque, hich had vigorouſly repulſed the Spirits ntroduc'd by the firſt bite, could not reſiſt he latter but for half an hour, and that at aſt it was forced to yield, inregard that the umber of the enemies was great, and be- g weakn'd by the conflict, it had but now ndured, had not force enough to bear up gainſt the new aſſault of the latter.

We did alſo prick ſeveral times, and retty deep, dogs, pigeons and pullets, ith the long teeth of Vipers, ſome pull'd t of the throat of dead ones, others out ſuch as were alive. There was alſo one the company, who handling a dead vi- ers head, had a mind to prick his finger, d actually did ſo, with one of the great eth, ſo that the bloud iſſued. I alſo my lf thruſt into my hand one of them, d ſo deep, that a piece of it remain'd more

than half an hour in my flesh; but in all th
we found not the least appearance of ve
nom, nor any ill, but such, as might be cau
sed by the pricking of a Pin, or some suc
thing.

We also deplum'd a Pigeon at the mo
fleshy place, and holding with both ou
hands the jawes of a Viper open, and ma
king her raise her great teeth, we presse
both the jawes at once against that flesh
part, and caused the teeth deeply to ent
into it, and order'd the matter so, that th
yellow liquor of the Gums had time enoug
to pass into the wounds, which the tee
had made. We at the same time saw, th
the bloud issued out of the wounds, a
mingled it self with the yellow juyc
which remained there. We had then re
dy a little stone, come from *Portugal*, whi
those of that Country call the *Snak*
Stone, being pretty black, shining, roundis
and flat, about the bigness of a French pie
of five *Sols*, but three times thicke
which we presently applyed to the pla
bitten, which was cover'd with bloud, a
with the yellow liquor mingled the
with. The stone immediately was fastn
to the wound, and we perceived nothi

ext

traordinary in the Pigeon. We might ve believed, that this safety of the Pige- n was due to the vertue of this Stone, hich they would assure us was infallible gainst the bitings of Vipers and all kinds Serpents, if we had not some dayes be- re tryed the like Stone upon a Pigeon, tten in the same place by an angry Viper, d if that wound had not been follow'd y the death of that Pigeon, a quarter of hour after. We thought, this very ell deserved another experiment; and aving still the same Stone by us, which em'd to have saved the former pigeon, nd such another, which the Lord Ambas- dour of *Spain* had trusted his Physitian ith, we by one and the same enraged Vi- er caused to be bitten two Pigeons of e- ual bigness and fleshiness, each in the me place, well freed from its feathers. he bloud was seen upon both wounds; ut there appear'd but little of the yellow quor. We soon applyed both the Stones, ne to each Pigeon; they presently stuck ast to the places pricked; but we saw im- ediately in both a very high and thick eating of the heart, which was follow'd y the death of both Pigeons, which hap-

ned at one and the same time, in less than a quarter of an hour.

We had also a mind to know, whether the Venom, that had so much force upon the bloud, were also able to make some ill impression upon the noble or solid parts of the bitten animals, which parts appear'd to us very fair and very well conditioned. We gave also a Pigeon, dead of a Vipers biting, to be eaten by a Cat that was very lean, which fed very greedily upon it; and the same did afterwards eat many more, and Pullets also; upon which she grew very fat, so far was she from finding any inconvenience thereby.

Moreover we had a desire to learn, whether one and the same Viper was able to kill by its biting divers animals wounded one presently after another; and whether the Venom was exhaustible, so that the animals, bitten last, might be free from its mischievousness. To know the truth hereof, we caused to be bitten five Pigeons one after another, by the same Viper which we angred every time she was to bite: All these Pigeons soon dyed; and we particularly observed, that the last bitten dyed first of all. And as to the Bloud

and

nd all the inward and outward parts, they ere in a manner alike with those of the igeon, that was bitten first.

The various Experiments, we have been elating, do insensibly oblige us to deliver ur thoughts concerning the Venom of Vi-ers, and its operation. We think this to e a proper place to declare ourselves here, nd afterwards to employ the rest of our ain experiments for the defence of what e shall have advanced upon this Sub-ct.

CHAP. IV.

f the Venom of a Vipers Biting, and its Operation.

THE Antiens, prevented by the opinion, that there were very few parts in a Viper, that were exnpt of poyson, have but very slightly exnin'd them. And as they esteemed that ne Choller of the Viper did much con-

tribute to the Venom, believing, that the
ſeat thereof was in the Gall, they there
alſo ſetled that of the poyſon, and imagi-
ned, that the taſte of the Gall, very ſharp
and very bitter, was an argument of it
malignity, and that the veins and arte
ries, which paſs near the Gall, and may
be followed as far as into the jawes, and
appear the ſame through the whole body
above and below the Gall, were the pipes
which Nature had purpoſely form'd to
carry the juyce of the Gall into the Gums
and that it was that liquor, which cauſe
all the mortal Symptoms, and death i
ſelf.

But they have not conſidered, *that* th
Choler of the Viper reſideth not in th
Gall; *that* the Galls of innumerable oth
Animals have a taſte very approaching t
that of a Viper, and yet are not venc
mous; *that* the veins and arteries, whic
paſs near the Gall, and ſeem to pa
thence and extend unto the Gumms, an
all the parts of the Body, are veſſels def
gned, onely to convey the blood, whic
have not their origin in the Gall, an
which cannot carry a juyce, which the
could not receive: *that* there is not an

taſt

aſte of Gall in all thoſe imagined Veſſels, o more than there is in the liquor of the Gums, nor in all the reſt of the Body above he Gall: and *that* in the whole Bladder f Gall there is but one veſſel, that is any hing conſiderable, though it be very ſlen-der, which iſſuing, as we have ſaid, from he internal ſide of the upper part of the Gall, deſcends (ſo far is it from aſcend-ng) and diſcharges it ſelf into the firſt nteſtine, according to the deſcription we ave made of it, and conformably to the Figure, that may be ſeen in the *Cut*.

But not to ſtay upon principles ſo lightly eſtabliſh't, and ill maintain'd, for-aſmuch as we have on our ſide a great num-ber of Experiments, upon which we are grounded; We ſay, That the *Gall* of a Viper is not at all Venomous, but *that* on the contrary it contains a Vertue, that is Balſamick and cleanſing, and very proper for many good uſes; *that* there is no Veſ-ſel, which carries its juyce to the Veſicles, that are about the great teeth; *that* the yellow liquor, therein contain'd, is in all things very different from that of the Gall, excepting that they are both equally free from Venom; *that* that yellow liquor is ga-ther'd,

ther'd, and form'd by the *Salival Glands*, above deſcribed; *that* it is carried into thoſe Veſicles or Baggs by the *Lymphatick* veſſels which part from thoſe Glands; *that* this juyce is nothing but a puré and plain *Saliva*, of which we have already obſerv'd the uſe; and *that* this juyce contributes nothing to the venomouſneſs of the Biting; ſince, being taſted and ſwallowed (as we have often experimented) it does no hurt neither to man nor beaſt; and ſince alſo, being put upon open wounds, and upon inciſions made in the fleſh, the ſame being rubb'd therewith, and mingled with the bloud, it annoyes nothing at all: notwithſtanding the judgment of a perſon very intelligent, and particularly in this ſubject of Vipers, wo aſſures to have made a great number of Experiments; which being contrary to ours, the great opinion we have of the abilities and the ſincerity of that famous man, hath obliged us to employ the more care and exactneſs, and to confirm ourſelves, by a very great number of Experiments, which have alwayes been found alike, in the truth, we here aſſert, and of which we ſhall make evident and irrefragable proof.

We

We say further, that there is no other venom in all the other parts of the Body; and more, that there is none even in the great teeth, if the Viper be not alive, and the biting not accompanied with vexed and *enraged Spirits*. The hurt, which the teeth doth, when the Viper biteth, consists chiefly in that it opens a door to the enraged Spirits, without which irritation the Biting of the teeth is not mortal, and ought to be no further consider'd then for the deep and direct wound, which a tooth, sharp, so long, and so slender, of any other animal whatsoever, might make. In which circumstances, the great number of Experiments, by us made, hath rendred us knowing; in regard that we have observed a quite manifest difference in the Biting of a Viper angred, from that of a Viper, which was made to bite by holding its jaws, and by pressing its great teeth into the body of some animal: because this forc'd action serves rather to make the Viper retain its Spirits, then to let them out; for which the freedom of the animal is necessary, the spirits not being able to part, but the imagination and the Choler of the Viper

must

muſt immediately precede and thruſt them out. For this way of biting, by holding the jaws, and thruſting the teeth into ſome animal, although it emit more of the yellow liquor upon the part bitten, than the biting made by an angred Viper, left to itſelf, is not followed by any ſiniſter accident, and is healed like a ſimple wound, whereas the other is attended with death in caſe we want means of preventing it.

The effect therefore of the venom being altogether of a ſpirituous nature, and not working but according as the ſpirits are more or leſs iritated and puſh't on and according as they finde more or leſs free paſſage, we have reaſon to impute it to the exaſperated Spirits, having found no footſtep of it, neither real, nor apparent in all the viſible parts. But the better to maintain this our aſſertion, we ſhall here give you our thoughts concerning the action of the enraged Spirits.

Theſe Spirits then, puſh't on by the choler, which the Viper had conceived finding the apertures, made by the Teeth follow their inclination, and as it is their property, to advance and penetrate, they at the firſt ſeek out all wayes for it, and

hey advance more or leſs, according to the acility or difficulty, they meet with. Thence it is, that the Biting is much more angerous, when the teeth light upon he greater veſſels, than when they only ight upon Fleſh, or the little branches of he veins and Arteries. So that the vex-d Spirits of a Viper, meeting with the loud and Spirits contain'd in the veſ-els of the bitten animal, puſh and preſs hem to make way for themſelves, and em-baraſſing the particles that compoſe the loud, cauſe there a coagulation or confu-ion, which diſturbs the ordinary Circula-ion, and by this means hinders the com-nunication of the Spirits, to the principal parts, from which depends their ſubſiſtence and life. And by reaſon of this privation they muſt ſuccumbe, either for having been attack't in their fort by theſe vexed Spirits and infected by them, or rather be-cauſe theſe ſpirits of the Viper have made themſelves maſters of the *avenues*, and ob-ſtructed the paſſages, by which the blood and the ſpirits were communicated to them.

We conclude therefore, that the ima-gination of the Viper being irritated by the

the *idea* of revenge which ſhe had fram
to her ſelf, gives a certain motion to th
Spirits which cannot be expreſſed, an
puſhes them violently, through the nerv
and their fibres, towards the cavity of th
teeth, as into a funnel; and that fro
htence they are convey'd into the blood
the animal, by the opening, which the
have made, there to produce all tho
effects, of which we end eavour to give
reaſon. Others, more able than we, may pe
haps carry their reaſoning farther.

For the reſt, ſome have thought, tha
thoſe enraged Spirits have in them a ſecr
acidity, capable to coagulate the blou
and to hinder the Circulation, whence th
mortall accidents proceed. But ſince tha
this acidity may have been produced in th
maſs of the Blood by its own parts, whic
come to be diſſolved and ſevered, whe
they are tainted by the venom, and ſinc
corruption ſlides into it, as into milk
which ſowreth and corrupteth of it ſelf
without mixing any acid thing therewith
it is not neceſſary to ſearch for a coagu
lating Acid in the Spirits of the Viper
which cannot be perceived by the taſte t
know the truth of its exiſtence therein

an

nd that the leſs, becauſe *that* Acid may be naturally formed in the Bloud of the animal bitten, without looking for it in the Viper, as if it had come from thence.

How-ever this be, we muſt agree herein, that this irritation in the phanſy or in the ſpirits of the Viper is the main cauſe of the activity and piercingneſs of its venom, and that without it the biting would not produce ſuch ſurpriſing effects, as thoſe are, of which we have related ſo many Examples. Nor is a viper the onely animal, whoſe biting is mortal: Dogs, Wolves, and Men themſelves prove that; and not to go from our Subject, the biting of Serpents, of which the Viper is a *ſpecies*, is more or leſs malign, according to the nature of their ſpirits, and eſpecially according as they are angred and exaſperated.

It ſeems, that *Cleopatra* was well inſtructed in this matter, when ſhe, intending to kill herſelf, commanded to be brought her two *Aſpes* in a fruit-basket, and pricked them with a golden needle, which ſhe pulled out of her hair-dreſs, and made her ſelf be bitten immediately by one of thoſe Aſpes in the right arm, and by the other,

in

in her left breast; knowing (as a famous Author saith) that their natural fiercenes and cruelty was not sufficient to execute well what she desired, and that it was needful, this pricking should serve to provoke the spirits to bite to purpose, and to render the wound mortal; if at least it be with *their* biting, as it is with that of our Vipers, who also have this particular quality, that not onely they are soon angred, but that in the very moment of the irritation they bite with a strange swiftnes; which speaketh much the subtlety and impetuousnes of their spirits, whence depends their strength and activity. We observe also, that in distilling Vipers bodies, we thence draw very subtile and very penetrating parts, and in much greater quantity, in proportion, than from any other animal.

In the mean time, the obstacle, which these irritated spirits of the Viper give to the communication of the spirits of the animal bitten, nor the coagulation, or confusion, which they cause to the bloud, are not of that force, that specifique remedies should not master them, and restore the animal unto that Condition, where-

wherein it was before it was wounded. Which is that, we shall prove in the sequele by divers Experiments; where we hope to shew in what manner the remedies do overcome the powerful action of those enraged Spirits.

CHAP. V.

EXPERIMENTS

Of the yellow juyce, contain'd in the Vesicles of the great teeth, made upon divers Animals.

IN the design, we had, well to try all things, we pursued our Experiments, and to be well assured of the quality of that yellow liquor, which hath been believed so dangerous, we caused to be bitten, by six angred Vipers, se-

 parately

parately and ſeveral times by each of them, a ſlice of bread, and ſo much, that it had well exhauſted and retain'd all the yellow liquor, contained in the Gums of theſe ſix Vipers: At the ſame time we gave this ſlice of bread to a faſting Dog to eat, who was no more inconvenienced thereby, than if he had eaten a piece of dry bread, that had imbibed nothing of this juyce.

We have alſo often made divers Pullets and Pigeons to ſwallow pieces of bread dipped in the ſame liquor; and we can aſſure that none of theſe animals had any miſchief thereupon.

I my ſelf had the curioſity to taſte of this juyce, which I have divers times done in the preſence of many perſons without waſhing my mouth before or after. And ſeveral Phyſitians alſo have taſted of it themſelves, both to know the taſt and to be aſſur'd of the harmleſsneſs thereof; and 'tis certain, that they were no more incommoded thereby than my ſelf.

And becauſe it hath been believed, that this juyce, being thus taſted and ſwallowed by Men or other Animals, that had no

ound nor Ulcer in their mouths, nor in
heir ſtomachs, was indeed harmleſs; but
hat it was quite another thing, when it
id accompany a Biting, and entred into
he openings made by the teeth and that
he ſame being put upon an Ulcer, a wound,
r a ſimple excoriation made on the skin,
as mortal, and failed not to produce its
fect, three or four hours after it had been
ut upon the wound; and that as well upon
len, as all other ſorts of Animals, without
xception; we reſolved alſo to make ma-
y Experiments upon this account.

I can therefore ſay, in the firſt place,
hat I have taſted of it my ſelf, at ſuch
mes, when my mouth was excoria-
d, upon which I obſerved, that even
y ſpittle was a little ting'd with bloud,
ithout having perceived any acrimony,
extraordinary heat. We alſo made a
ryal upon a Pigeon, which we wounded
nder the wing, and in the leg in the ſame
oment of time; and we let into each
ound ſome of this yellow liquor, which
e juſt afore had drawn from the gums of
vo enraged Vipers; then we re-joyned
he skin, well to incloſe the ſaid liquor,
id we bound both wounds over with a

band, that nothing might run out. We can assure, that the Pigeon felt not any inconveniency from it, and that we even found upon the wound, made on the leg, a coagulated drop of the juyce, round, and of the same colour, as we had put it there, and the bloud of the place dryed, and that soon after, both wounds were dryed up, and heal'd of themselves.

We also made the like Experiment upon a Cat, which we purposely wounded in the leg, but he received no harm at all by it. We have also often experimented in upon Pullets, and other Pigeons, but always with the like success, and without any offence to the Animals.

The same tryal hath been thrice made at three several times, and even twice in one day, upon a dog, whom we had wounded on purpose towards the bottom of the Ear, where he could not lick his wound and no mischief at all followed upon it.

We cannot but adde here an Experiment of the mortal effect of the enraged Spirits, without any intervention of the yellow liquor. We made a Viper several times to bite upon a slice of bread, by pressing every time its jaws against the bread

an

ınd we did this ſo often, that not only that uyce was altogether exhauſted, but that :he bloud began to come out of the gums. At the ſame time we vexed the Viper, ınd made it bite a Pigeon in the moſt fleſhy ɔart; and we obſerv'd, that indeed the :ffects of the venom of the biting were ıot ſo quick, the Pigeon not dying but an ıour and an half after it had been bitten; ɔut then we found alſo, that the teeth of :he Viper were in a manner cover'd with the :rums of the bread, from the force of its ıaving bitten at it, and that that had hin-dred them from making a deep entrance, ınd that having half ſtop'd up the pores of :he tooth, a good part of the angred Spirits :ould not come forth; ſo that the death ɔf the Pigeon could not follow ſo faſt, :hough yet it hapned without any mixture ɔf the juyce which had been altogether emptied.

CHAPT. VI.

EXPERIMENTS

Of the Gall, Eggs, Inteſtins, Head, and Bloud of Vipers, made upon divers Animals.

WE have made ſeveral Dogs and Cats to ſwallow the Galls of Vipers, ſometimes whole, ſometimes burſt and diſſolv'd in ſome liquor, and ſometimes ſix, ſometimes ten, ſometimes a dozen at a time; but they never found themſeves ill after it, no more than the Pigeons and Pullets that had ſwallowed ſome of it, and which we had alſo wounded and afterwards rubbed with the Gall of Viper: for this Gall ſerved them for a Balſom, the wounds being the ſooner cured thereby; ſo that we can juſtly declare the gal

gall to be free from all venom, as well as the yellow liquor; and even inculcate here what we have already said, that the galls of Vipers have particular vertues in them.

We can say the same of the *Matrix* and Eggs of a Viper, and of all the Intestins, of which we often have made good quantities to be swallowed by Doggs and Cats, some of which have eaten thereof with greediness, when they could light upon't; and none ever hath felt any trouble after it. On the contrary, we have tryed, that having caused to be bitten, at the thickest place of the Ear, by a sufficiently vexed Viper, a young Cat, very lean, that had but just before eaten the Eggs, the *Matrix*, and all the guts of a Viper; the biting had almost no effect, and there appeared nothing but a very little swelling, and a very inconsiderable lividness in the place bitten.

We have further made many Dogs and Pigeons swallow the Heads of Vipers, newly cut off, and yet living, having only cut with Sizers the point of their great teeth, least in passing down they should bite the throat, or the inward parts of the animals, that were to devour them; but

we have not obſerv'd any thing after it that was extraordinary, in all thoſe creatures.

We had alſo a deſire to find, Whether a Viper, being eaten by an Animal, which it had bitten before, would be cur'd of the biting. We therefore cauſed to be ſlightly broyled the head of a Viper, which had on it a part of its neck, newly ſever'd from the body; and we made a Dog to be thrice bitten at the Ear by a well enraged Viper, in ſuch a manner that the blood came out at the three places pricked. We ſoon caſt before him the head and neck broyled, and yet hot. The dog, that was hungry, and felt not ſo ſoon the effect of the bitings, immediately ſeized on the head, bruiſed it between his teeth, and ſwallowed it down: after which we ſtayed a pretty while to ſee, whether the three bitings would prevail over the devoured head and neck; but the Dog was free, except ſome blewneſs and a little tumor, he had at the places bitten, but which little by little vaniſh't in three or four dayes.

We made alſo a dog to be bitten three times in the ſame place, and without broyling the head of the ſame Viper that had

it him, we caſt it to him, hoping that e would eat it, becauſe he had not eaten ny thing for many hours before; but the og would not touch it. Upon that we ruiſed and ſtamp'd that head in a mortar, nd ſo cramm'd it down the dogs throat; ubbing alſo the bitten places with the loud of the ſame Viper: which done, ve expected the ſucceſs; which was, that his head, raw and bruiſed, and if you will, ſſiſted by the blood of the Viper, being pplyed to the part bitten, had produced he ſame effects with the former, which had been ſo ſlightly broyl'd; in regard that his dog was free, excepting thoſe inconveiences the former ſuffer'd, and was, after hat as ſound, as if he had never been bitten.

If theſe two Experiments had been nade, before that Gentleman, above liſcours'd of, was bitten by the Viper, we hould have been in much leſs anxiety for his preſervation. But it was enough, that ve were able to ſecure him from the dangerous effects of the biting, by wayes grounded upon reaſon, and by remedies, that were more proper for ſuch perſons, as could not well reſolve to eat the bare fleſh of Vipers.

CHAP.

CHAPT. VII.

Several other Curious Experiments made upon Vipers.

WHereas we gave but little credi to what divers Authors have a ſured to be true, namely, that the Head o a Viper bruiſed and applyed to the bitin of it would heal the ſame; we made Pigeon to be bitten in the moſt fleſh part of its body, well freed of its feathers and we cut, bruiſed, and applyed to th place bitten, the head of the ſame Viper that had wounded the Pigeon, and too care to have it held upon it with a hand We alſo cut the head of a living Viper, an had it ſlightly broyl'd, then bruis'd an laid hot to the wound of another Pigeon which had been newly bitten in the ſam place, to find, whether by the heat of th broy-

oyling, the parts of the head being more
en'd, and the spirits more set at liberty,
ey would work better; but the success
as not more beneficial for one Pigeon,
an the other; for they both dyed half a
uarter of an hour after they had been bit-
n; and their bodies being open'd, we
und in them, what we did in others, kill'd
Vipers, namely a blackish blood, in part
oagulated, and half corrupted, in the heart
id the great vessels; but we took notice,
at there was less black & blew about the
ace bitten; which was perhaps all the
fect, that these bruised heads had pro-
uced, which had not been able to carry
eir virtue any farther.

It is not so, (to say that on the by)
ith the pricking of a *Scorpion*, which being
ruised on the part stung, serves for an
ntidote, and cureth: for which this rea-
n may be alledged, that the venom of
Scorpion, not working so briskly, and
ot piercing with so much quickness unto
e inward parts; the Spirits, that issue
om the bruised Scorpion, have leisure to
ake way for themselves, and to go and
nd out the venom, to joyn with it, and
o make it come forth; whereas the ve-

nom

nom of the Viper goes immediately
taint the mass of the blood, and t
parts which it bedeweth; as was app
rent in our Gentleman, who had no pai
nor swelling in his arm, but after all t
other accidents; contrary to the opera
on of the Scorpions Venom, which, b
fore it passeth further, acteth upon t
part prick'd by benumming, cold, and te
sion, or by inflammation, and very gre
pains; as those Authors, that have wr
ten thereof, and the persons, that ha
been prick'd by them, doe assure.

We have found very true, what Sign
Redi hath said of the effects of the Essen
of *Tobacco* upon Vipers; That, runni
their skin through with a thred dipp'd
that essence, and leaving the thred in t
skin, the Viper dies in less than a qu
ter of an hour, and becomes as hard
brass, but soon after supple and plyar
We have also tryed, that a little piece
Tobacco in the roll, held in the throat o
Viper, and the smoak of Tobacco blow
into its throat produce the like effec
but a little more slowly; and that bo
do cause convulsions, and extraordina
contractions in a viper, which are atten

e with death; and that, when all the
ther parts of the body are deprived of
otion, the heart yet beats about half an
our after; and that Tobacco, or its ef-
ence, kills Snakes as well as Vipers. I know
t, whether this will do with other ani-
als, since, having run a thred dipt in the
ence of Tobacco, into the skin of the
der-belly of a Dog, he immediately how-
d very much, and continued so to do for
lf a quarter of an hour, running round,
en lying down, and then rising again, and
the mean time purging above and be-
w, and voyding excrements more liquid
en ordinarily. He would eat nothing,
d onely drunk now and then a little, after
hich he vomited; but this was all the
ouble he had, which insensibly went a-
ay, and soon after, without any other
cident.

We have vexed a viper, and made it to
ite another viper, which on purpose we
eld within the reach of its teeth. But al-
hough she open'd her throat, and put her
elf into a posture of biting, yet she refrai-
ed, and sunk not her teeth deep into the
ody of the other; which moved us to
hrust them our selves by pressing her jaws;

but

but the bitten viper received no inconv
nience from it. Yet we have obſerve
that a viper which was made to ſwallo
ſome of the eſſence of Tobacco, and whi
we yet held by the neck with pincers, d
bite herſelf; but as the eſſence alone fa
ed not to kill her, ſo there was no reaſ
to impute her death to this kind of bitin
which was probably an effect of the co
vulſive motions cauſed by the eſſence
Tobacco.

We alſo pierced twice, in the day-ligh
with the point of a pen-knife, the he
of a live viper in the midſt of the Brai
from the top to the botom; one thr
long-wayes, the other croſs-wayes, a
in ſuch a manner, that the blood run o
both above and below; but notwithſtan
ing, the viper, being let looſe, cre
about as before, and as if ſhe had n
been wounded; but ſhe ſtill loſt bloud
the wounds, and at laſt dyed at the end
an hour, but her heart did ſtill beat a
continue to do ſo two hours after. Whi
Experiment ſufficienly argues the e
traordinary vivacity of the Spirits of t
viper.

We have alſo put into a glaſs-veſſel,
livi

ving viper, together with three live *Scorpions*, and there left them together four hayes; but found them in the same condition, in which they were, when we put them in, though there be Authors that assure, that these Animals kill one another, being shut up together in one and the same vessel. Mean time a viper will kill Scorpions, as well as Lizzards, and other animals to devour them and feed upon them, but that she doth only, when she is at liberty, and not when imprison'd; for then she ceaseth to take food.

We have likewise found the contrary to what Authors have affirm'd of the *Vaspe's* attaching a Viper, and that the former would fix its sting into the head of the latter, and quitted her not, till she were dead.

Divers Authors have assur'd, that all the remedies, which are reputed Alexiteral, or Preservatives against poison, did kill Vipers, by their vertue contrary and opposite to their venom. To be certain thereof, we forced a Viper to swallow half a drachm of *Theriaque*, dissolved in *Carduus Benedictus*-water; and having laid her aside, we perceived not any change in her, ex-

except that the ſurface of her skin ap
pear'd for a while a little moiſt; but ſh
grew more vivid upon it, and more ready t
bite than before.

We had alſo a minde to know the effe
of *Spirit of Wine* upon a Viper. We there
fore made one ſwallow about a drachme
it; which thereupon was preſently ſtun'
and then fell into ſtrange agitations; bu
ſeeing that that ceaſed little by little, w
gave her another doſe of the ſame quan
tity, which not onely caus'd in h
the like agitation, but afterwards mad
her almoſt un-moved, and ſo inebriate
her that ſhe ſeem'd to be half dead. Sh
remain'd about three hours in this cond
tion, but at length ſhe began to ſtir again
and was like the former, more brisk, an
more diſpoſed to bite than before. W
put alſo a living Viper into a bottle almo
full of Spirit of wine, and we ſaw, that ſh
turned to and fro therein, now ſwimmin
on the top, then in the middle, and by an
by at the bottom of the bottle, and th
ſhe reſiſted a good hour, before ſhe w
choaked therein.

We cauſed likewiſe a Viper to ſwallo
ſome ſugar, part of which was in powde
an

nd the other part diſſolv'd in water. She ept the whole for a while with her, but fterwards vomited it up; and having laid er aſide, to ſee, what would become of er, we found her dead four and twenty ours after.

We have often ſpit into the throats of ıany Vipers, even when we were faſting, ut they ſoon after caſt up our ſpitle, and ad not any hurt thereby; though there e Authours affirming that Vipers become ıbid or conſumptive thereby; which yet ıay very well happen, not from thence, ut rather from the abſtinence and ſadneſs, ter a long impriſonment.

Many Authors have mentioned, that ipers have a great Antipathy to *Aſh*-ood, and that, if a live Viper were put ithin a round, made, one half, of the leaves f Aſh, and the other half, of kindled oales, the Viper would rather expoſe erſelf to be burnt, then to come near the ſh-leaves. But having made a whole ound of ſuch leaves, which had about ree foot in diameter, we put a Viper in he midſt, which preſently hid herſelf un- er thoſe leaves.

Whileſt I had live Vipers in my houſe,

ſeveral Women with child came to me ſome deſignedly to ſee them, others without having any ſuch thought, and even being ſurpris'd at, and abhorring the ſight o them; but none of them having been inconvenienced by it; ſo far were they fron miſcarrying thereupon, as certain Author would beare us in hand they would do Not that ſuch a thing may not chance t happen to ſome woman or other extraordinary fearful, and of a temper ſo delicate that a much leſs occaſion might produc ſuch an effect; but that ought not to paſ for a general rule.

We have often preſſed ſome Vipers both Males and Females, at the place where be the *Paraſtates*, or the Bladder containing the ſeed, namely under the tai and near the openings, which ſerve for ge neration; and have ſo much and ſo lon preſs'd them, that a white liquor cam forth; but we never perceived there an piercing or ill-ſented ſmell, no more tha we did in opening thoſe *Paraſtates* with lance, though we held our noſe cloſe to it which is alſo directly contrary to what ſom Authors have aſſured thereof.

CHAPT. VIII.

GENERAL REFLEXIONS

Upon all we have experimented.

THE great care and attention uſed by us in the Experiments, we have hitherto deſcribed, and in thoſe, we have thought fit to ſuppreſs, hath made us to profit of all the occaſions, that preſented themſelves; and we have taken pleaſure to obſerve all the effects, that have appeared to us, and carefully examined them, and inquired into their cauſes afterwards, that we might make our reflexions thereon.

The Biting of the Viper, which hapned to the Gentleman Stranger, began to furniſh us with much matter; and at that time we knew the Venom by its effects, which ſeem'd to proceed from a very ſlight cauſe, it being nothing but a little pricking, and onely the cut of a tooth, which was not any thing deep, and the ill of

which did not seem to us increased by any of the yellow liquor of the Gums, the innocence of which was not yet fully known to us. In the mean time the mortal Accidents came on in great number, whilst continued vomitings hinder'd the effect of the remedies, which could not be kept in the Stomach, to communicate from thence some of their vertue to the parts affected. It was well enough known that there was something very subtile, very quick, and very powerful in this Venom and it was also presumed, that that resided in the Spirits; but the nature of it, or by what means, or how, or on what parts acted, was not known so well.

Yet we must avow, that on an occasion so pressing, so dangerous, and so extraordinary, we could not take our measures better than by having recourse to the Volatile Salt of Vipers. The cause being subtile and spirituous, there was required a remedy of the like nature, that might be able to make haste to finde it out, to join with it, and to draw it to the extremities of the body, and to make it come forth by the wayes, it had opened for it. Besides then, the continual vomiting demanded

he aid of such a remedy, that could ork in a moment, or execute at least by everal takings, what it was not able to do t the first. The happy success, which attended the use of this Volatile salt of Vipers, acquainted us with the sufficiency hereof, and showed us the mastery it had ver the malignity of those Spirits. It also egot in us a desire to know aright, in what anner it produced such good effects, and o be enabled so to discourse of it, as that thers might have no reason to reject our entiments.

We esteem therefore, *that* this Salt, y its subtile, volatile and piercing quali-y, is very proper to dissolve the coagulaions of the Bloud, and to sever the parts, hich therein were congeal'd or fix'd, (if e may so speak) and caus'd the disorder nd confusion of its motion; *that* it perormed this in the Blood of the said Genleman, which it restor'd to its former ondition, and so gave again to the parts he free communication of the Spirits, hich they had lost. We believe also, hat this Volatile Salt, by the facility it ad to hook and fasten it self unto those exed Spirits, as being of the like nature,

did easily joyn with them, and drove them to the extremities of the body, drawing them forth through the pores of the skin and issuing out with them by the way, i had open'd for them.

The Ligatures made about the place bitten, the Scarifications, and the approach of the well heated iron-spatuls t the wound, were to serve to stay the im petuousness of those irritated Spirits, an to give them an out-let at these openings rather than that they should go farther And the exhibition of the Theriaque, th Viper-powder, and the like, was to con duce to drive them back, as it might hav done, if these remedies had stay'd in th Stomach As also the *Epithemes* c Theriaque upon the Heart and Stomac might have serv'd much, if the action c the enrag'd spirits had been more slow and if at the time of their applicatio those spirits had not been too farre ad vanced.

But the Use of this Volatile Salt was t carry the Bell, as it did, from all the o ther remedies; and those, that were em ploy'd afterwards and in the intervals o its exhibition, were nothing, if we ma

o ſpeak, but Souldiers aſſiſting their Cap-
ain; ſuch as the Confection of *Alkermes*
nd of *Hyacinthe*, which were very proper
o fortify the noble parts; as alſo were the
yrup of Limons, and the Decoction of
corzonera, and the ſhavings of Ivory.

The Slices of Citron, which might
eem to ſome by their acidity capable to
ugment the coagulation of the blood,
ere not given till after the Volatile Salt
ad uſed its force to diſſipate it; and they
erved to recover the Stomach, debilita-
ed by continual vomiting, and by their
cidneſs to reſtore the loſt appetite, and
o help the concoction of the aliments, and
heir diſtribution into the parts, that had
eed of them. Beſides that Citrons have
ſpecifique vertue againſt the poyſon of
ipers, if we will believe thoſe Authors,
hat have written of it; and is a great
iend to the Heart and the other noble
arts.

The Anointing with the Oyle of Scor-
ions of *Matthiolus*, and with the water of
he *Queen of Hungary*, made upon the
vell'd parts, and the application of Alexi-
erial fomentations, ſhould in all appear-
nce have ſerv'd much; but the ſequele

ſhew'd, that there was nothing but th
Volatile Salt, which could make thoſe a
gry Spirits ſurrender, and ſo was to tak
the honour of all.

The Experiments, which we afterwar
made upon a great number of differing A
nimals, have given us a much great
knowledg of the effects of Vipers-poyſo
of the parts on which it works, and
thoſe that ſeem to be exempt from i
though at laſt they do ſuccumbe: W
have ſet down the moſt conſiderable
them, making ſome reflexions on the b
ting of ſeveral Doggs, done by Viper
but there remain'd ſtill for us to diſcourſ
Why and How the parts of Vipers, beir
eaten, can ſtop and overcome the Veno
of their biting.

We ſay therefore, that all the parts
a Viper abound chiefly in Volatile Sal
which in diſtillation is found partly alone
partly in the form of a Spirit, which prope
ly is nothing but a Salt diſſolved in ſon
portion of Phlegme; and partly in th
form of an Oyle, which alſo is but a Sa
mix't among the unctuous part of a Vipe
We ſay alſo, that in the digeſtion, ma
in the Stomach, of the parts of a Vipe
boc

body, that have been swallowed down, his same Volatile Salt, which they contain, is separated, and afterwards distributed to all the parts that need them; especially if of these parts there have been swallow'd enow, to furnish that quantity, which is necessary, of this Salt; and so we need not doubt, but that this Salt will produce an effect like that of the Volatile Salt, which was given to our Gentleman bitten; Unless it should be said, that this same Volatile Salt of those parts of a Vipers body, which have been swallowed, being of the same nature with the irritated Spirits, attracts them to it self, and by this union changes their maligne quality, and so tames them, that they have no power over the bitten Animal; which, in my opinion, is hard enough to conceive, and perhaps established upon unsolid foundations.

We hope, that among the many Experiments, those of the Five Pigeons, bitten one after another, by one and the same Viper exasperated, and of which the last bitten dyed first of all, when the Viper was most vexed, and most exhausted of its yellow liquor; and that of the Pigeon bitten by a Vi-

Viper, which we had caused to bite several times into bread before, and that even till bloud came forth, to the end that the Juyce might be well emptied of it, and which notwithstanding was followed by the death of the Pigeon; These Experiments, I say, will prove on one hand, that the yellow liquor contributes nothing to the poyson; and on the other, that these incensed Spirits, assisted by the openings which the great Teeth had prepared for them, are the sole and true cause thereof.

The wound, made by a Viper not vexed, whose jaws were held in, and whose teeth were at the same time thrust into the body of a Pigeon, which also was accompanied with store of the yellow juyce, and yet not attended with any ill accident; as also the pricking, made by the great teeth, pulled out of a live Viper, or by such, as stuck yet in the head of a dead Viper, and did no hurt at all, do sufficiently confirm this truth, viz. that the cause of the Venom is to be imputed to the Spirits enraged, and not to any other thing or parts in the Vipers body.

I have not undertaken to reason upon all

l the Experiments, we have made, as I ave done upon the Bitings, both be- ause that is beyond the Sphere of a man f my profession, and because I designed nely to confine my self particularly to he wounds and to the Remedies able to eal them.

For the rest, if in the Treaty concern- ig Theriaque, which I have lately pub- sht, I have advanced any thing not con- onant to what I have declared here, ouching the action of the Venom, I m to be excused therein, forasmuch as had not then had the occasion, well to now the nature and the effects of the Bitings of Vipers, and referred my self to he most approved Authors about it. But yet all we have there said, derо- gates in nothing from the preparation of Vipers for Theriaque, which we have here laid down, and which was in that Book our main design, as well as to re- form several other preparations, that seemed not reasonable to us: That which now remains to be done by us, is, to speak of the Remedies to be drawn from Vipers, which may serve to heal their bitings, and to cure many other evils.

THE

THE REMEDIE
EXTRACTED FROM
VIPERS

CHAPT. I.

Of the different choyce tha may be made of the parts o a Viper.

THere is nothing in Nature, t which can be given more justl the title both of *Aliment* an *Medicine*, than to a Viper, since it afforc equally very good Nourishment and ver good Remedies. It also hath in its Bod not one part, which is not very useful and of which Artists may not draw some thin

ning that is good; their chief difference onsisting in this, that the substance of the ne is more or less close, then that of o-ners. Yet, as in all Bodies of Animals, here are parts preferable to others, so e may make a distinction of those in a iper, especially if we mean to eat them, to reduce them to powder, to take it the mouth, alone, or mingled with other edicaments.

In this case, it will be well, to use on-the Heart, the Liver, and the Trunk, mean, the Body emptied of its guts, ithout head and tayle. Not that, if you ould make use of the head and taile, ny ill would attend it, or that you need o fear any ill quality in them, no more han in all the other parts of the body; ut the Heart, Liver and Trunk are cho-en, as those that are most esteem'd, and hich are taken before the rest, out of he body of such Animals, which men se to feed upon. Those also, that would nourish themselves with Viper-flesh oyled and seasoned, may do well, in ating of it, to separate the bones there-of, and to leave them uneaten: but if hey bruise them between their teeth,

and

and ſwallow them down together with t
fleſh, they would afford them a like, a
even a ſtronger nouriſhment than t
fleſh: for, we have found by Diſtillatio
that the Bones yield the ſame parts, th
the Fleſh does and even in greater qua
tity. For the ſame reaſon, the Bones
the trunk are not to be caſt away, wh
you will prepare the powder of Vipers, a
that the rather, becauſe they are in th
way very eaſy to ſwallow. One may al
very uſefully dreſs the fleſh of Vipers wi
their own fat, as one would do with bu
ter, or with the fat of other animals. Th
Skin it ſelf, if men would, might be boy
led and eaten with benefit; but that
would not be ſo ſavory, as the princip
parts we have been ſpeaking of.

As for the *Chymical* preparations, a
the parts of Vipers may be therein em
ployed, and I would not except from the
the Stomach it ſelf, nor the Inteſtins, if the
were well clear'd of Worms, and all Ex
crements.

I alſo know no difference, as to good
neſs, of one Sex from the other, althoug
moſt Authors have preſcribed the uſe o
Females: On the contrary, if there b
an

ny ſuch difference, I would preferre the
Males to the Females, when theſe are full
f Eggs, and big, foraſmuch as then they
re too much waſted for the feeding and
creaſing of their Eggs.

As to the Seaſons, in which they are to
e taken and uſed, I almoſt equally conſi-
er the *Spring* and *Autumne*; for the times
herein men need them, ought to carry
in the behalf of thoſe who have a mind
o feed on them. But care muſt be had
o chuſe ſuch Vipers, as are bigg, fat, vi-
orous, and active; and not to keep them
ery long after they have been taken, be-
uſe they grow leaner and leſſer every
ay, both out of Melancholy, and want
f food, which after that time they uſe
ot to take. I alſo make no difference
etween thoſe Vipers of *France*, that are
red in one Province, and thoſe of ano-
her; for thoſe of *Poitou* and the neigh-
ouring parts are as good as thoſe of *Dau-
hine* and about *Lyons*, and in other places.
he place therefore is not to be conſide-
ed but for the quantity, and for the con-
eniency of getting them, in regard that
hey are not wont to be found in mari-
me places, which are the onely, that

Authors

Authors have disapproved for Vipers upon the belief, that the flesh of Viper taken in them, did cause thirst, by re son of the saltish food, they met wi there.

CHAP. II.

Of the Use of the parts of Vi pers, in respect of their nou rishing Vertue.

THere is scarce an Author, that hat written of Vipers, but affirms, tha in several parts of the World, man persons, and even whole Nations, have fe and still feed upon the flesh of Vipers in somuch that in great and costly Ente tainments, they made exquisite and ver considerable dishes of it. There are also that have alledged for an example son Nations, which by the use of Viper-flesh hav

ave extraordinarily lengthn'd their life, ven to 140. years. It is needleſs, to in- rt here the teſtimonies of Antiqui- e on this ſubject; the Curious may nde them in Books. We content our- lves to affirm, that many perſons do ſtill ſe it at this time in divers Countries, whe- ner it be from Cuſtom, or to ſatisfie their ppetite, or by the Advice of knowing hyſicians, and that upon occaſions they nde wonderful effects thereof. I alſo oubt nor, but that the uſe of it would e more frequent among us, if the ver- es of Vipers were well known, and if one ould diſlodge out of the minde of people e horrour and natural antipathy, they ve againſt this animal. For the taſte of iper-fleſh is very like that of Eeles; hence it is, that in ſome Countries Vipers e called *Eeles of the Mountain*; and one nds ſomething in them even more ſa- oury than in Eeles. I know perſons, no well knowing the moſt inward parts Vipers, have out of merriment, and in ompany, made good meals of them, and und it very ſavory meat. But thoſe at have too much averſion from this nd of food, may find very convenient

wayes to benefit themſelves by the vertu
of them, ſo as not to be diverted from it b
any abhorrency of the animal: for the
may feed Capons and Pullets with th
fleſh of Vipers cut in ſmall pieces, whic
thoſe Creatures eat very greedily; an
continuing for ſome time to feed ther
therewith, it will certainly communicat
the vertue of the Vipers to the body o
thoſe Animals; which may be eaten, a
we eate other Capons or Pullets, the taſt
of which will be very ſavoury, becau
that of Viper fleſh is ſo.

Neither ought we to doubt, that th
qualities of Vipers paſs into the bodies o
thoſe animals, ſince there are innumerab
others, the fleſh of which hath not onel
the vertue, but even the taſte of th
things, they are fed with. The fleſh o
the Birds, that live on Juniper-berrie
and of thoſe, that live onely upon Olive
hath not onely their qualities, but alſ
their taſte and bitterneſs, and that ſo high
ly, that one can ſcare eat them. In th
Countries, where Silk-worms are bre
it is obſerved, that in their ſeaſon, whic
is chiefly in the months of *May* and *Jun*
the Eggs of Hens, that eat thoſe Worm
hav

ve a taſte and ſmell of them, as well as eir fleſh; inſomuch that nice perſons ed their Poultry a part, and hinder them om eating any Silk-worms. It may be ken notice of, to this purpoſe, that 'tis uſtome to give to Nurſes the medicines, hich young Children cannot be made take, to the end that their vertue may ſs from the body of the Nurſe to that of e Child; and it hath been often obſerv'd, at the Urine of the Babe hath had the t of the Druggs the Nurſe had ken.

But yet ſome might phanſy, that Anials cannot take the good from the good rts of the things eaten by them, but ey muſt at the ſame time receive the imeſſions of the ill ones, that are there; d it might even be objected, that Lizrds, Scorpions, Cantharides, and the her Creatures, on which Vipers do feed, ould impreſs in their bodies the ill qualis, they have, as, among the reſt, the antharid, its Cauſtique quality. But twithſtanding all this, the Experience e have of the harmleſsneſs of Vipersdies, and alſo of their good qualities, rniſhes us with a contrary argument, ſuf-

ficient to deſtroy that phanſy; and teaches us, that the ſtomach of Anima converteth into good all the ill qualities to be met with in the bodies, it receiveth to digeſt; and that it uniteth and appropriateth the good ones to the very ſubſtance of the Animal that hath eat them: Whence it comes to paſs, that is as 'twere transformed, or at leaſt very much changed by thoſe good qualities and is upon that account capable to communicate them to other animals, in whoſe ſtomach it enters to be there digeſted. We ſay beſides, that there are divers Examples of Bodies, that would be altogether poyſonous in the ſtomach of men, which yet ſerve for food to, and faſten, other animals, which afterwards yield good nouriſhment to men. Such are *Hellebore* and *Hemlock*, which nouriſh and faſten Quailes and Goates, which afterwards are uſefully employed for the nouriſhment of men; and this is it, what *Lucrece* has very well obſerved in theſe Verſes;

Præterea nobis Veratrum *eſt acre venenum,*
At Capris adipes & Coturnicibus auge
Quip

Quippe videre licet pinguescere sæpe Cicutâ
Barbigeras pecudes; homini quæ est acre Venenum.

But those, that have no aversion from ipers-flesh, may take of them the Heart, e Liver, and the Trunck, and having wa-ed them well, they may then accommo-te them to their own taste in the dres-g. Where they are to take care, not make the flesh too hot by too much ice, especially pepper; but yet they are lowed to put to it some aromatique rbs, as Garden- and Wild-Thyme, and e like; or a little Nutmeg, Cinamon, loves, to raise the taste. They must also oid the fault, committed by the Anti-ts, whipping and vexing the Vipers, be-re they killed them; least this irritati-n should cause some ill impression in their dy, which by it self hath no venom at l in it. Let them also not cast away the oth, wherein the Vipers have been boy-ld, because it retaines the greatest vertue them. Neither do I see, why one should int the quantity, or limit the time of the e of it; that depending from the degree

of the illneſs, and from the conſtitution c
the perſons, that will make uſe thereo
And although we know Vipers to be a ve
ry Alterative Medicine, and that the
chief uſe is onely for their Medicinal qu
lities; yet if taken as an Aliment, the
is no danger at all to eat of their fleſh, c
to drink of their broth, ſomewhat mo
or ſomewhat leſs. It is alſo to be mod
rately ſalted; and thoſe that have any
the Fixed Salt of Vipers, ſhall do well t
employ it. You may alſo adde to it ſom
of its Volatile Salt, if you will have th
Fleſh of Vipers work more powerfully.

As to the *Vertues* of Viper-fleſh, acco
ding to the conſent of innumerable Au
thors, whoſe opinion is ſupported by re
ſon and truth, confirmed by many Exp
riments; we can ſay, that they are ver
great, and that there is no Animal in Na
ture, that affords ſuch and ſo many: An
we wonder not at all, that the Antien
have ſo frequently employ'd Vipers in the
Hieroglyphicks, and adorned their *Meda*
with them; thereby to deſign very ad
vantagious things for the publick, an
for private men; forasmuch as this An
mal is very capable to furniſh them. F
th

e uſe of it preſerves the natural heat in a
ry good temper, it repaireth the ſame,
d reſtoreth it when 'tis altered; it yields
very good food; helps digeſtion by its
at, which is not exceſſive; it retards
d age and prolongeth life, by a proper-
, which Vipers have, to maintain in
od plight the whole habit of the Body.
Whence it is, that many have believed,
at both Staggs and Eagles, induced to
by a natural inſtinct, eat all the Vipers,
ey can meet with, and that 'tis upon
at ſcore, that their life is extraordina-
long.

There is alſo adſcribed to Vipers, and
t without reaſon, a Renewing vertue,
pable to make young again; which they
citly ſhew, by caſting their skin twice
ear, and renewing themſelves by the co-
r of a new skin. This, joyned to the
otile parts, of which the Viper is com-
ſed, and to its lively and daring aſpect,
tifies it to be pertinent enough, that Au-
ors have attributed to it the vertue of
earing and ſtrengthning the Eyes.

Vipers have alſo a very particular ver-
e of Cleanſing the whole Body, and par-
ularly the Bloud, and of expelling

through the pores of its skin all the sup
fluities: Whence it may be inferred, t
they are very proper to cure the *Itch*, T
tar, *Erysipelas* or Saint *Anthonies* fire, *M*
sels, *Small Pox*, and the *Leprosy* it self, t
use of them being long enough continu
though I cannot well believe what *Ga*
saith, That the Wine, wherein one on
Viper is choaked, is able to cure so gr
an Evil, and which doth not so easily yi
to remedies.

Vipers also may, by removing all t
impurities and obstructions of the Body a
skin, cause beau y therein; and upon t
account it is, that many Ladies in *Italy*
them for their ordinary food.

By the good nourishment, they yi
by the purity they give to the blood a
to all the parts, and by the liberty th
give to the Spirits to do their functi
therein, they are a great relief to perso
in a Consumption, and to those that
emaciated by long diseases, and wasted
tedious Feavers. There are even Autho
who assure that the use of them is capa
to cure the Venereal disease; for which
doubt not but they may se. ve much, if th
do not altogether cure it.

Th

Their mundifying vertue, joyned to the Alexiterial, makes them also very proper to expell all sorts of poysons, and even the Plague it self and all contagious diseases. They are also very contrary to all putrefaction, which commonly is the matter and source of most maladies; whence it comes, that those who use them, are not subject to diseases, unless they live irregularly, which is able to destroy all the good, which the use of Vipers might afford.

We might here specify many other sicknesses, that might be cured by the use of Viper-flesh; but we think not fit to do so, since the general vertues, which we have noted, may suffice to make men apply the use to many particular Evils, that may need it. Yet we shall describe, in the Chapter ensuing, the uses and Vertues of the parts of Vipers, taken as a Medicine, without any great preparation.

CHAP.

CHAP. III.

Of the Vertues of several parts of the Viper, and of their Use in Physick.

THE Vertues, which the *Flesh* of Vipers is able to communicate to those, who eat them for nourishment, are doubtless very considerable; but they are not the onely ones, that Vipers are endow'd with; and not to alledge superfluous things, we shall confine our selves to the principal Vertues, of which we have experimented the greatest part.

It is very certain, that the *Head* of a Viper, broyled and swallowed, healeth the biting of that animal. The Heart and the Liver may do the same. Reason and Experience have confirm'd it; and therefore

in

an urgent occaſion thoſe parts may be ery uſefully employed. The applicati- n of the Blood of a Viper to the Biting, alſo that of its Head bruiſed, are neither be rejected, nor is that of the Entralls: ut theſe applications alone are not capa- le to cure it; for, the ſubtlety and quic- eſs of the Spirits carrying them with reat ſpeed into the body, there muſt be ſed internal ſpecifick remedies to repulſe hem; and you may alſo very pertinent- repeat (at the mouth) the uſe of the ead, heart, liver, and the other parts of Viper, without fearing to take too much f them, becauſe thoſe parts can never o hurt, and they alwayes produce ſome ood effect. They may alſo ſerve for all orts of venoms and poyſons, and againſt ll ſorts of contagious and epidemical diſ- aſes.

Divers Authors aſſure, that the *Head* f a Viper, hung about the neck, hath a ery particular quality to cure the Squi- ancy and all the diſtempers of the Throat; nd that the Brain of a Viper, wrapt up n a little skin, and likewiſe hung about he neck, is very good to make the Teeth of children come forth; which effect

others

others believe to be due to the great teet
of Vipers. If we had experimented it, w
could then ſpeak with more certainty. Th
remedies are eaſily practicable, and with
al harmleſs; wherefore thoſe who nee
them may make tryal of them.

Some alſo have affirmed, that the *Li*
ver of a Viper, ſwallowed, keeps one fro
being bitten either by this Animal, c
by any other ſerpent, and that the pow
der of Vipers hath the ſame efficacy. Bu
we muſt not rely upon their report; w
onely believe, that the Liver ſwallowe
is capable to heal the biting of a Viper
like the heart, fleſh, and other parts, o
which we have ſpoken; and that it ma
much facilitate the delivery of Wome
with child, as doth the Liver of Eeles.

The *Skin* of a Viper is not altogethe
deſtitute of vertue; for beſides that it i
alſo, as they ſay, very good for the deli
very of women, making a garter of i
about the right leg, it hath a very ſingu
lar vertue for all the diſtempers of humane
skin: And although all the other parts,
eaten, may work the ſame thing; yet, tha
we might have benefit from all, we hav
experimented, that the Viper-skin does per
fectly

ctly heal the inveterate mangie of Dogs, making them eat it boyled or raw. It might so be said, that the specks in the Viper-skin seem to signify the marks of the itch or mangy; or, if you will, of the leprosy, which the scales of the skin represent yet better, and so tacitly expres its vertue.

Some have believed, that the *Gall* of a Viper applyed, can heal its biting; but we give no credit to it, no more than to the application of its bruised head. But this we judge, that it is proper for the wound of the biting, onely as it is for all other wounds, and for ulcers themselves, having great absterfive, mundifying and cicatrising vertue. It is also very good for the weaknesses of Eyes, above all, for suffusions and films, being taken inwardly, or applied outwardly; so far it is from doing them hurt.

The *Fat* of Vipers hath very great vertues; for, besides that it is very good in the dressing of the Viper-flesh (as hath been said) it is able also, taking a drachm of it, to give great relief in Epidemical diseases, and to expell the venom thereof. It is also very useful to facilitate the travel of women; and to dissipate the swellings of

the

the throat, anointing it outwardly ther
with. It alſo much relieves Gouty pe
ſons, and ſerves to reſolve nodoſities.
unſwels all hard and inveterate tumors, a
even thoſe that proceed from Venereal di
eaſes; and for this reaſon 'tis, that *Jean*
Vigo hath uſed it in the Plaiſter which bea
his name. It is likewiſe very good for Bur
ings, puſtuls, and all diſtempers of the ski
and laſtly, it is very powerful againſt all th
illneſſes of the Sinews, and of great vertu
for the parts attackt by the Palſy. W
might alſo adde many other vertues, adſcr
bed by Authors to other parts of the Vipe
but we forbear, becauſe we have not exp
rimented them.

CHAP

CHAPT. IV.

Of the Powder and Trochisques of Vipers.

SInce we do not alwayes meet with persons, who, having need to make use of Viper-flesh, are disposed to at thereof; it is very necessary to have eady such remedies, that be as well accommodated to the inclination of the Pa-ient, as fitted to remove the malady. The knowledge, which Physitians have ad of the great Vertues of the Viper, joyed to the difficulty, met with in the poine f pleasing Patients, hath obliged them o search for divers Preparations, in which he Antients did not well succeed; and if ve would bind ourselves to their way of preparing the *Powder* and the *Trochisques*, ve should loose the principal vertue of the Viper, and retain onely the most useless. For, in the opinion, which they entertained,

ned, that there remain'd alwayes some v
nom in the flesh of the Viper, if it we
not freed therefrom by some preparati
or other; their practice was, to p
the flesh of Vipers in some earthen po
and having luted it, to set it in a Bak
oven, after the Bread was drawn out, a
to leave it there, till this flesh was reduc
to powder. In which preparation the be
of this flesh, which is the Volatile Salt, w
certainly dissipated. They also made s
veral medicines with this powder, mi
among other medicaments divers wayes
of which we need not to enlarge. We sha
content ourselves, here to set down
preparation of the *Powder* of Vipers, whic
shall be grounded on Reason, and shall re
tain all the vertues of the Viper; easy al
to prepare, and very convenient for the Pa
tient to use.

Take then towards the end of *April*, c
in the beginning of *May*, such a quantity c
Vipers as you please, Males and Female
chusing big ones, and such as are fat an
vigorous, and using none of those Female
which are already big with eggs; and the
prepare those, you shall have thus chose
as follows: Without whipping and vex
in

n them, cut off, with a pair of ſizers, ir heads and tailes, flea them, and emp- y them of all their entrals, of which you to ſeparate the heart and the Liver; ul lay aſide their fat for its peculiar uſes. Waſh the trunks of the bodies, the hearts d livers in clear water, and after that in ite wine; then dry them with a very an linnen cloth, and having put the arts and livers again into their trunks, all the trunks with ſmall pack-thred, h at one end, and hang them up in the in the ſhade, and leave them there, till y be well dryed; which will be in three four dayes. After that, cut theſe nks into ſmall pieces, and ſtamp them great Braſs-mortar with an iron-peſtle, l ſearce all through a very fine hair- e, and ſo keep it for uſe. This is the ht Powder of Vipers, which contains the vertues; to which may be added rop of Cinamon-oyle, to give it a good nt.

There are ſome, who, to make this wder would have the trunks of Vipers t in pieces, and put together with their arts and livers in a Glaſs-cucurbit, and is covered with its head and luted, and

ſo placed with a recipient, in a very ge
tle *Balneum*; thereby continuing th
warmth for three dayes together, to dr
the phlegm of Vipers, accompanied w
a ſmall portion of the Volatile Salt, and
keep this liquor apart; and then to ta
out of the Cucurbite what ſhall rem
there, and of it to make the powder
Vipers.

But, beſides *that* this method is troub
ſome enough; *that* the fire of a *Balneum*
not ſufficiently ſtrong to ſend forth enou
of the Volatile Salt, at a time when '
not yet looſen'd from its ſubject; *that*
notwithſtanding too much ſo, not to en
inſenſibly ſome ſmal portion, which wou
afterwards be wanting in the Powder, a
which alſo may exhale out of the wate
beſides alſo *that* the Vipers are in dang
to be too much dry'd in the Cucurbi
and even to be there roſted in part: W
eſteem, there is cauſe to prefer *our* Prep
ration to *this*, in regard it is much eaſi
and, without any deſtruction or alterati
of the good parts of Vipers, carries aw
all their ſuperfluous and uſeleſs hun
dity.

You might notwithſtanding follow th
w

y in part, if you should desire to have
od Viper-water; but then you must in-
ase the fire of the *Balneum*, and finish
: distillation in much less time, and yet
e need not to hasten the fire too much
the latter end, least the water smell of
: *Empyreuma* or burning. You must
), after you have taken out the parts
the Viper, that rest in the Cucurbite,
: them into a glass-retort well luted,
l set this into a reverberating furnace,
t and exactly lute to it a great Recipient,
give it a fire increased by degrees, and
ter about the end, to obtain the Vo-
le Spirit, Salt, and Oyle, that could not
by the fire of the *Balneum*; which are
be separated and rectifyed, as we shall
hereafter. Then take a portion of this
latile Salt well rectified, and dissolve
n distilled water, and keep it carefully
: well stopp'd bottle, as an excellent
edy; of which you may increase or di-
nish the dose, according to persons and
asions; and according as you shall have
olved more or less of the Volatile Salt

Upon this occasion, I thought fit to
ertise those, who distill Capons, Par-

tridges, ſlices of Veal, or other parts
Animals, in a Glaſs-limbec (as the cuſto
is,) and who employ for that purpoſe t
fire of a *Balneum*, or that of Sand or
ſhes; that by a moderate fire they cann
make riſe almoſt any thing but uſele
fleem; and that, not being able to i
creaſe the fire without making the diſtill
water ſmell of the *Empyreuma*, they wou
ſucceed better, if in this they did, wh
I was juſt now ſaying of the water and v
latile Salt of Vipers; and if they joyn
their water with the volatile Salt of the
ſtilled Animals, in which reſides the ch
vertue. Thoſe, that have no mind to ta
ſo much pains, ſhall do better not to gi
diſtilled waters to their Patients, as t
cuſtom is, ſince they have no vertue at
if none be communicated to them by t
volatil Salt of the Animal,

As to the *Trochiſques*, the Antie
have as ill invented, and as ill order
them, as the *Powder*. For, not to ſtay
blame here (as I have done elſewhe
the whipping, which they uſed, and whi
was not onely uſeleſs, but alſo very no
ous; I ſhall ſay in a few words, that t
decoction, they made of the body of t

Vi

iper in Water, with Salt and Anise, till
e flesh would sever from the bones,
hich they afterwards cast away as well as
e broth, was not a *Preparation* of the flesh
the Viper, but rather a *destruction*, since
was made to leave its principal vertue in
e broth; and that they weaken'd it yet
ore, by incorporating it with very dry
ead, of which the proportion of a fifth
four times as much weight of flesh,
ough but little in appearance, came yet
a moiety, since that four ounces of
is flesh, and one ounce of bread (which
as so dry that it could not be lessened)
ake onely two ounces of *Trochisques*,
hen they are well dry'd. This we have
ore at large examined in our Treatise of
e *Theriaque*; and because their fault is
ry easily understood, I shall insist on
no farther; nor on their reasons for
aking use of Boyling to correct a ma-
gnity in the flesh, (of which there is none.)
d to be able to sever it from the bones,
hich they believe naught, or at least un-
efull, which yet are very good; forasmuch as all their reasons are sufficiently re-
ted in the same Book, and because they
e yet more so, by what we have establish'd
this.

And

And although it be not alwayes nece
ſary to make *Trochiſques* of Vipers, ſinc
we might be without them; yet there b
ing ſome uſe of them, and to preſer
their name, you may take a little Gum
Arabique, very white and pure, and r
duce it to powder, and infuſe it in goo
Malvaſy, till it be well diſſolv'd, and th
wine ſomewhat tinged thereof: then tak
of the powder of Viper, prepar'd as we hav
lately directed, and incorporate it with
ſufficient quantity of this gumm'd Malv
ſy, braying them together in a Marbl
mortar with a woodden-peſtle, and ſo r
duce the whole into a ſomewhat ſolid paſt
whereof make Trochiſques, of the ſi
and ſhape you pleaſe, and dry them in th
ſhade upon a hair-ſive.

I ſaid, that we might be *without* Tro
chiſques, becauſe that having the Pow
der, which they are made of, that may ſu
fice for our uſes; but there is one incon
veniency in the Powder, in that it wi
ſcarce keep any conſiderable time, eſpe
ally if it be not well ſtopt up, and if, be
ſides, ſome art be not uſed to hinder th
breeding of worms in it: Whereas Tro
chiſques, being made compleat by the ad
ditio

ion of Malvaſy, and by the cloſe com-
ſſion of the parts of the Powder, they
not ſo eaſily penetrated by the Air, nor
ubject to corruption. The Trochiſques
ng dry, they may be ſlightly rubbed
r with a little Balſom of *Peru*, which
l give them a good ſcent, and help to
ſerve them.

The Uſe both of the Powder and Tro-
ſques is excellent and alike; but the
ochiſques are to be reduced into pow-
, when they are to be uſed. Neither
them have an ill taſte, and they contain
the vertues, we have aſcribed to the
ſh of Vipers, as having loſt nothing in
ing, made without the heat of the Sun-
ms, but a ſuperfluous moiſture, which
ld ſerve for nothing but corrupt them,
had remained. They may be given
ordial waters, broths, wine, or ſome fit
oction, or you may make *Bolus*'s of
m with Syrrups, Conſerves, or Cor-
l Confections, or turn them into tablets
h ſugar.

Their main effect is, to purify, open, pe-
rate, and to drive to the extremities of
lies all venom, corruptions, impurities,
erfluities, and they may be very bene-

ficially used in many occasions for dive
maladies, without the fear of any ill succe
For both have this quality, that they do
wayes some good, but never any har
Their dose is from a Scruple to a drach
or two; and they may be given to all ag
and sexes, and at all times.

CHAPT. V.

Of the Salt of Vipers made t the Ancients.

AMong many different Preparatic of the Salt of Vipers, made by t Ancients, of which we finde t descriptions in their Books, there is no more famous, nor that hath been long in use, than one that is very ample a much enriched by many Alexiterial rem dies; whence tis also, that they gave this Salt the name of *Theriacal*. But h ving considered this pompous Prepara

o

on, we do not wonder, that a much esteemed Author hath not given it his approbation, since we cannot finde any thing in it, that is according to rule or reason, no more than there is in the rest. We finde, that the sentiments of that Author proceed from an understanding so judicious, and so knowing, that we cannot but subscribe to them, almost in all: For, in the Calcination, they used, there remain'd nothing but the *fix't* Salt, which contains but very little vertue; Vipers, as all sorts of Animals, having but little of Fixt Salt, whereas they have much of the Volatile, which soon riseth in the Calcination, and carries away with it the principal and the most essential vertue of the Animal. They were also much mistaken, when they thought, that *four* Vipers, which they burn'd with *fourty* pounds of Sea-salt, or *Sal Gemmæ*, or *Sal Ammoniac*, (as some would have it) and with a great quantity of Simples, should communicate great vertues to these Salts and these Coales. For in the Calcination, which they used to make in an earthen pot luted, with its cover on, and yet in one place pierced, the Volatil Salt of the four

four Vipers would certainly fly quickly away ; and if it had stay'd (which yet we do not grant) and there had been half an ounce of it (which is a quantity beyond what the four greateſt Vipers could yield,) what, I pray, would that be to 40. pounds of Sea-ſalt, and to many pounds of Coales, more than a ſmall rivolet mingled with the Ocean? But as to the fixt Salt, four Vipers are not able to afford half a Scruple of it.

'Tis alſo certain, that both the Sea-ſalt and *Sal gemme*, do not periſh in the Calcination, but ſtill remain there. But if ordinary Salt Ammoniac be employed, the Urinous and Volatile part, which is in that Salt, will not fail to make its eſcape, as well as the Volatile Salt of Vipers, and there will onely remain the fixt Saline part of the Salt Ammoniac, mix't with ſome terreſtrial parts; which is that, we finde in the Diſtillation, after we have driven out all the Volatile Salt, of which afterwards, changing the veſſel and the fire, we draw an acid ſpirit, very much approaching to that, we draw out of Sea-Salt, by wayes almoſt like theſe.

Artiſts know alſo, that Herbs, Wood, Horns,

Horns, Bones, and other such like matters, if they should be calcined in an earthen pot, luted and covered, though a hole were left in the cover, would alwayes be afterwards found in the form of very black coales, although they had endured a great fire; and that the Salt cannot be separated from them, unless they be calcin'd again in an open vessel; or they being reduced to ashes, the Salt be then sever'd from them by a Lixivium, and by Filtration.

On which occasion we relate an Example of an imperfect Calcination, which is naturally made in the Earth about the Summer-Solstice, of the end of the root of many Plants, and among others, of *Mugwort* and *Plantain*; on which end, the subterraneous Fire, or, if you will, the Fire of the Sun, working, and yet being surrounded by the Earth, (which is to the root what the earthen pot, luted, is to the Vipers, and to the Mixts, that were shut up with them) burns it and reduces it to coales, but cannot turn it to ashes. I have often found this to be true, and lighted upon a little coal at the end of the root of those Plants, at the time above-mentioned.

So that, although the Fixt Salt of the added

ded be Simples in the Coales, yet it would have been more proper, and more methodical, to have quite calcined those coales to reduce them to ashes, and so to draw from them and to purify the Salt for use, than to make people swallow the gross, earthy, and useless part of these coales.

Those Antients added to this pretended Salt calcin'd, the powder of many Alexiterial Druggs, which not being devested of their vertue by any calcination may communicate, and even alone furnish the greatest part of the good qualities, by them ascribed to this Salt. And 'tis upon the account of these principally, that the name of *Theriacal* may belong to it, which impertinently would be attributed to the Vipers, since they have lost their prime vertue in the Calcination.

This Preparation of *Theriacal* Salt doth sufficiently shew us, that the Antients did not take pains to know the inward parts, of which mix't bodies are compounded, and that they did not well know the nature of the poyson of Vipers, of which they imagin'd they should be infected by the fumes proceeding from their Calcination; although none could come from them,

hem, when there was none, as we have nade appear. And although the ſmell, s well of the Vipers, as of the Simples, vere troubleſome, whilſt they burned, ret they were not therefore at all venonous.

The little knowledge, which the Aniients had, and many Moderns ſtill have, of the nature of the two Salts in Vipers, nath led them into a great fault, viz. to calcine the bones of Vipers, to draw from hence, as they thought, the true Salt of Vipers, which they were not at all like to finde, after they had diſſipated it by Calcination. The firſt fault hath drawn after t a ſecond; for the ſmall quantity of *fix't* Salt, they found in them, not much ſatisfying them, carried thoſe, that had no great ſenſe of honour or conſcience, to a very great abuſe, which was, to mix among thoſe calcin'd bones a great quantity of Sea-ſalt, to diſſolve this Salt, and and to boyle all together in water, to filter and coagulate it, and to ſell at a great rate this Counterfeit ſalt for true Salt of Vipers.

But, to accommodate ourſelves to thoſe, who, intending better, will make

no

no ill use of it; and to furnish them with pleasing Salt for those, that may desire it for ordinary use; we shall here deliver the way of preparing a Salt of Viper, that shall have much vertue; the method of which shall be very easy, and the use very convenient.

Take three dozen of great Vipers, well chosen; cut off their heads and tails, flea them, and empty the bodies of all their entrals, and wash them well, together with the Heart and Liver: Boyl all together in ten pints of common water, so long till all be perfectly boyled. Then strain it, and squeese well all the parts; and in this decoction dissolve four pounds of Sea-salt; and carefully filter it; afterwards, coagulate, or, if you will, chrystallize this Salt, which will be found white and abounding with the vertue of the Vipers, and of no ill taste at all; which you may use in all things as common Salt.

And to shew, that these boyled and squeesed parts have left much of their vertue in the Decoction, and yet that they have not left all, and that still there remains some of it, principally in the Bones; lay them abroad, and dry them, and then distil

distill them, and you will draw from them, especially from the Bones, a Volatile Salt and oyl, but in much less quantity, then if they had not been boyld.

If you would have a Viper-Salt of more vertue, and that might even be call'd *Theriacal*, you must proceed after the same manner, as hath been lately set down; but in stead of Seal-Salt, take a like quantity of Salt, drawn from *Alexiterial* and *Theriacal* Plants, as the roots of *Valerian*, *Imperatoria*, *Angelica*, *Leaves* of *Scordium*, the little *Centaurium*, *Carduus Benedictus*, and the like. 'Tis true, that this Salt is a little more displeasing to the taste than the former, but it may produce more considerable effects, and be used in extraordinary occasions.

These sorts of Salt have indeed good vertue, and are convenient for lasting, especially the two first: But the Volatile Salt hath something more particular, and considerably better: the properties of it are innumerable, and it is an *Epitome* of the excellent qualities, contained in Vipers. We shall now speak of its Preparation, as also of the Phlegm, of what is called volatile Spirit and Oyle, which accompany it;

it; and of the *Fixt* Salt, which remains after distillation, mixed among the terrestrial parts; and that done, we shall treat of their vertues and usefulness.

CHAP. VI.

Of the Volatile Salt of Vipers, and the Fixt Salt, and other parts, which are separated by Distillation.

WE make here publick our Preparation of the *Volatile* Salt of Vipers, with the more frankness and chearfulness, because we esteem it one of the best Medicines in Physick. 'Tis true indeed, that some Authors have already spoken of it; but there is none, that hath described it with more exactness, than we

e, nor that hath more desired, that eve-
one might, according to this Method,
tain for himself and his occasions a re-
edy, which goes beyond many others,
say no more. We hope, that our
y of proceeding will be well received by
, and that, if there be any that shall
ide fault with it, they will be such only,
o are unwilling to communicate what
ey have, and often wrap it up under the
me of *Secrets*.

Take onely the Bodies, Hearts and Li-
rs of Vipers, or, (to have the more be-
fit of all) add to them the Heads, Tails,
d skins, and generally all the parts of a
iper; of which you will have a care to
ke away all the Excrements and Worms;
also the Eggs, that may be in the *Ma-
ix* of the Females. Small and great,
ales and Females are of the same good-
s, as also the Salt is, that shall have
en drawn from all the parts of the Body.
ry in the shade all these parts separate-
, then cut them into bits, and fill with
em your Glass-limbec up to the neck,
hich is to be well luted. Put it in the
idst of a Reverberating furnace, propor-
on'd to its bigness, cover it with its

 head

head, and ſhut the Regiſter of it; Fit t
the Limbec a Glaſs-recipient, which muſ
be very large; and lute well all the joynts
Then begin to give a ſmall fire, which con
tinue for about two hours, ſo that th
Limbec be heated gradually, and th
Phlegme begin to diſtil into the Recipien
Afterwards increaſe the fire gently unto
ſecond degree; and give a little openin
at the Regiſter, and continue the ſame fi
likewiſe two hours; then increaſe it, oper
ing the Regiſter yet more, and ſo continu
two other hours; at the end of which yo
are to give it the fire of the laſt degree
quite opening the Regiſter, and you mu
continue to drive the fire, till no mo
come out of the Limbec, and the Recip
ent be all obſcured by the Volatile Sal
which will ſtick to its ſides, towards th
bottom, and to the upper part. Then l
the veſſells cool, and the Furnace alſo; a
ter which you are to un-lute the Recipien
wherein you will finde the Phlegme, th
part which is called Spirit, the Volati
Salt, and the Oyle mingled together; e
cept a part of the Volatile Salt, that ma
yet adhere to the upper part, and to th
ſides of the Recipient, which you may de
terouſl

erously take away, and, if you will, keep
or use, as 'tis. This Volatile Salt, Spirit,
nd Oyle, are so penetrating, that you are
ot able to hold your nose over it.

Powre out, what you find in the Reci-
ient, into a Gloss-Body, which must be
rge, tall, broad below, and whose figure
pes up straightning towards the orifice;
which you must adapt a Glass-head, that
to have somewhat a high body, and
rge, and a very straight mouth, and pro-
rtioned to that of the Glass-body. Lute
e joynts exactly with paper and starch;
t the Body in a Sand-bath, and sink it
wn as low as the matter reacheth; fit a
all Recipient to the beak of the Head,
d lute that also: kindle under it a very
ntle fire, and order it so, that the Sand
d the Glass-body may be heated gent-
; after which you may increase it a little,
t onely so as to make it strong enough
drive up the Volatile Salt; which, be-
; dis-engag'd from the parts of the Vi-
's bodies, riseth easily. It will be sub-
ned, and stick every where to the inside
the Head, like a Chrystallized Snow.
here will arise at the same time a little
the Spirit, which is properly nothing

but a portion of the Volatile Salt, havi
carried up with it a little of the Phlegm
that will run into the little Recipient, and
which even a part will congeal into Chr
ſtals. You muſt alwayes be careful in m
naging the Fire; for how little ſoev
you increaſe it, the Phlegm will riſe wi
ſome of the Oyle, and they will diſſol
and hide the Salt; and then you muſt r
commence the Rectification; but gover
ing the fire well, when you ſhall ſee t
Head well lined with Salt, which will
very white and very Chryſtalline, you m
then un-lute it, and take it off, and lu
on an other head, inſtead of the form
You are to take out the Salt, as ſoon a
as well as you can; and to encloſe it in
ſtrong bottle, with ſuch a mouth, t
the Salt may paſs through it, and whi
may be exactly cloſed, without which t
Salt will eaſily fly away. Mean time, y
are to continue a like fire under the Gla
body, and when no more of that Volat
riſeth, you are to deliſt, and to take o
of the head the Salt there gathered, a
keep it as the former. Your Sand bei
cold, take off the Glaſs-body, and dec
from it the remainder through a gr

Gla

Glass-funnel, covered with paper for filtration, held over some vessell. All the Phlegm will pass thorough the Paper; but you'l finde some Oyle there, that cannot pass, which you may make run through the Funnel into a bottle, having pierced the paper with some convenient instrument.

Those that shall desire a high and much more perfect Rectification of this Volatile Salt, may make it in manner following. Take two pounds of Ivory calcin'd to whiteness, and reduced to a fine powder; which is to be mixt with four ounces of this Salt. Then put all into a new Glass-Body, of the same shape with the former. To this let there be adapted and luted a blind Head, or such an one, the extremity of whose beak is well stopp'd (for *that* is useless for this purpose, there being no Phlegme; and if there were, the calcin'd Ivory being a dry Body, and in part spungy, would lick and retain it, as it would also the Oily part, that might happen to be among the Volatile Salt:) let there be given to this Glass-body a moderate Fire, with the same cautions as before; the Salt will quickly rise, and stick to the Head;

where, the Sublimation being ended, yo
will finde it in the form of Chryſtals, whi
like ſnow; which you are to put up a
keep in a bottle exactly cloſed, to uſe
upon occaſion. This Salt thus rectifi
ſmells not of Fire, and hath nothing b
its own natural ſtrong and penetratin
ſcent.

There may perhaps be found Artiſt
who will take it ill, that we have been
large and ſo particular in exactly ſettin
down all the things, that are to be obſe
ved in preparing and rectifying this Sal
But it is not for them, that we have do
it, but for thoſe, who not knowing it w
be glad to learn it. We have given the
ſincerely the true means uſed by ourſelve
which they may alſo practiſe in preparin
and rectifying the Salts of the parts of a
Animals. Thoſe that have any tinctu
of Chymiſtry, will here find enough t
teach themſelves; as we have done, an
do daily. Mean time they muſt not b
offended, that there remain with us up
on this ſubject ſuch things, which cou
not be ſaid, nor well comprehended b
by thoſe that have labour'd a great whi
in this Art. Intelligent perſons, tha

ſha

all examine our proceeding, or have a
ind to experience the ſame, will find
ır ingenuouſneſs, by finding the ſucceſs of
l we have made them expect, together
ith the facility, we give, of the Operation.
hey will alſo find, that our way of fil-
ng the Retort as far as the neck, is more
oper than that of leaving a third part
npty, as ſome would have it, in the Diſtil-
tion of the Bones, Horns, and other dry
ırts of Animals; although thoſe, that
nderſtand it, practice it not but in matters
ıat will melt, and may break the Re-
ırt, or let ſomething run out by the
eak, when 'tis fill'd too high. But in
y ſubſtances, as are our Vipers, and the
orns, and Bones of Animals, Crabs-
ves, Stones, and the like, it is enough to
ave this neck empty, to give vent to
ıe parts raiſed from the matter, and that
e to go into the Recipient. They will
ſo acknowledge, that our way to leave
ıe Oyl among the other ſubſtances, when
e will ſever them by ſubliming and recti-
ing them, is not without reaſon, in regard
ıat the Oyl hath commonly with it much
olatile Salt, which leaves it, and after-
ard riſeth in the Rectification.

We

We esteem also, that this Preparatio
will be preferr'd before many others, tha
are operose and have little method i
them; and, among others, before the Rec
fication, which some pretend to make b
the addition of Spirit of Salt to th
Phlegme, and to that which is call'd Sp
rit, and to the Volatil Salt: which instea
of rectifying this Salt, and of making
purer and better, changes its nature; ar
instead of subliming it to the Head and th
top of the Body (as they have pretend
it did, after the Phlegm was risen,) th
Spirit of Salt riseth it self in its first form
in its smell, colour and taste, leaving
the bottom the Salt, which is there four
like fixed, having the tast and the oth
qualities of the Spirit of Salt, but beir
lessen'd of two thirds of its weight. Th
kind of men have fill'd Books with mar
Preparations they understand not, nor ha
experimented: For, forgetting, amor
other things, in the process of this, su
methods as are absolutely necessary, ar
without which they do not ing, they pr
mise impossible successes, and putti
the Cart before the Horses, they fix t
Salt when they pretend to sublime it, a

o very unadvisedly prostitute themselves o shame and confusion. For, instead of edifying first the Volatile Salt (as more ntelligent men might have taught them, of whom they had borrowed this Preparation) and of subliming it, and of separating it by this means from other parts; hey labouring to disguise the Process, have retrenched the main and most necessary part of it, and employed at the very first that method, which they should have observ'd to fix it, believing that that would sublime it; not considering, that having by that means inverted nature, the success would prove answerable to it. I set a side their unwarrantable practice of adding a pound of luke-warm water among the substances found in the Recipient, after the first distillation, since it is an Augmentation, not onely useless, but troublesome, of that Phlegme, which must needs be separated.

Now, although one part of this Salt, remaining in the Body of the Limbec, may yet afterwards becom Volatil, by mixing it with some Lixiviat Salt, and making it to sublime; yet *that* is not done but with a new and very great loss of its weight; nor

nor is the taſte of it better than of that which ſhall have been well rectified according to the method, we have before deſcribed; ſince the Lixiviat Salts, by reviving it in part, give it as diſpleaſing a ſme as the former. We may further add here that the uſe of tall and ſtrait-neck't Bodies is much more proper for this Rectification, than the uſe of Matraſſes with long necks, myſelf having experimented that the Phlegme fals back again more eaſily, and that the Volatil Salt riſeth purer in the Bodies of our faſhion; of which the *Figure* may be ſeen on the *Title page*, where alſo is that of the Retort and the Recipient, for the firſt Diſtillation.

Now although the ſame men, that have given us cauſe to reprehend them, have affirmed contrary to truth, that there is no *fix't* Salt in the parts of Animals: To prove that there is, and to benefit by that of the Viper; Take what ſhall remain in the Retort, commonly called the *Caput Mortuum*, which you will find of the form and colour of Coales; calcine it in a Furnace, or, to ſave expences, in a Potters Oven, till all become white and of the form of Chalk, pulverize it well

well, and make it boyl in a competent quantity of water, that may receive and dissolve the Salt; filter it, and make it evaporate and consume. You'l find at the bottom a coagulated Salt; though in a small quantity, and such an one, as that of five pounds of Viper-bones well calcin'd, we have obtain'd no more than three ounces of fix't Salt. This Salt hath a very sharp and poynant taste; it is Lixiviat, and approaching enough in divers regards to the fixt Salt of Tartar. You'l find on the Filter the Terrestrial part, stripp'd of all its vertue; which then may justly be call'd *Caput Mortuum*. And thus you'l have the Phlegme, that which is call'd Spirit, the Volatil Salt, the Oyl, the Fixt Salt, and the Earth; into which all the parts of the Viper have been reduced in their separation.

CHAP. VII.

CHAP. VII.

Of the Fixation of the Volatil Salt of Vipers.

ALthough the Volatile Salt of Vipers have in it, to speak truth nothing offenſive, but its ſtrong and piercing Smell, and that thoſe, who ſhall take into their mouth the weigh of a good number of grains, cannot receive from it any other trouble but that of this Sent, which yet ſoon paſſeth away, this Salt leaving afterwards a ſaline and very agreeable taſte; yet notwithſtanding many perſons, offended with the piercing odour, which is firſt perceived in this Salt, and beſides diſſatisfied with its eaſy Avolation, unleſs it be extreamely well cloſed, have endeavoured to fix it, and ſo to free it from this ſmel, not conſidering that this ſmel cannot be altogether ſeparated from this Salt, but its vertue muſt be ſo too, and that the fixation changes its nature: And inſtead of contenting

ing themſelves to rectify it well, there-
y to carry away, as much as may be, the
dventitious ſmel, which it may have ac-
quired by the violence of the fire by the
irſt diſtillation, they have ſometimes al-
ogether deſtroyed it, and have dealt
vith it, as if one would deprive *Muſc* and
Amber-gris of their good ſent, and *Colo-
quintida* of its bitterneſs; and many com-
pounds of their operations, which would
ot be what they are, if you ſhould robb
hem of the leaſt of thoſe parts that com-
poſe them.

We ſay therefore, that after the Recti-
fication of this Volatil Salt, (ſuch an one
as we ſhall ſet down beneath,) the beſt and
ureſt preparation would be, to do no-
thing elſe to it, but to make it to be uſed in
that condition, only mixing with it things
accomodated to the Patients taſte, or with
ſuch other remedies, as do not change
its nature, nor make it looſe any thing of
its force or vertue.

If the Fixed Salt of Vipers were capa-
ble to arreſt and retain the Volatil, there
were then nothing to be ſaid againſt this
fixation, becauſe having been both for-
med jointly and in the ſame body, they
have

have no averſion to, but rather are able t
help one another; But this common ori
gin, and this friendſhip which they hav
contracted, whilſt they lived together i
one and the ſame ſubject, hinders them fron
deſtroying one another, and maketh, tha
what is Fixe can nor will change the natur
of the Volatil. And indeed, althoug
you mixe them together, and that th
quantity of the Fixe be five or ſix time
greater than that of the Volatil, and tha
they may alſo lodg with one another; yet
they both equally keep their nature and
vertue, and they may be ſeparated by fire,
and manifeſt at all times their ſeveral and
diſtinct vertues. But this hinders not the
taking one Salt among the other, nor that
the Fixe ſhould not then borrow ſome-
what of the ſubtilty of the Volatil, the
better to penetrate the Entrals and Veſſels;
to open the more vigorouſly the obſtructi-
ons, and to expel the impurities, it meets
with, by ſiege or urine; and that, on the
contrary, the Volatil Salt, helped by the
Fix't Salt, ſhould not carry away and drive
out through the pores of the skin or other
ways, the more groſs and more viſcous
parts of the humors, that perhaps might-

have

ave escaped its quick and subtile operati-
n: For which uses, both Salts may be
ix'd together upon occasion, without un-
ertaking an impossible fixation.

But especially, the fixing of this Vola-
l Salt by *Quick-lime* cannot pass with all
rtists but for an operation altogether des-
uctive to it; and 'tis that, which is most
all to be avoided, because not only
carries away the smel, taste, and vertues
this Salt, but quite changeth its na-
ure, and converts it into its own, by pe-
ifying the same.

The Fixation of this Volatil Salt, by
ne Spirit of Salt, although it seem to de-
roy it and change its nature, in that it
rries away the smel and taste of the Vo-
til Salt, may notwitstanding be admit-
ed rather than the other, in regard that
ne Spirit of Salt, by preserving the ver-
ue it hath to open all the obstructions of
ne inward parts, working upon the Vo-
til Salt, may appropriate to it self some-
hing of its vertue, especially that which
able to second its action, and to expel
ogether with it, by urine or other ways,
he most tenacious and most stubborn hu-
nors. Those that would expel the hu-

mors

mors by these ways, may usefully prepar
it after this manner.

Mix four ounces of the Volatil Salt
Vipers, well rectifyed, with four ounc
of Water; put them into a Glass-Cucu
bite Somewhat high, of a narrow mouth
broad and flat towards the bottom, ho
ding about two pints. Fit to its mout
a Glass-funnel, the end of whose pipe
very narrow: Lute the funnel quite rou
about the orifice of the Cucurbite, t
that there may be no other aperture bu
that of the end of the funnel. The
powre, little by little, and drop-wis
some Spirit of Salt well rectified upo
the Volatil Salt. At first there will be
conflict betwixt them, which will cau
an ebullition, but that of a short duratio
Continue to powre upon it of the sam
Spirit of Salt, gently and leisurely, acco
ding as you find the ebullition cease, an
by intervals stir also the Cucurbite; an
repeat this so often, that at last there ap
pear no motion any more, and th
Spirit of Salt have as 'twere mortified an
fixed the Volatil Salt. Then place th
Cucurbite in some receptacle furnisht wit
Sand; fit to it a head, lute it (though

th

he beginning that be not neceſſary) and
y a ſlow fire draw away all the moiſture
f the Spirit of Salt, and of the Volatil
alt, which will riſe almoſt inſipid. Con-
nue the fire ſtill, and when you ſhall pe-
eive a taſte of the Spirit of Salt in what
hall be diſtill'd, change the Recipient,
creaſe a little the fire, and drive it (yet
ithout too much violence,) until there
iſtil no more, and that the Salt remain
: the bottom of the Cucurbite altogether
y and of a gray colour. You'l find in
ne Recipient a Spirit of Salt of the ſame
ſte, of the ſame colour, and of the
me force it had when it was powr'd up-
n the Volatil Salt; but you ſhall not
nd any part of the Volatil Salt riſen to
ne head, nor to the top of the Cucurbit,
; ſome have given out it doth, without
aving experimented it, as we have done.
'he gray Salt, found at the bottom, is
ut in a ſmal quantity, being leſſen'd al-
moſt of two thirds: It's taſte is very ſharp,
iting, and much differing from what it had
efore it was fix'd, and as 'twere mortifi-
d by the Spirit of Salt. After this you
ay diſſolve this Salt in water, filter it, and
ake it evaporate, and letting it cool,

you'l find at the bottom a ſmal quantity of Salt coagulated in the form of Chry ſtals. Powr out by inclination the wate ſwimming on the top, to have the Salt by itſelf, which you may dry in the Air, o the Sun, or over a little fire. You ma alſo make good uſe of the Salt that ſha have remained in the water that ſwam top, by making it evaporate in part Chryſtallizing and drying it, as the for mer. You might, if you pleaſed, very we omit luting the Funnel upon the Cucurbit when you will powre the Spirit of Salt up on the Volatil *Salt*; foraſmuch as we hav found by experiment, that in the opera tion of the *Spirit* of *Salt* upon the Volat *Salt*, there riſeth nothing but phlegme that hath neither vertue nor ſmel; althoug the ſame perſons, that have err'd in man things in the rectification of the Volat *Salt*, have fear'd they ſhould looſe there in a Volatil *Spirit*, which was only i their imagination: And the luting, whic we have adviſed, was only to prever peoples belief, that a part of the Volat *Salt* might have eſcaped that way.

But although this Volatil *Salt* appe fix't, and remain as ſuch at the bottom

th

he Cucurbit, after distillation, yet here is a part, which retakes its former nature, and becoms Volatil again, if it e mix'd with *Salt* of *Tartar*, or with ome other Lixiviate *Salt*, putting them ogether in a subliming vessel. For these *Lixiviate Salts*, being of a nature contrary to *acid Salts* and *Spirits*, do mortify them and retain them to themselves, nd let go the Volatil *Salts*, which the acid spirits had, as 'twere, mortified and x'd, and all that was Volatil in this seemingly fix't *Salt*, riseth in a white form, nd hath almost the same taste and the me other qualities of the Volatil *Salts* ell rectified. Yet you will also find there great diminution of its weight, so that will be more advantagious to keep it in he condition, it was in before this last blimation; the greatest advantage of hich is, to come to know, that the fixtion, that hath been made by the Spirit f Salt, although it have as 'twere chaned the nature of the Volatil Salt, and id its diaphoretique quality under that of he diuretique, yet hath not quite destroyd it, since there is some part, that can etake its pristine form and vertue,

This Salt thus fix'd poſſeſſeth the ve
tues of a Spirit of Salt concentred, bu
they are found augmented by thoſe
it hath borrowed from the Volatil Sal
Thoſe, who wou'd only carry away, by u
rine or ſiege, the ſuperfluous humours
the body, may uſefully prepare and en
ploy it; but thoſe, that ſhall uſe the V
latile Salt well rectified, without chan
ing its nature, nor diverting its action b
any fixation, will finde therein ſuch effect
as will be incomparably more apparent a
more ſenſible, and will not waſte of it
much.

CHA

CHAPT. VIII.

Of the Vertues of the Volatile Salt of Vipers, and of what the other parts, ſeparated by Diſtillation, may perform.

THE Volatile Salt of Vipers is to be conſider'd, as a Sun, as well among the parts, that riſe by diſtillation, as among thoſe that reſt in the Retort; there being none among thoſe that are come over, but have borrowed from it almoſt all the vertue it can have; or any of thoſe that have ſtay'd, but have need of it, or are uſeleſs without it. The *Flegm* that riſeth firſt, carries alwayes ſome part with it, without which it would produce no effect. That which is called *Spirit*, is nothing elſe, to ſpeak aright, but Volatile Salt, which in the diſtillation

hath been followed by a little Flegme dissolving it, and giving it the form of a Spirit: which may be shewed by the Rectification, wherein that saline volatil part is separated, raised, and coagulated into a white and chrystalline forme, and leaveth at the botom of the cucurbite the moisture that had changed its nature, and is nothing else but flegm. We say, on this occasion, the same thing of what many Authors improperly call the Volatil Spirit of an humane skull, of Harts-horn, and of other parts of Animals, they being nothing else but Volatil Salts mixt with flegme, which they afterwards quit, when they are rectified. The *Oyle* also would have but very little vertue, if it borrowed no Volatil salt, and if it retained not in it a good part thereof, as may be observed in the Rectification: for, if the Oyle were measur'd, or weighed, before 'tis put among the rest into the cucurbite for rectification, and if it were weighed again after that all the Volatil Salt is risen, it would be found much diminished in quantity and in strength also, because most of the Volatil Salt, which had joyned it self to it, hath been carried away by the rectification

ion. So those, that separate the Oyle om the other parts to rectify them, and ho use it not but for wounds or ulcers, nd to take away superfluities, do doubtss not know it aright; for it is also enow'd with other vertues more considerale; of which we shall speake in this *Chapr.* The Fixt Salt, which rests in the Reort, mix't among the terrestrial part, alnough it is to be put in the rank of Lixiiat Salts, and possesseth few other quaties, but those of Salt of *Tartar*, yet etains something of the nature of the Voitile salt. And those, that have consided this Salt as a *Caustick*, have had good uccess with it, without knowing its naure, seing they imputed it to the maligne arts, which they believed to be in Vipers, whereas they should have ascribed it to he nature of Lixiviate salts. But this alt being taken at the mouth, will be nuch more effectual, if you mingle some Volatil Salt with it; this Caustique faulty not hindring but that it may be taken afely and beneficially in appropriated liquors, as many other lixiviate Salts are.

The *Terrestrial* part hath nothing in it, hat deserves to be considered, and it may

juſtly be called *Terra mortua*, Dead earth, after it is freed from its fixed Salt. So that all the parts, that riſe by diſtillation, as well as thoſe that cannot riſe, are of ſmal force, or altogether uſeleſs, without the Volatil Salt. It is therefore upon good reaſon, that we attribute to it the principa vertues, which a Viper can furniſh.

The ſimilitude of ſubſtance, which th Volatile Salt of Viper hath with the ſpi rituous parts of our Body, conjoyn'd to it ſubtile and piercing quality, maketh, tha accommodating itſelf to their condition and finding all liberty in its actions, it pro duceth all the effects, it is capable of, an penetrateth without any oppoſition int the moſt ſecret and the moſt remote part of the Body. It hath this peculiar, tha though it act as a Soverain, and finde no thing of reſiſtance to its dominion, yet i exerciſeth it not as a Conquerour, nor a a Deſtroyer, but rather as a Reſtorer c the places and parts, where it paſſeth; an although all its courſes be extraordinar quick and precipitate, yet they are ſo we meaſured and ſo well directed, that no pa of the Body miſſeth them, and that nor of its ſteps is unuſeful, but rather very be

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eficial to all the places, where it paſ-
th.

Now ſince the fleſh, the heart, the liver,
nd the other parts of the Viper, taken as
n Aliment, or as a Medicine, may ſerve for
ne cure of many maladies, and produce ve-
y conſiderable effects; 'tis not at all to be
oubted, but that this Salt, which is the
noſt ſubtile and the moſt potent of them
ll, is ſomething more ſublime and more
fficacious. And we are aſſur'd, that if it
ere well known to us, it would paſs for an
lmoſt Univerſal medicine; men would be
areful of preparing it, and we ſhould ſee
t often preſcribed by Phyſitians, and find
t ſucceed in innumerable obſtinate diſea-
es, that are but ſeldom and difficultly
ured.

To Judge well of the Effects, which
his Volatile Salt can produce in our Bo-
lies, we muſt know its manner of operati-
on, which is, to open, to comminute, to
ttenuate, to pierce, and to drive to the ex-
reme parts of the Body, and through the
ores of the skin, all the impurities, and
ll the ſtrange bodies, that can get out by
hoſe wayes. Further, it is an enemy to
ll corruption, very friendly and very agre-
able

able to our nature, which it assists and for
tifies, enabling it to expell, not onely b
the pores of the skin, but also by siege an
urine, and by all the Emunctories of th
Body, the superfluous humors, which mo
lest it: Whence it comes to pass, that i
produces admirable effects upon a thou
sand occasions, curing a great number o
sicknesses, or at least giving great relie
therein, even in those, that are most refra
ctory, and most difficult to cure; such as ar
Apoplexies, Lethargies, Convulsions, Pal
sies, and many other maladies, believed t
have their source in the Brain. It is also
great relief to the Distempers of the Breast
as Swoundings, Palpitations of the Heart
Difficulties of Breathing, and Pleurisies
Besides it particularly unstops the Obstru
ctions of the Liver, Spleen, Mesentery, an
other parts of the lower Belly. It dissipate
all inward impostumes, in their rise, an
dislodgeth secret and unknown pains
which have their origin in the Spirits. I
helps digestion, the purification of th
mass of the blood, and its distribution t
all the parts of the Body, and resolves an
prevents coagulations: And so being ar
Enemy to all corruption, it is very prope
fo

or all sorts of Fevers, caused thereby; s for most intermittent Feavers, and particularly *Quartans*. It also worketh powerfully in the distempers of the *Matrix*; nd is a remedy to all the vices of the skin, nd to the Leprosy it self: but above all, is specifique against all Bitings and stings of venomous creatures, against all venoms and poysons, if they be not corrosives or in that case, recourse must presently be had to Vomitives and to Unctuous things, after which it produceth good effects. It hath a particular vertue against the Plague, against all Contagious diseases, and Epidemical ones, such as are the Measels, Small Pox, and the like. In a word, the Inductions, we can draw from the great number of Experiments, we have seen of it, at different times, oblige us to affirm, that its vertues goes beyond what can be expressed. And those, that shall make reflexion on what we have said of it, will be able to apply and use it beneficially to many other sicknesses, which to enumerate would be too prolix and too tedious.

In the mean time, we cannot forbear to relate here a very remarkable Experiment, made upon a Gentleman, who suffered about

about a month since, a violent and cont
nual paine, doubled and redoubled, at th
right part of his front pretty near the Tem
ple: the end of a finger might cover th
place of the pain; there appeared no redne
nor swelling, and there was perceived n
hardness. Yet the pain, though it was, a
'twere, fixed in a point, was communica
ted to the other neighboring parts, so tha
the Gentleman could not chew, nor so muc
as open his mouth to take down a littl
broth, but with extreme pain, thougl
hunger urged him. The Physitians, tha
saw him, had used several means to relieve
him, and, among the rest, *Venæ*-sections
in the arm and foot; they had purged him
often; they had employed frictions of his
neck and shoulders; they had applyed to
him Vesicatories, and Snailes, behind his
eares: they had caused his temporal arte-
ry to be open'd, and drawn from him ten
or twelve ounces of arterial blood, and
then cauterised the Aperture; they had
also prescribed him powerful Sudorifiques,
which were continued many dayes morn-
ing and evening, and had made him sweat
very copiously; and the Patient himself,
of his own accord, being extremely pres-
sed

ed by the violence of the pains, caused ne of his upper teeth, which was very ound, to be pulled out, hoping thereby o give some vent to them: But after he ad used all these means in vain, one dose f the Volatil Salt of Vipers, given in vine, remov'd presently all the pain, which caused as great a wonder in the Assistants, as satisfaction in the Patient. This o surprising effect, which demonstrateth etter, than all reasons, the force and effiacy of this Volatil Salt, may also conclude he discourse of its Vertues.

There remains now, that we say something of the vertues of the *Oyle*, which riseth by Distillation with the Volatil Salt, of which it also retains a part. Its strong sent is the cause, that it is not often employed; whence it comes, that sometimes it is more advantageous to the Preparer, to profit by the rectification of the Volatil Salt, which it hath, than to keep it in its condition for Patients that shall use it notwithstanding its strong smel and ill taste. This smel is so intimately sticking to it, that there is no rectification, able to remove it. But we make herewith known to all those, that shall be able to com-

comply with the uſe of it, that it is one o
the beſt and moſt efficacious outward re
medies in all Phyſick, provided it b
made uſe of, when 'tis yet indued wit
its Volatil Salt: For it opens, attenu
ates, reſolves, is abſterſive, and adm
rably cleanſing; and we know, wh
have experimented it, that the continue
anointing with it, accompanied with th
internal uſe of the Volatil Salt, produce
admirable effects in the parts labouring un
der the Palſy, and deprived of motion
and even in thoſe, that are dryed for wan
of the communication of Spirits and nou
riſhment. A little Spunge imbibed wit
this Oyl, carried in a little box pierced
and often ſmelled to, is very good in th
time of the Plague, to keep off the il
Air, and to fortify the Brain, and th
noble parts. It is alſo good to make it t
be ſmelled, to put of it in the noſtrils, an
to annoint the Temples with it, in Epi
leptical Symptoms, and for thoſe, tha
are troubled with giddineſs, and have
their Brain charged with vapors or flegme
for it gives them vent, and diſpels them
powerfully. It hath alſo a conſiderable
effect againſt the ſuffocations of the *Ma-*

trix,

ix, and againſt all ſorts of worms; in hich caſe, ſome drops of it may even be ven at the mouth, in wine, or broth; id the hollow of the ſtomach anointed erewith. It viſibly diſſipitateth all out- ard contuſions, and ſerveth much for ward ones, and eſpecially for thoſe of e Head. It reſolves tumours and hard- ſſes, giving iſſue by the pores to ſuch atter, as can tranſpire, digeſting the roſſer, and bringing them to a laudable ppuration. It is alſo abſterſive and clean- th all ſorts of Ulcers, and healeth all e diſtempers of the skin, even the moſt ubborn, provided the internal cauſe ereof be removed. In all which evils its fects are yet more quick and powerful, it be enforced by the internal uſe of the olatil Salt, which, in a word, is that, hich gives it its main vertue.

We ſhall add, on this occaſion, that the ncients valued very much their Oyl of ipers, which they prepared ſeveral ways, me by infuſion, ſome by the decoction f Vipers in Oyl of Oliues. If they had ghtly proportioned the quantity of Vipers ith that of the Oyl; if they had added hereto what moiſture was neceſſary; and

if

if in this they had employed ſome go
method, this Oyl might produce go
effects, and we ſhould approve of
and refer our Readers to it. But findi
nothing regular in all the Preparations,
them deſcribed, we thought good h
to ſet down one, according to all t
rules of Art.

Take about the end of *May*, or t
beginning of *June*, a dozen great V
pers newly taken, cut each of them in
ſeven or eight pieces, and put them int
well glazed and ſtrong earthen pot: po
upon them three pounds of Oyl of Olive
and one pint of white wine; cover t
pot well, and make it boyl over a gen
fire to the conſumption of the moiſtu
Then ſtrain all, ſqueeze out the Vipe
well, and keep the Oyle for uſe. In t
mean time, fear not (as the Antients di
the Vapors, that may iſſue out of the p
during the decoction; for the Vipers,
we have ſaid, have no poyſon in all th
body. This Oyle, thus prepared, ha
not, 'tis true, all the ſtrength and vertu
of the diſtilled Oyle, of which we we
ſpeaking a little before; but it may ve
well ſerve for an oyntment in all the c

ſtempe

empers of the skin, in contractions of erves, in rheumatisms, & in many other vils.

CHAP. IX.

Of the Manner of using the Volatil Salt.

ALthough it be impossible to specify in particular all the wayes of using the Volatil Salt of Vipers, no ore than one can well enumerate the knesses, that may have need of it; Yet, some degree to satisfy those that may sire it we shall make here an Abridgent of a good part of what we have seen actis'd by Pyhsitians, that perfectly know e qualities and proprieties of this Salt, d use it daily to the great benefit of their tients.

You must *first* know, that its piercing ste hinders it from being given alone, d that it must be mix't, *now* with some

Aliment, as in broth, the yolk of an eg
a rofted apple, a little jelley, &c. *fom*
times with Medicines, and that innumer
ble wayes, which partly depend from t
humour and diſpoſition of the Patient, b
chiefly from the wit, knowledge, and d
cretion of the Phyſitian. For this S:
calls for a Phyſitian, that hath ſufficie
ability to know and meaſure its force a
activity; that is intelligent and verſed
all Maladies, to be able beneficially to e
ploy it in thoſe that require it, that kno
to chuſe a favorable time and occaſio
and to mix it pertinently and to good p
poſe with ſuch things, as may not chan
its nature nor divert its operation, nor ſu
vert the indication, he ſhall have take
So that 'tis neceſſary, to be equally aſſu
of the genuine and methodical preparati
of the Salt; of the knowledge of its q
lities and vertues; of the nature of the
ſtemper, of the condition, temper, a
ſtrength of the Patient; of the fitneſs
its exhibition among aliments or appr
priated medicaments, and of the occaſio
and the time, in which it may be uſeful
employed. And when a due regard ha
been had to all theſe circumſtances, m

v

ill not fail to finde very good effects of it, ut that thoſe, who are not accuſtom'd o make uſe of it, may not unawares finde it effects contrary to the nature of this alt, we have thought ourſelves obliged o advertiſe them, that they muſt above l things avoid mixing them among *Acids*, nd eſpecially among Spirit of Salt, Vitri-, Brimſtone, and the like, which would x it and deſtroy its operation. To find herefore facility in its exhibition, it may e taken in diſtilled waters, or ptiſane, or ch decoctions as are appropriated to the ſeaſe; as alſo in Juleps, Emulſions, or otions diverſly compoſed. It may alſo e mix't in Conſerves, Extracts, Confecti-ns, and the like; as alſo in Lozenges and piats, diverſly made according to the ture of the diſtemper, and the intenti-n of the Phyſitian; It is alſo mingled ith Purgatives, Sudorifiques, Aperi-ves and Diuretiques; and no leſs, with s own fix't Salt, and ſuch other Salts, as e not contrary to it. It is alſo given in Vine, and among certain Mineral waters. may be adminiſtred to both ſexes, and o all ages, at all times and hours, be-veen meals according to the nature of

the diſeaſe, and the intention of the D
ctor. It may be taken, if one will, ſev
ral times in a day, and even at night; a
the uſe of it may be continued for a go
while.

As to its doſe, that is different, acc
ding to the occaſion, age, temper and h
mour of the Patient, and the nature
the diſtemper, and the reiteration made
it: For, the doſe is to be much leſs
thoſe, who take it often in one day, a
continue the uſe of it, than for thoſe, th
take it but once in a caſe of need. Som
times 'tis eſteemed ſufficient to give 6.
10. or 12. grains of it; but on cert
occaſions we may give 20. or 25. grai
and ſome-times, half a drachme, and ev
a whole drachme. But diſcretion and sk
is to be uſed; without which, this Salt
excellent as 'tis, may produce effects qu
contrary to what the Phyſitian and the P
tient might expect from it.

CHAP.

CHAPT. X.

Divers Remedies or Compositions, of which the Volatil Salt of Vipers is the Base or Ground.

WE had not undertaken to describe the vertues, nor the Uses of the Volatil Salt of Vipers, no more than of the Fix't Salt, and of the Oyle that riseth by Distillation, if this our Book were only written for the skilful Physitian, who perfectly knows all, and especially the parts that may be drawn from the Viper. But being desirous to do a good office to such persons, as have no knowledg thereof, or that knowing it in part, have need to be directed, especially in the exhibition of this Volatil Salt; we thought good to conclude this Book with the *Receipts* of

the chief Compositions of which this Volatil Salt may be the Ground, which are not found in Books, and may produce Effects worthy of this Salt.

And knowing, that there are many curious persons, who having a great esteem for the Viper and its uses, make preparations thereof in private, following the *Receipts* they find in Books, which sometimes are well, some-times ill prescribed or ill executed; We shall impart to them an *Elixir* of *Vipers*, that shall be of great vertue, pleasant to the taste, of easy preparation, and of long duration.

Take four douzen of Hearts and as many Livers of Vipers, dry'd in the shade and reduced to powder; two drachmes of good Cinnamon, half a drachme of Cloves grosly beaten: put them into a strong glass-bottle, holding about two pints. Powr on it a pound of the *Queen* of *Hungary's* Water, a pound of Melisse-water, half a pound of Orange-flower-water, and half a pound of Rose-water. Close the bottle exactly, and expose it to the Sun for fourty dayes; after which dissolve in the liquor a pound of fine Sugar, and pass all through a clean bagg. Put up thi

's Elixir in a Bottle, and add to it half ounce of the Volatil Salt of Vipers, ell rectified, twelve grains of Levant- usk, and as much of Amber-gris. Close e bottle exactly, and you may keep this *lixir*, to use it in time of need, from half spoonfull to a whole. You may take it in the morning upon an empty Sto- ack, and at all hours, according as ne- ssity shall require. This medicin is very ood and very convenient: It is not onely oper against all Poysons, against the lague, and all Contagious and Epidemi- l diseases, but it also fortifieth all the ble parts, preserves the Natural heat good condition, and by this means the e of it conduces much to preserve ealth, and to prolong Life.

The *Elixir* following deserveth also to e communicated to the Public, as a me- icine that is not common, and is very a- ailable, not onely for the Sicknesses of ien, as well in the Brain, as the stomack, nd all the noble parts; but also very par- cularly, for most of the diseases of Wo- nen. I shall give you here the Descripti- n of it. Take an ounce of good Saffron, s much of fair Myrrhe, as much of *A-*

loes Socotrina, and the same quantity
White Amber; a drachm of the Extra
of *Opium*, and as much of the Extract
Castor. Mingle your Extracts in a litt
Spirit of Wine; pulverize all the rest
and put altogether in a Glass-Body: pou
upon it three pounds of Spirit of wine ta
tarized, place the Body in a Bath of A
shes; fit an Head to it, with its Recipien
well luted together: Give it a moderat
fire, and draw from it about the moiety
the Spirit of Wine; then unlute your ve
sels, decant the tincture, that will swi
above your powders, which will be foun
very much imbued with all their qualitie
and keep it by itself in a bottle well-close
Powre the Spirit of Wine, which yo
have drawn off, upon the remainder in th
Body; Fit again to it the Head and th
Recipient, and draw again from it th
half of the Spirit of Wine. Decant
gain the tincture swimming a top, ming
it with the first, and keep it likewise. Co
hobate for the third time the Spirit
wine, drawn off, upon the remainder i
the Body; proceed as before, and pow
off the tincture swimming a top, and mi
gle it with the former: then filter all thre
tog

ogether, and powre all into a ſtrong Viall, dding to the whole an ounce of the Volatil alt of Vipers, which will eaſily diſſolve in t; keep the whole thus mix't and well loſed. The *doſe* may be from ten to ſixeen drops.

We ſhall yet adde to this an *Opiate* of reat efficacy for moſt diſtempers of the Brain; and tis this. Take half an ounce of the Extract of the root and ſeed of the male-Pæony; and of the true Miſſeltoe of the Oak, and of that of Betony-flowers, and of that of Clove-gilly-flowers, the ſame quantity of each of them; three drachms of the Confection of *Alkermes* of *Meſue*, three drachms of the Volatil Salt of Vipers, one drachme of the Volatil Salt of *Succinum*, two drachms and an half of prepared Pearl, and as much of Crabs-eyes prepar'd; three drops of Cinamon-oyle, and as much of the oyle of Mace: Mingle all according to Art, and make an Opiate of it, and keep it in a pot of Fayence (a ſort of fine white Earthen pots) well cloſed. The doſe of it may be from a ſcruple to a drachme.

You may alſo make, in the following manner, an opening and laxative Opiate, that

that ſhall conduce to the cure of ſundry long and ſtubborn diſeaſes, eſpecially of thoſe that are cauſed by ſeveral obſtructions of the parts. Take of the Conſerve of Tamariſk-flowers, of the Conſerve of the Flowers of *Geniſta* or Spaniſh-Broom, of that of Mary-gold, and of that of the Male-peach flowers, of each ſix drachms; half an ounce of the Volatil Salt of Vipers, as much of the Extract of the ordinary *Iris* root, and as much of the Extract of Rubarb; two drachms of the fix't Salt of Vipers, as much of the Mineral Bezoar, and as much of the Salt of Worm-wood; a drachme and an half of Roſin of Scammony, and as much of the Extract of Coloquintida; and a drachme of the powder of Cinnamon. Mix all theſe things together, and adding to it, as much as needs, of the Syrup of Succory, compounded with Rubarb, you ſhall make an Opiate of it, the Doſe of which may be from one drachme to two, and even to three for ſtronger Bodies.

There may alſo be made Pills, that ſhall have a vertue near the former in efficacy, to be taken in a leſs quantity. Take of the Extract of Aloes, made with the juyce

of

of the cleanſed flowers of Violets, of the extract of Rubarb, and of that of the Levant-Sena, of each two drachms; as much of the Volatil Salt of Vipers, as much of the Roſin of Scammony, and as much of the Gumm Ammoniac in drops; one drachme of Mineral Bezoar, and the like quantity of the Fixt Salt of Vipers. Reduce all into a maſs of Pills, of which the doſe ſhall be from half a ſcruple to two ſcruples.

Thoſe, whoſe ſtomach ſhall be troubled with tenacious humors, ſuch as could not be carryed away by Purges, or other remedies; thoſe, that have a nauſeouſneſs, and are ſubject to troubleſome reſentments from the Stomach, may to good purpoſe uſe the following powder.

Take of Coriander-ſeed (that is not prepared with Vinegar, according to the ill way of the Antients, but ſuch as is ſold in good ſhops,) of Anis-ſeed, of ſweet Fennel-ſeed, of the root of Lickoriſh well ſcraped and dryed, of each half an ounce; three drachms of the Volatil Salt of Vipers, and as much of Crabs-eyes prepared; two drachms of the Fixt Salt of Vipers, and as much of well-choſen Cinamon. Bring all

to

to a fine powder, and adde to it its weight, or if you will, double its weight of fine powder'd ſugar. Cloſe this mixture in a Glaſs-veſſel, or in one of the fine white Earthen pots, and cloſe it carefully. You may take of it, at a time, from half a ſpoonfull to a whole, according as you have put more or leſs Sugar to it. You may alſo adde to the powder ſome drops of the Oyl of Anis, and of the Oyl of Cinnamon, and even of Musk and Ambre-gris.

This Volatil Salt is to very good purpoſe mix't among the Sneezing powders; for beſides that it penetrates exceedingly by its activeneſs, it alſo diſcharges the Brain powerfully, and withall fortifieth it. It may be mixed with the powders of Betony, Marjoram, Roſemary, Arabic, Stæchas, Sage, and the like, not putting but a ſixth part of our Volatil Salt among theſe powders.

Thoſe that would have an Opiate, proper not onely to fortify the Heart, the Stomach, and all the noble parts, but alſo to expell all kind of Venom, and all the impurities of the maſs of Bloud, and of the ſolid parts, and to make them iſſue out at the pores of the skin, or at the other emunctories,

stories, may prepare very beneficially the following Opiate.

Take two ounces of the Conserve of Gilly-flowers, one ounce of the Confection of Alkermes, ambred and musked, six drachms of the Volatile Salt of Vipers well rectified, half an ounce of the Confection of Hyacinth, as much of the Electuary of *Diascordium*, three drachmes of the Mineral Bezoar; and of Pearl prepar'd, of Crabs-eyes prepared, of the Extract of Angelica, and of that of Carlina, of each of these the same quantity; two drachms of the Salt of Carduus Benedictus. Mix all together, and reduce it to an Opiate, by adding to it some Syrup of kermes, or the Clove-Gilly-flowers, as much as needs to give a good consistence to the Composition: Which you are to keep close for your occasions. You may take of it, for a preservative, half a drachm, at a time, in Wine, or broth; but in urging sicknesses, you may take of it a whole drachme, and even two drachms.

Those that will use the Oyl which hath been drawn by Distillation, may either employ it all alone, or mingle it with an equal quantity of *Unguentum Martiatum*, and even

even adde to it Oyles distilled of Rose mary, Sage, Lavender and the like.

Those, that shall well consider these Receipts, will finde therein not onely a fi proportion in the dose of all the particulars, but also great cautiousnes in mixing nothing with them, that may destroy o change the natnre of our Volatil Salt which is the thing, most to be avoided i the exhibition.

We might here adde many other Compositions, of which the Volatil Salt of Vipers may be the Ground; but we have contented ourselves to deliver these for examples, knowing, that there may be found divers others, good enough, in Books; and esteeming, that 'tis better to prepare them upon occasion according to exigency, and following the Receipts, which able Physitians may prescribe thereof.

We have also explain'd ourselves sufficiently in all particulars. We would have been more large, if we had not apprehended we might exceed our bounds, and undertake things, which might be thought to be beyond our reach, and to belong onely to knowing Physitians.

Those that know well to prepare this Vo-

Volatil Salt of Vipers, and to unite it well with the Volatil parts of Plants, and with the Sulphureous parts of certain Minerals, that are friendly to our nature, may say, that they have made some progress in their Profession. We labour daily, and wish our selves able in time to impart something to the publick, that may be more accomplisht.

FINIS.

A

LETTER

OF

RANCESCO REDI

Concerning

me Objections made upon his

OBSERVATIONS

About

VIPERS:

Written to

ſieur *BOURDELOT* Abbot,
and Lord of *Conde* and St *Leger*.

And

ſieur *ALEXANDER MORUS*.

Printed in Italian *at* Florence, 1670.
Now made Engliſh.

Together with

SEQUEL of NEW EXPERIENTS upon *VIPERS*, and a Diſrtation upon their *Poyſon*: Serving for Reply to a Letter written by Signor *ranceſco Redi* to M. *Bourdelot*, and M. *Morus*.

Written in French *by* Moyſe Charas.
Now likewiſe Engliſhed.

LONDON,

ted by *T. R.* for *John Martyn* Printer to the *Royal* ciety, at the *Bell* in S. *Pauls Churchyard*, 1673.

A LETTER OF
FRANCESCO REDI,

Concerning some Objections made upon his Observations about Vipers.

Written to

Monsieur *BOURDELOT*,

AND

Monsieur *ALEXANDER MORUS*.

SIRS,

FROM your liberality I have received the Book entituled *NEW EXPERIMENTS* upon *VIPERS*, learnedly posed by those noble *Virtuosi*, who du- some months had met in the House of *Charas* for that purpose. I have read ver more then once with great con- ment, plainly finding that those Wor- persons have not scrupled by their e- ent labours to confirm the Truth of se Observations, which I also had made ching *VIPERS*, until the year 1664.

And indeed I think my self much obli
to their ingenuity, and do frankly ackn
ledge, that whatever worth that rude
plain piece of mine may have, it hath
ceived it from the honourable teſtimon
given to it in *France*, where all the ex
lent Sciences and Arts do highly floriſh
the admiration of thoſe that profeſs t
in the other parts of *Europe*.

I intreat you, Sirs, that you would
me the favour to repreſent upon occa
theſe my candid and cordial ſentime
and withall to declare the high eſtee
have for that Book; the authority of wh
is ſo venerable with me, that, having fo
therein ſome few things directly contr
to my own Experiments, I have o
doubted of my ſelf, and been almoſt re
to believe, that I dream'd when I m
and when I wrote them. But ſome of
Learned Friends, that were freque
preſent at thoſe my Operations, have la
ed at me for that proneneſs of my bel
and between jeſt and earneſt aſſur'd
that thoſe Experiments had by no m
ſo ſucceeded with me in a dream. N
withſtanding which, without any regar
their aſſeverations, I reſolved to ite

l reiterate them, and that with ſo great
careful diligence, that I ſhould greatly
ure my ſelf and Truth, if I ſhould not
ely and candidly tell you, that all thoſe
r or five Experiments, which to thoſe
ntlemen in *France* have not ſucceeded,
ſucceed with me in *Italy* without fail,
hey were formerly recorded by me; on
contrary, thoſe will not ſucceed with
that have been made in *France* and are
itrary to mine.

And ſince you may perhaps have the cu-
ſity as to deſire to know of what kind
y are, I ſhall here give you a brief ac-
int of them; aſſuring my ſelf, that it
l be acceptable to all the Lovers of
uth, but eſpecially to the Authors of
Book of the *New Experiments*, who
e been induced to write by no other
tive then the ſole deſire either to con-
n or to find the Truth of a matter ſo cu-
us, of which ſo many underſtanding men
e written.

In my Letter then of the *Obſervations*
ut Vipers, addreſſed to the Illuſtrious
renzo Magalotti, ſpeaking of the Poi-
n of thoſe creatures, both what it is, and
what part of the Body it reſideth, I af-

firm'd (as I affirm ſtill) that the Poiſ
of a Viper is nothing elſe then a certain y
lowiſh liquor, which lodgeth in the veſic
that cover the greateſt teeth of the Vipe
and that that Juice is not only poiſono
when it is ejected by the live Viper wh
ſhe biteth, but alſo when 'tis colle
from a dead Viper, and even ſuch an
that hath been dead many days, provi
it be made to paſs into a wound, and
main there. Moreover, I added, that t
ſame liquor, when taken down into t
ſtomach, is not deadly, no not ſo much
noxious. And this was my opinion, whi
hath been confirm'd to me by innumeral
Experiments, made with the greateſt exa
neſs I could employ.

But the Authors of the Book of the *N*
Experiments do reſolutely write, Th
that above mention'd Liquor is not poiſo
ous, but a meer and a moſt innocent *Sali*
or Spitle. Thence they go on to affirm
an undoubted and experimented Trut
that the Viper hath no part of her boc
neither limb nor humor, able to poiſo
and that all her poiſon conſiſts in the ſ
imagination of the Viper, irritated a
made angry by the *idea* of vengeance, whi

hath conceived in her head; by the rans whereof the ſpirits being put into a olent motion, are darted through the rves, and at times through the Fibres of cavities of the Teeth, by which cavities oſe ſpirits are carried to infect the blood the animal, by the opening made with biting teeth. In ſhort, they conclude, t if a Viper be not angry, and have not it vindicative imagination, her bitings never poiſon, but are very innocent, uſing no miſchief at all to him, in whom ey are made. For theſe are their words; Pag. 36. in the Engliſh Verſion, *Theſe ſiderations, ſupported by many Experi-nts made by Us, and to be related hereaf-, have induced me to call theſe Glands* lival, *and to aſcribe to them the very ſource that yellow liquor, which hath been ſo much cried, and withal ſo little known; and is thing elſe, but a pure and a very innocent pitle. I hope that thoſe who ſhall take the ins of examining after me, theſe Glands, d this Juyce of the Gums, will not ſtick to ve me their ſuffrages.*

Item p. 105. 106. *But not to ſtay upon inciples ſo ſlightly eſtabliſhed, and ill main-in'd, foraſmuch as we have on our ſide a*

great number of Experiments, upon wh
we are grounded: We say, that this Juic
nothing but a pure and plain Saliva, *of wh*
we have already observed the use; and t
this Juice contributes nothing to the venom
ness of the Biting, since being tasted and sw
lowed (as we have often experimented)
doth no hurt to man or beast; and since a
being put upon open wounds, and upon incisi
made in the flesh, the same being rub'd the
with, and mingled with the blood, it ann
nothing at all; notwithstanding the judgm
of a Person very intelligent, and particula
in this subject of Vipers, who assures to ha
made a great number of Experiments, wh
being contrary to ours, the great opinion
have of the abilities and the sincerity of th
famous man, hath obliged us to employ the m
care and exactness, and to confirm our sel
by a very great number of Experiments, whi
have always been found alike in the truth
here assert, and of which we shall make ev
dent and irrefragable proof.

Item p.cog. *We conclude therefore, that t*
imagination of the Viper, irritated by the id
of revenge, which she had framed to her se
gives a certain motion to the spirits, whi
cannot be expressed, and pushes them violent
throu

ugh the Nerves and their Fibres, to the ity of the teeth as into a funnel, and that n thence they are conveyed into the blood he animal by the opening, which they have e, there to produce all those effects, of ch we endeavour to give a reason.

tem pag. 111. *However this be, we must in agree, that this irritation in the fansie the spirits of the Viper, is the main cause be activity and piercingness of its venom, that without it the biting would not pro- such surprising effects, as those are, of ch we have related so many examples.*

tem pag. 138. *These Experiments will ve on the one hand, that the yellow liquor ributes nothing to the poyson; and on the r, that these incensed spirits, assisted by openings, which the great teeth had le for them, are the sole and true cause reof.*

These sentiments they confirm by some periments, all which consist in this, that y had drop't a quantity of that yellow uor into the wounds of a Pigeon, a Dog, l some Pullets, which yet dyed not of and that having caused a Pigeon to be ten by a Viper not enraged, the animal eived thence no hurt at all. For they

say,

say pag. 115. *We also made a trial up*
Pigeon, which we wounded under the n
and in the Leg in the same moment of ti
and we let into each wound some of this ye
liquor, which just afore we had drawn f
the gums of two enraged Vipers; then we
joyned the skin well, to enclose the said liq
and we bound both wounds over with a ba
that nothing might run out. We can ass
that the Pigeon felt not any inconvenie
from it, and that we even found upon
wound, made in the Leg, a coagulated dro
the juice, round, and of the same colour as
had put it there, and the blood of the wo
dryed, and that, soon after, both wounds w
dried up, and healed of themselves.

Pag. 116. *We also made the like Exp*
ment upon a Cat, which we purposely woun
in the Leg, but he received no harm at a
it: We have also often experimented it on I
lets, and other Pigeons, but alwayes with
like success, and without any offence to
Animals.

Ibid. *The same Trial hath been th*
made at three several times, and even tw
in one day upon a Dog, whom we had woun
on purpose towards the bottom of the E
where he could not lick his wound; and
mischief at all followed upon it. It

Ibid. *We cannot but add here an Experi-*
nt of the mortal effect of the Enraged Spi-
, without any intervention of the yellow
our. We made a Viper several times to bite
n a slice of bread, by pressing every time
jaws against the bread; and we did this so
n, that not only that juice was altogether
hausted, but the blood began to come out of
Vessicles. At the same time we vexed
Viper, and made her bite a Pigeon in the
t fleshy part; and we observ'd that indeed
effects of the venom of the biting were
so quick, the Pigeon not dying but an hour
l an half after it had been bitten; but then
found also, that the teeth of the Viper were
a manner covered with the crums of the
ad, from the force of her having bitten at
and that that had hindred them from ma-
g a deep entrance; and that having half
't up the pores of the teeth, a good part of
e angred Spirits could not come forth; so
t the death of the Pigeon could not follow
fast, though yet it hapned without any mix-
re of the juice, which had been altogether
ptied.

Pag. 138. *The wound made by a Viper*
t vexed, whose Jaws were held in, and
hose teeth were at the same time thrust into

the

the body of a Pigeon, which also was accompan with store of the yellow juice, and yet not tended with any ill accident.

To these Experiments I have noth else to oppose, but those very many o that were made by me in the year 1664. a recited in the above-mentioned *Observa ons* of mine *about Vipers*, and those also t I shall recite hereafter, made likewise my self, not with a desire to confirm the fi but indeed to discover the Truth. A that I may not be put often to repeat sc things, I shall premise some General Obs vations, made by me at the time when I de in Vipers.

1. A viper more easily kills a Pigeon Pullet, a Turky-cock, a Squirrel, a D mouse, and generally all small Birds a Animals, than a great Animal, as a She a Deer, a Horse, a Bull; yea these great ones and those that are of an hard skin, ve often a Viper kills not at all.

2. According to the bigness of the A malbitten, and according to the place wh the Viper biteth, death follows sooner later; especially according as the pla wounded is a clear texture, or thick with veins and arteries; or those veins a arteries are very small or big. 3.

3. If from the wound of a Viper much od iſſueth, it ſometimes happens, that Animal not only dyeth not, but does ſo much as feel any great inconveni-ce.

4. It doth alſo not ſeldom fall out, that Animal bitten by a Viper ſuffers grie-us Symptoms from the poyſon, which ing it near death, but yet kill it not; the creature without any help of Phy-k and by the ſole work of nature reco-rs.

5. Thoſe Animals that are bitten of a per dye a little ſooner, than thoſe, into wounds of which hath been on purpoſe nveyed that yellow liquor, which by hath been fetch't out of the baggs of the eth of that Viper.

6. 'Tis neceſſary, that great dexterity uſed in making the ſaid liquor to enetrate into the wound; becauſe, if the ound be narrow, it pierces difficultly; large, it cannot be otherwiſe but it will leed, and with that blood the ſaid liquor ill turn back, and ſo the poiſon come out gain.

I had then provided a good number of ipers which I cauſed to be brought me out of

of the Kingdome of *Naples*; and having this moneth of *May*, 1670 wounded Pigeons of the bigger sort in the thighs put into them some of the yellow liqu freshly taken out of the mouth of the l Vipers; and all these Pigeons, some wit the space of one hour, some in half an ho and some in two hours, died. This Ex riment I repeated upon ten Chickens, li wise wounded in their thighs, with the sa event that had befallen the Pigeons.

Then I cut off the heads of twelf Vipe and all the heads being cut off, and the V pers quite dead, I thence extracted the po son, and caused them to be put into t wounds of eight Turtle-doves, all which d ed in the space of half an hour.

In the month of *June*, having killed m ny other Vipers, and gather'd out of the ba of their teeth and their gums all the yello and viscous Juice that was there, I anointe therewith some beesom-rods, sharpn'd li arrowes, and immediately I pricked wi them ten young Pigeons in the more flesh part of their chest, leaving them fixed in t wound; and the Pigeons survived not abo two or three hours. But lest it should b doubted; whether these Pigeons died n

ne wound it ſelf, enraged by the pun-
es of thoſe rods, I made a trial upon
other Pigeons with rods not infected
h that poyſonous liquor; but none of
n dyed, though the wounds became pu-
nt.

alſo took eight heads of Vipers, cut off
hours before, and, the Vipers being quite
d, I cauſed eight Turtle-doves to be
en by them in the thigh, and not one of
n eſcaped.

Moreover I made the heads of fifteen
ers to be cut off: and put them into a
s-veſſel well cover'd, having laid them
n one another, that ſo they might remain
iſt. Four dayes after, I ſtruck with thoſe
ds five young Cocks, and five great Pi-
ns in the thigh, and they all after a little
ile died. The like fell out with other
er-heads, which having been killed ſix
es before, had in all likely hood loſt all
ller and thoughts of revenge. And to
vent all Objections that might be raiſed
this occaſion, I ſhall not omit to relate
you, that about the beginning of *Auguſt*
en two of my Vipers, that alone were
t me in a box, died of themſelves of ſick-
s, I cauſed two Turtle-doves to be ſtruck

by

by them, which also, like the former, d
in less than an hours time.

But I may go further. I had collec
in a glass all the poisonous liquor of
heads of two hundred and fifty Vipers,
make various Experiments therewith u
occasion. But being by much busines
dred, I delayed to accomplish my desi
Whence that liquor turn't first into a gl
colour'd like amber; then in 30 daye
became altogether dry and friable, so t
it could easily be reduced to powder
ing pulverised, I had a mind to try, w
ther that powder, let into a wound,
keep the force of poysoning; and I fo
that really it did so, all those Pullets, Pi
ons, and Turtle-doves, into the wound
which I had put some thereof, dying of i
a little while.

Having made this Experiment, I be
to doubt, whether that poyson of the
rowes of the King of *Macassar* in the Isl
of *Celebes*, which commonly are called
arrowes of *Bantam* in *Java Major*, were
the poyson extracted out of the mouth
some Viper, or of some other Viper-l
serpent, and perhaps of a more maligne
ture because of the diversity of the Clim

not much averse from believing this to
o; and it may be confirmed by what I
read in *Pliny*, *viz.* That the *Scythians*
infect their Arrows with a Viperin poi-
His words are, *Scythæ sagittas tingunt*
rinâ sanie & humano sanguine: irremedi-
id scelus mortem illicò levi tactu affert.
this was perhaps extracted by *Pliny*
of *Aristotle*, who in h s Book, intitul'd
θαυμασίων ἀκουσμάτων, soon after descri-
the process of preparing it, which I dare
affirm to be the true one, or to requi e
many circumstances and cautions. And
knows, whether the Arrows of *Hercules*,
which the Fables alledge that they were
ued with the blood of an *Hydra*, were
infected with this poison of Vipers? So
believed by *Diodorus Siculus*, when he
, Τῆς ἀνιάτου τὴν ἐκ τῆς ἐχίδνης ἰὸν ἀνειλεφυίας.
Ovid gives the name of Viper to the
lra, when in his ninth Book of *Meta-*
ph. he saith;
irs quota Lernææ serpens erit unus Echidnæ.
l afterwards;
——— *Capit insscius heros,*
duiturque humeris Lernææ virus Echidnæ.
which may be added, that *Philoctetes*,
Heir of the Bow and Arrows of *Hercules*,
ng gon in the Grecian Navy to the *Trojan*

War, and having unawares wounded hi
(as *Servius Grammaticus* relates, *l.*3.*Æn*
with one of his Arrows in the foot; was
among the Grecians in the Isle of *Stalim*
by reason of the violence of the pain,
the intolerable stench of the wound. Wh
Sophocles, alluding, it seems, to the kin
poison, in a Poetical way and phrase
teth, that *Philoctetes* was left in that Isle
cause he had been bitten by a Viper.
words are;

Ὦ τέκνον, ὦ παῖ πατρὸς ἐξ Ἀχιλλέως
Ὁ δ' ἐγὼ ἐγώ σοι κεῖνος, ὃν κλύεις ἴσως
Τῶν ἡρακλείων ὄντα δεσπότην ὅπλων,
Ὁ τοῦ Ποίαντος παῖς Φιλοκτήτης; ὃν οἱ
Δισσοὶ στρατηγοὶ χὠ Κεφαλλήνων ἄναξ
Ἔρριψαν αἰσχρῶς ὧδ' ἔρημον, ἀγείᾳ
Νόσῳ καταφθίνοντα, τῆς δ' ἀνθρωφθόρου
Πλήγεντ' ἐχίδνης ἀγείῳ χαράγματι: *That*

O Son of Achilles, *I am he, whom thou m*
have heard to be the possessor of the Hercu
Arrows, the Son of Pæan Philoctetes: *w*
the two Armies and the King of the Isle of
phalene *shamefully left lying here, pining a*
by a cruel disease, struck by the fierce bite
murthering Viper.

And *Cicero* himself in his second Book
the *Tusculan Questions*, and in his Book
Fato, and many other Writers do follow
opinion, *viz*, That *Philoctetes* was bitten

a

per. And possibly all of them had an
not only to this place of *Sophocles*, but
to what *Homer* said before, in his six-
ith Book of *Iliads*.

And though against this conjecture it may
aid, that the poison of Vipers is incon-
rable in respect of what Poets do write
he Arrows of *Hercules*, which by them
aid not only to have the force of killing
nout fail, whether the wound be small or
it, as happen'd to the Centaure *Chiron*
to *Nessus*; but also that the blood of
r wounds was become so pestiferous as to
t any live body whatsoever, touched
reby, and that with such violence, as to
e the flesh fall off from the bones: which,
add, was experimented by *Hercules* to
great mischief, when his Shirt was tinged
h the blood of *Nessus*; whence *Ovid*
h,

Victa malis postquam est patientia, reppulit aras
Implevitque suis nemorosam vocibus Oeten;
Nec mora, letiferam conatur scindere vestem;
Qua trahitur, trahit illa cutim (fœdumque relatu)
Aut hæret membris, frustra tentata revelli,
Aut laceros artus & grandia detegit ossa:

is is a Poetical Fable; whence, I am apt

to believe, is raiſed that relation conce
ing the Arrows of *Macaſſar*, of which
ſaid, that they kill one in that very mom
he receiveth the ſlighteſt wound thereby,
that alſo in the ſpace of half an hour the fl
of the killed perſon becomes ſo putrif
that it falls off from the bones in many pie
whence do exhale ſuch virulent ſteams, t
if they light upon any ordinary and not er
nomed wound, they mortally infect it,
without fail kill the Patient.

I do here affirm, that I have made m
tryals with thoſe Arrows of the Indians,
have not found them in *Tuſcany* of ſo fie
and malignant a nature, as hath been relat
The Dogs I wounded with them, dyed ſ
of them in ſix, others in ſeven, others
twelve, others in twenty four hours.
their fleſh was not putrified, nor fallen
pieces, nor did their blood or exhaled ſte
at all kill other wounded Animals. Bu
have often obſerved, that, if one intend
kill with theſe Arrows, it is not enough
make a ſimple inciſion of the fleſh, but
muſt by art make them ſtick a while in
wound (which is like to what happens
putting into wounds the powder of the d
ed yellow liquor of Vipers:) Whence i
that thoſe Savages make of Wood the ſha
e

s of thoſe Arrows, imbue them with poi-
, and then joyne them to the Arrow ſtick
uch a manner, that thoſe ends ever remain
he wound, whether the Arrow do break
be drawn out; as came to paſs in the Siege
Jeruſalem to thoſe Heroes of *Flandres*, *Go-*
red and *Robert*, of whom that great Floren-
Poet thus ſingeth:

Soſpingeva il monton, quando è percoſſo
Al Sig. de Fiaminghi il lato manco,
Si che travia s' allenta, è vuol poi trarne
Lo ſtrale, e reſta il ferro entro la carne:

That is,

The Engine diſcharged, the left ſide of the
ndrian Princes was ſo ſtruck, that they were
uſt out of their way, and when they would
w out the Arrow, the Iron ſtuck within
ir fleſh.

It is therefore neceſſary, that the Arrows
ſtick for ſome time in the wound, if they
ll kill: Whence I underſtand not, how
e vulgar comes to fanſy, that the Blades of
ords may be envenomed. I do well re-
mber, that with the yellow liquor of Vi-
ers, and with other things eſteemed veno-
ous, I have ſometimes ſlightly tinged Lan-
ts for letting of blood, and with them have
t the vein of ſome Animal or other, but
ath hath not followed upon it. Let ſuſpe-

ding men rather beware of the Tents Chirurgions ; for 'tis too hard to ca death by poiſon'd Lancets or other ſuch I inſtruments. Hence it ſeems to me to ſa of the fable (though the caſe be differe that *Pariſatis* the old Queen of the Perſia did poiſon her Daughter-in-law by the ha of her Carver, poiſoning the one ſide of Knife, and therewith cutting aſunde Fowl, of which he gave to the young Qu to eat that part, which the poiſoned ſid the Knife had envenomed, eating the ot part himſelf.

I could never ſee the truth of what is lated of poiſons killing by a meer and r mentaneous contact, or by vicinity alo as that Stirrups, Sadles, and Benches h been poiſoned, and thereby proved mor Let him believe it that will; I cannot. A what a certain modern Writer relateth fo great truth, concerning a prodigious ac dent hapned by a kind of Serpents bred the Indies, I muſt leave to himſelf, who ſai *After I have ſpoken of theſe Serpents, I preſu it will not be unacceptable to give an account the ſtrange effect they produce. If perchanc happen, that they paſs over a cloath or ſhirt d ed in the Sun, there is wont to be bred in Kidneys of thoſe that uſe this cloath, a cert*

k

of Serpents, which little by little growing encompaſs the whole body, and when their reaches their head, to conjoyn the circle, death is unevitable: Wherefore, to avoyd miſchief, they kill them with Razors and cets, to prevent their growth.

You have found above mentioned three ſons, wounded by the Arrows of *Hercu-* namely *Chiron*, *Neſſus*, and *Philoctetes*. two firſt dyed ſuddenly; the third, af- a long ſickneſs eſcaped. If the cauſes of s difference were to be given (whether it an Hiſtory or a Fable) I ſhould ſay, that *eſſus* and *Chiron* dyed, becauſe they were unded whilſt *Hercules* was yet living, by rows freſhly envenomed; beſides that *eſſus* was pierced through his heart, as *O-* hath it,

Jámque tenens ripam miſſos cùm tolleret artus,
Conjugis agnovit vocem, Neſſóque paranti
Fallere depoſitum; quò te fiducia, clamat,
Vana pedum violente rapit? Tibi, Neſſe biformis
Dicimus, exaudi, nec res intercipe noſtras.
Si te nulla mei reverentia movit; at orbes
Concubitus vetitos poterant inhibere paterni.
Haud tamen effugies, quamvis ope fidis equinâ,

Vulnere, non pedibus, te consequar. Ulti
dicta
Re probat, & missâ fugientia terga sagitt
Trajicit; extabat ferrum de pectore aduncu
Quod simul evulsum est, sanguis per utru
que foramen
Emicuit, mistus Lernæi tabe veneni.

But *Philoctetes* was wounded long after t death of *Hercules*; whence 'tis credible, th those Arrows had loſt much of their poiſo ous force, even as the powder of the yello liquor looſeth of its force, and the Arrows *Macaſſer* by length of time grow languid which though they poiſon and kill if one wounded therewith, yet do they no hurt all, if their poiſon be ſwallow'd and tak into the ſtomach. Which Experiment I ha tryed upon two Doggs, to whom I gave ſwallow two pieces of fleſh covered wi the powder of the ſcrapings of ſuch Arrow as alſo upon ſeveral Chickens, to whom gave the water to drink, wherein thoſe ſh vings had been a long time infuſed.

But, to return after this long digreſſio to the main thing; you may by the above r lated and often repeated Experiments, ſe that the poiſon of the *Italian* Viper conſiſ not in an imaginary *idea* of anger raiſed t revenge, but rather in that yellow liquo

ich is voided out of the bags of the big- teeth of Vipers; which juyce if it chance be ſpilled in the mouth and upon the lat of thoſe animals is able to envenom ſpittle which moiſtens their throat.

ſhould think it very well worth while thoſe learned Authors of the book of *New Experiments*, that they would aſe to make their Experiments anew. d if they ſhall find them conform to thoſe y have already publiſhed, and really con- ry to mine, then we may unanimouſly con- de, that we have lighted upon a truth hi- rto unknown; which is, That the Poiſon the *French* Vipers conſiſts in an imagina- *Idea* of a revengeful anger; but that of *Italian* ones hath its ſeat in that yellow uor, ſo often mentioned by me. But if on other ſide, the *French* Experiments uld not hold, then it may be affirmed, t the *French* as well as the *Italian* Vipers e of one and the ſame nature; and have ſame kind of poiſon.

Wherefore if in *Italy* the Viperin poiſon rtainly lodges in that yellow liquor, it ll be no untruth in me to affirm, that if by ting, a Viper ſhould have loſt all that juyce ſiding in thoſe bags, and that alſo which y be furniſht by the neighbouring parts, it will

will, I say, be no untruth in me to affirm that the subsequent bitings will not be mortal: which is the thing I have these many years asserted, and do still assert, although the abovesaid Authors deny it, giving out that one only Viper, being vexed and swelled with choller, is able to kill as many animals as she bites; they trusting to one Experiment, in which they say there died five young Pidgeons by the biting of one only Viper. I *hope* (say they, p. 137.) *that among the many Experiments those of the five Pidgeons, bitten one after another, by one and the same viper exasperated every time, and of which the last bitten died first of all, when the viper was most vexed, and most exhausted of its yellow liquor*, &c.

I am willing indeed to believe the fact to be true; but for the confirmation of it I would they had caused many more such Pidgeons, and many other animals, of different kinds and bignesses, to be bitten of the self same Viper, which had killed those five ones, to see whether that angry and cholerick poison had an infinite power. For when I examin'd the matter, I chose about the beginning of May a Female Viper, one of the biggest and lustiest, and vexed her to bite ten Chickens one after another, in the right thigh; of which

t: firſt, ſecond, and third died almoſt in an
ſtant; the fourth ſeemed only to be ſick;
t the fifth and all the reſt did not only not
e, but were not at all ſick; and yet every
ne the Viper did bite, I angred and madded
r exceedingly. In the moneth of *June* I
peated the experiment in five tame *Ducks*,
tten by one and the ſame Viper, which alſo
mediately after bit three young *Turtle-*
oves. The firſt wounded Duck dyed three
urs after; the ſecond, five hours after; but
e reſt eſcaped. 'Tis true, that the firſt
ounded of the Turtles dyed, but not the
her two. Of twelve *Ring-Doves* at one
ne there dyed but four; but the next day
twelve others there dyed ſix. Of five *Rab-*
its there dyed three; and of three *Lambs* the
o laſt lived, the firſt of them dying two
urs after it had been bitten.

I ſhould be too tedious, if I ſhould relate
you all the other experiments: Wherefore
ſhall go on to add, that having written in
y *Obſervations*, that that yellow liquor was
t conveyed to the bags of the teeth from the
ladder of gall, I did ſuggeſt, whether it
ight not be diſgorged there by certain ſe-
eral *Ductus's*, that might be inſerted at the
ead of them: which did appear the more
robable, becauſe that in all Vipers at the

bottom

bottom of those vesicles I had always fou
two glanduls, which had not, that I kne
been observed or described by any bod
Whereupon the Authors of the *New Expe*
ments do affirm, that they could never f
such Glanduls as I had named; but that i
stead of them they had found two othe
which they call Salival, thus by them desc
bed, *p.* 31, 32. *I believed at first, followi*
Signor Redi, *that there might be Salival v*
sels in Vipers, as there have been lately found
Man and divers other Animals; so that af
many re-searches made with sufficient attenti
and patience, in many Vipers heads I discover
at length such Glands, proper to forme th
juyce, and to convey it to the Bags; and afte
was well perswaded of it my self, I shewed th
to divers of those knowing Physitians, that h
met at my house the last year. These persons h
a mind to see them with their own eyes; and a
ter I had well examined the parts which I shew
ed them, they not only found them true, but th
also saw there a greater number of smaller ve
sels then had appear'd to me, of which some th
are Arteries and Veins pass above the Glana
and others that are Lympheducts run below;
that they judged, that I could confidently asse
and describe these Glands which I call Saliva
and which they had acknowledged together wi
me

n; *though* Signor Redi *durſt not ſpeak poſi-ely of them, becauſe he had not diſcovered m*; *neither had they been deſcribed by any thor of their knowledge, nor by any one of ne.*

And pag. 35. *As to the ſmall Glands, which* Signor Redi *hath obſerved at the bottom of the ſicles that contain this juyce, I can ſay, that I ve with great care and diligence ſearched af- them, and that 'tis true, I have there found e appearances of Glands, but having opened em, I ſaw nothing in them but ſmall teeth that re faſtned there, without finding any thing of Glaudular nature there, nor that did in the ſt approach to the ſhape, ſubſtance, or quali-s of the Glands which I have been deſcri-ng*, &c.

I do not at all wonder that thoſe Writers ve not found thoſe Glanduls I named, I ſee-g they went about to ſearch them within ie Veſicles of the teeth, and at the bottom of em: Whereas I never ſaid that they were to e found within them, I ſaid they were to be und *Sotto 'l fondo* (under the bottom) of oſe bags, and in good *Tuſcan* language, tis nother thing to ſay *nel fondo*, (in or at the ottom) another *Sotto 'l fondo* (under the bot-m.) And therefore when they ſought them here they are to be met with, they eaſily found

found them, and they are the ſame which th
deſcribe, neither are there any other co
derable glanduls to be diſcovered in the he
of Vipers. Nor could I at all write that th
Glanduls lay in the bottom of the Veſicles,
I was of opinion that the yellow liquor d
run into them after it had paſſed through t
Salival Conduits, which yet I imagined mig
have their origin from, or connexion w
thoſe two Glanduls ſeen by me, and therefo
muſt needs be in a ſcituation a little diſta
from the Veſicles, and not in the bottom
them. Now whether theſe Glanduls have th
office and this uſe, I intend not now to ſpe
of, let it be what it will, 'tis too inconſider
ble a matter to make any more words of it.

I confeſs, that the dangerous experimen
which Vipers have, made them ſo diſpleaſi
to me, and even ſo odious, that I reſolv
not at all to meddle any more with them; b
that I was tempted thereto by a great deſi
I had experimentally to learn, whether t
volatil Salt of Vipers, Chymically prepare
were endowed with that preſent and infal
ble vertue of curing the bitings of Vipers,
the ſaid Writers affirm. For my *Geni*
keeps me from much truſting to thoſe thing
that have not been made out to me by Exp
riment; although I do not preſently reje
the

m as falſe before Experiment, but rather ing deſirous to know whether they be true, ut them to tryal: But neither do I acquie in one or a few experiments, but I love to more and more, being ever apprehenſive t I ſhould be deceived; as it often hath happ'n'd to me, when I have been ready to conie in one haſty experiment. And to ſay truth the moneth of *June* there wanted not much t that I had impoſed upon my ſelf in the al of an experiment, which I am going to late to you, and which done I ſhall eaſe you further trouble.

Having read them in the Book of the *New xperiments*, that the Head of a Viper, being en of an animal, bitten by another Viper, d certainly cure the wound; and the thing ing by me looked upon as very uſeful, exllent, and admirable, I had an eager deſire to y it my ſelf, that I might ſpeak of it with re confidence, although thoſe learned men d made theſe two following experiments of *viz.* pag. 120. *We had alſo a deſire to find ether a Viper being eaten by an animal, which had bitten before, would be cured of that biing. We therefore cauſed to be ſlightly broiled e head of a Viper, which had on it a part of the ck, newly ſever'd from the body; and we caud a Dog to be thrice bitten at the ear, by a well enraged*

enraged Viper, in such a manner that the bl
came out at the three pricked places. We soon c
before him the head and neck broiled, and
hot. The Dog, that was hungry, and felt not
soon the effects of the bitings, immediately se
ed on the head, bruised it between his teeth, a
swallowed it down. After which we stay'd a pr
ty while to see, whether the three bitings wo
prevail over the devour'd head and neck; but t
Dog was free, except some blewness and a lit
Tumour he had at the places bitten, but wh
little by little vanisht in three or four days.
made also a Dog to be bitten three times in t
same place, and without broiling the head of t
same Viper that had bit him, we cast it bef
him, hoping that he would eat it, because he h
not eaten any thing for many hours before ; b
the Dog would not touch it. Upon that we brui
and stamped that head in a mortar, and so cra
it down the Dogs throat, rubbing also the bitt
places with the blood of the same Viper ; wh
done, we expected the success, which was, t
this head, raw and bruised, and if you will, a
sted by the blood of the Viper, being applied to t
part bitten, had produced the same effects w
the former, which had been slightly broiled ;
regard that this Dog was safe, excepting th
inconveniencies the former suffer'd, and was
ter that as sound as if he had never been bitt

ese two Experiments had been made before Gentleman, above discours'd of, was bitten Viper, we should have been in much less anx- for his preservation.

And a little before (pag. 119.) they had : *We have tryed, that having caused to be en at the thickest place of the car, by a suffi- tly vexed Viper, a young Cat, very lean, had but just before eaten the Eggs, the Ma-, and all the Guts of a Viper; the biting had ost no effect, and there appeared nothing but ry little swelling, and a very inconsidera- lividness in the part bitten.*

And pag. 154. *It is very certain, that the id of a Viper, broiled and swallowed, healeth biting of that Animal. The Heart and the er may do the same. Reason and Experience e confirm'd it; and therefore in an urgent sion these parts may be very beneficially em- ed.*

And pag. 156. *We believe, that the Liver llowed is capable to heal the biting of a Vi-, like the heart, flesh and other parts, of which have spoken; and that it may much facilitate delivery of Women with Child, as doth the ver of Eeles.*

Hereupon I resolved to imitate those Gen- men, and having given a Vipers head half iled to a chain'd young Dog, I caused him

immediately to be bitten by an other Vi
in the right ear, but the Dog dyed not,
did he appear to me to have any other inc
venience than that he ſtood as 'twere amaz
and looking grim, and melancholily, for fou
five hours ſpace. I ſoon reiterated the ſ
Experiment upon another Dog, which
ving been forced to ſwallow the head of a
per, raw and bruiſed in a Mortar, gave
ſign of any great poiſon, and had very li
and almoſt no ill enſuing. Whence I was
dy to reckon this Experiment among th
proved and true, when a doubt coming i
my mind, obliged me to cauſe two o
young Dogs to be bitten in their ears, wh
though they had not eaten the counter-po
of a Vipers head, yet dyed not. Whence
ſuſpicion being increaſed in me, I cauſed
be brought me the raw head of a Viper,
crammed it into the throat of a young Pul
and then had its left thigh bitten by a Vip
whereupon it preſently fell to the grou
and in a little more then the eight part of
hour died. Whence the ſuſpicion grow
ſtill greater, about ten a clock in the mo
ing I made a Capon to eat two raw heads
Vipers, and afterwards about twelve a clo
I made him ſwallow two others, and wi
out loſing any time I cauſed him to be o
bit

tten by a Viper in the thigh, and the Capon mediately dyed, without finding any good the four ſwallow'd heads. The next day repared for two young Dogs a diſh of Vi-r-heads parboiled, but they would not eat m, and we were forced to cramm them wn: Soon after, the leſſer of the two Dogs s bitten in the thigh near the groin, and the ger in the tongue; and they both dyed. And the like manner dyed eight Chickens, two lings, two young Hares, and ſix Turtle-ves, likewiſe bitten by Vipers, and Phyſi-d not only by their heads, both raw and led, but alſo having their wounds waſhed h the Viper-blood. And I remember, that I ſed thoſe 6 Turtle-Doves to be bitten not the heads of live Vipers, but by thoſe of d ones, and ſuch as had dyed two days be-. Moreover, I continued for three days ceſſively to cram two ſuch other Doves h Viper-fleſh, and gave them no other nk then the broth of that fleſh; and yet y could not eſcape death, being bitten by iper.

Whence I am inclined to believe, that in *Icany* the fleſh of Vipers is no help or reme-, at leaſt no conſiderable one, to Animals ten by Vipers. Mean while I refer my ſelf he Learning, Experience, and Authority

of thoſe noble perſons, to whom I do m
willingly ſubmit this or any other opinion
mine, and with whom I would never entert
a controverſie. For I ſhould apprehend
it might befall me, what *Marcus Tullius*
wont to ſay of *Cato*, viz. That it was not
troubleſome to him to anſwer to the autho
ty of *Cato*, then to his ſtrongeſt arguments.

For the reſt, I earneſtly intreat you, S
that you would pardon the rudeneſs of
my Letter, ſufficiently appearing to h
been written by a perſon full of buſineſs,
ther then enjoying leiſure; and that you wo
pleaſe only to regard the naked truth, wh
without any paſſion I did undertake to
late.

A C

A CONTINUATION

Of the

NEW EXPERIMENTS

CONCERNING

VIPERS:

TOGETHER

ith a Discourse touching their Poyson: By way of Reply, to a Letter written by Signor *FRANCESCO REDI*, to Messieurs *BOURDELOT* and *MORUS*; Printed at *Florence*, 1670.

By *MOYSE CHARAS.*

English'd out of French.

LONDON,
Printed by *T. R.* for *John Martyn* Printer to the *Royal Society*, at the *Bell* in S. *Paul's Churchyard*, 1673.

A CONTINUATION
Of the
NEW EXPERIMENTS
CONCERNING
VIPERS.

inisht in the Press at Paris, *August* 4. 1671.

I Believed, I had sufficiently establish'd my opinion touching the *Poison* of *Vipers* by abundance of Experiments, supported by Reasons, heretofore ade publick: But there hath since appear'd t *Paris* a Letter of Signor *Redi*, in which e opposes my sentiments: And he being a erson, whose merit hath acquir'd him a great eputation among the Learned, that Letter f his hath not been without making some impression in the minds of many, and in some even of those, that had relish'd my opinion, in

favour of which they seem'd to have alrea
declared themselves.

I might indeed have defended my self as
that which is against me in that Letter, so
after it appear'd; having reasons strong a
numerous enough to maintain and justifie
I had advanced in my writing: But I thou
it better to deferr it till Spring, to the e
that after I should have made New Expe
ments, and the more assur'd my self of all
might, by a renew'd knowledge of the tru
afterwards the better perswade the publi
thereof. It will therefore appear by this S
quel of Experiments, here set down, that I a
so far from changing my Opinion, that I ha
reason to be more strongly than ever confi
med in what I embraced at first.

I do herewith sincerely declare, that wh
I published my book, my chief aim wa
faithfully to relate all the truths I had disc
ver'd, and not to offend Signor *Redi*, whom
exceedingly esteem and honour for his ra
Talents, and whose friendship I hope to ha
a share in; so far was I from pretending t
do any thing that might make him write a
gainst my Book, or from fore-seeing that e
ver I should have occasion to labour to de
fend my self against him: Which yet I sinc
found otherwise, by the Letter he hath writ
ten

e againſt me, and even without honoring
with a Copy of it, wherewith he hath gra-
d many perſons at *Paris* and elſewhere, e-
after I had had the advantage of ſome Let-
ry Commerce with him, as I might eaſily
ifie.

can beſides proteſt, that when I reſolved
ontradict certain points of his firſt Let-
it was in a manner againſt my will, and
auſe I could not at all diſpenſe with it, ex-
t I would have baffled my ſenſes, and that
it I ſaw my ſelf, together with a great num-
of witneſſes. I can alſo aſſure, that I
uld now be very ready to un-ſay what I
e affirm'd upon this ſubject, and to agree
h him, if I were not altogether perſwaded
the contrary in the main things he hath
tten againſt my Sentiments.

After theſe Proteſtations, being well aſſu-
as well by Reaſon, as by many new Expe-
ents newly made, that I have aſſerted no-
ng but what is true; I found my ſelf in-
penſably obliged to maintain it, and to
der a good office to the publick, by endea-
ring to ſhew that 'tis very difficult reaſo-
ly to oppoſe any thing to the contrary.

The difference between Signor *Redi* and
conſiſts chiefly in this, That he Pretends,
Jellow Liquor contain'd in the Veſicles

of

of the Gums of Vipers, to be the only a
true ſeat of their Poiſon; That this juyce
not venomous when taken at the mouth, t
that it is ſo when let into the wounds ma
by a Viper whilſt ſhe is alive, and even
thoſe, which ſhe may be forced to make ſe
ral days after ſhe is dead, provided that y
low liquor do intervene; That the ſame
quor drawn from a live Viper, as well as t
of a dead one, is always venomous if let in
wounds, and mingled with the blood of
Animal wounded, whether it be uſed when
quid, or after it is dryed and reduced to po
der; and that it generally kills all kind
Animals into the wounds of which it ſh
have been intromitted.

But I, who of all theſe points can admit
none but that of the innocence of the yell
liquor when taken at the mouth, and opp
ſing my ſelf to all the reſt; do ſay, That
Poiſon of a Viper is no where but in her en
ged Spirits; that the yellow juyce as wel
a live Viper, and even a vexed one, as of
that is either newly dead, or hath been ſo
ſeveral days, contains in it no poiſon at
neither in the biting, nor taken inward
nor put into wounds, nor mingled with
blood, nor any other way wherein it may
uſed; that it kills nor infects any kind of

m

; ; and that it is nothing but a meer and
ocent *Saliva*.

The queſtion muſt principally be decided
matter of Fact ; though it may alſo be
red by very pertinent reaſons. I am far
n accuſing Signor *Redi* of unfaithfuleſs in
Experiments ; though they were not made
ublick as mine, and that ſome thing might
aid as to the formalities of the biting, and
uſing of the yellow liquor : His reputati-
s too well grounded to be blamed ; and
is the conſideration which troubles me
t. Mean time I ſee the contrary to what
ath advanced againſt my Book ; and the
hs which I there oppoſe are ſo clearly
in my Experiments firſt and laſt, as well
hoſe I have made only in the preſence of
e curious perſons, as in thoſe I have late-
nade in publick, and before a great num-
of Phyſitians and other perſons very in-
igent in theſe matters. So that I can nor
ht any longer to hide thoſe truths, which
the chief inducement of writing this diſ-
rſe.

We need not wonder that Signor *Redi*, ha-
g made all his Experiments by order and
the expence of ſo great a Prince, who is as
ious as he is Munificent, had Vipers and
ſorts of Animals in far greater number than

I had; I, who did all from my ſelf, at my o
charges, and with a meer deſire to diſc
truth from falſhood. Nor do I think, I
obliged to multiply expences when the tr
was found ſufficiently clear'd up, and all
by-ſtanders acknowledged, that I had m
ſufficient tryals for every Experiment.
ſince he hath contented himſelf with hav
made ſome of the yellow liquor to be ſv
lowed by one only Man, one only Duck,
only Kid, thence to know and to aſſure h
ſelf of its innocence when ſwallow'd, with
making a greater number of Experiment
He muſt not blame me for having candi
bounded my curioſity, after I had in div
things made many more Experiments, t
he mentions he hath made upon this ſubje
as appears by what he writeth *p.* 17, & 18
his firſt Letter. I find therefore, that he h
no great cauſe to complain of me (as he dc
under the name of *thoſe Illuſtrious Authors*,
whom he aſcribes my Book in his Letter)
not having vouchſafed to make Experime
enow to confirm the truth of the Obſerv
ons about Vipers, contain'd in his firſt L
ter of 1664. He had not, I ſay, great ca
to ſpeak of it after ſuch a manner, ſince I
do ſo but in imitation of him, and becauſe
had in the ſame Letter advanced and aſſu

ticulars, which required not I ſhould
ke more tryals then thoſe I have deſcribed
ny Book: Although I can aſſure to have
de more then I have recited. He knows
y well, that about the end of pag. 23. of
firſt Letter he uſed theſe words.

*E quel veleno ſhizza tutto fuora, ſe non al
mo, almeno al ſecondo morſo; ſi che il terzo (e
volte l'ho eſperimentato) non è veleneſo:*
at is, *And that poiſon iſſues all out, if not at
firſt, at leaſt at the ſecond biting; ſo that
third* (which I have often experimented)
not venomous.

And if, becauſe of the reſpect I bear to the
ritings of a perſon of ſo high a reputation, I
ought among divers other Experiments,
a having made one and the ſame Viper, e-
y time vexed, to bite five ſeveral Pige-
s, which all died, and even the laſt of them
oner then the reſt, I might ſtop there; I
ink Signor *Redi* hath nothing to reproach
e with. He had aſſured in his firſt Letter,
d aſſures the ſame in his latter, That all the
oiſon did lodge in the yellow liquor, and
at this poiſon was all exhauſted if not at
e firſt, yet at leaſt at the ſecond biting, and
at he had often experimented that the third
as no more venomous: So that, if I was per-
vaded, that all the yellow Liquor muſt be

come

come out by the second biting made upon
second Pigeon, and if, after that, I have
dye three other Pigeons by the fresh biti
of the same Viper that had bitten the two fi
I do not think that Sign. *Redi* hath right
accuse me for not having done enough:
might rather have done me that justice as
acknowledge, that I had done more then
nough to maintain my Reflexions, and tha
was obliged from that time to seek the p
son elsewhere then in the yellow liquor,
regard it did no longer intervene, accordi
to him, in the three last bitings, and that
three last Pigeons were as soon, yea soon
dead then the two first, of the death of whi
he could charge the yellow liquor. If I cou
not find, no more then Sign. *Redi*, in all
body of the Viper, any other visible or p
pable part that was venomous, and t
might justly be declared to be the seat of
poison, and the true cause of the death whi
ensued upon the three last bitings; he m
not wonder, if I have sought and found it
the *vexed Spirits*, and if I have grounded
self upon the best evidence, I could get fr
Experiments and Reason.

But since the chief motive of my tryals ha
been the desire of exactly knowing the Tru
concerning those matters; having seen th

Sig

gn. *Redi*, *pag.* 31. of his laſt Letter hath
ſired I would make new experiments after
s Objections againſt me: To be the more aſ-
red of all, I have been willing to give him
t ſatisfaction, in giving it to my ſelf. For,
the moneth of *May* laſt, in the Chymical La-
ratory of the Royal Garden, in the pre-
ce of two or three hundred by-ſtanders,
th Phyſitians and others, capable to judge
it, and worthy to be credited; from a-
ngſt many live Vipers, ſent me out of *Dau-*
iné, and divers parts of *Poitou*, I choſe a
eat Feual-Viper, that was luſty enough
twithſtanding the great way ſhe came, and
ving open'd her jawes, I very carefully
eared and ſqueezed out of them at ſeveral
petitions, all the yellow liquor contained
the bags of her gums, and that alſo which
ght be diffuſed about the neighbouring
rts, with a fine piece of linnen cloth wound
out the handle of a pen knife: Which done,
ook the ſame Viper with Pincers about her
ck, and angred her in making her to faſten
r teeth into the end of her tail, and in preſ-
g from time to time her neck with thoſe
ncers; and immediately after I preſented
her five Pigeons and two Pullets one after
other, to bite them in the moſt fleſhy part
their Cheſt, having irritated her every time

of

of her biting. I purposely wounded a
six Pigeons and Pullets in divers places, in t
presence of all the company, and let into
wounds some drops of the yellow liqu
drawn from the Vesicles of newly enraged
pers. I laid both sorts a part; and the co
pany parted about an hour after, befo
which time, five of the Pigeons and Pulle
that had been bitten, were dead, and the t
remaining died about an hour after; but t
Pigeons and Pullets, which I had wounde
and in whose wounds I had put in some of
said juyce, ailed nothing, but that there a
peared some lividness at the place wounde
and such an one as might have been the
from the sole wounding them, and witho
any concurrence of that liquor. Two da
after, I shew'd the company the same wou
ded Pullets and the same Pigeons, whi
were very well, and had their wounds almo
perfectly healed up, only there remain'd
little blewness about the wounded parts.
would then have wounded the same animals
gain in other places, and intromitted fre
yellow liquor: some also of the by-stande
proposed to let into one of these creatur
some of this yellow liquor by that way
Transfusion, that hath lately been made in
vers parts of *Europe*, of some stranger bloo

in

) the veins of men, that ſo this juyce be-
mingled with the blood by the ordinary
culation, it might be able to diſcover what
r it could do. I readily complied with
ir motion, whereupon the intromiſſion of
s liquor was attempted upon one of the
e Pigeons that had been wounded two
s before. One Phyſitian and two Chirur-
ns did the work one after onother, in ma-
g both the inciſion and the ligature of the
t diſcernable veſſels of the right wing :
they let the Pigeon looſe ſo much blood,
t it dyed ſoon after. Seeing this, I ſaid,
t the Pigeon dyed only from the loſs of its
od, and not from the letting in of the yel-
liquor ; and that it would be neceſſary,
only Chirurgion of the Company ſhou'd
e a new operation upon another of the
e Animals, that had been wounded 2 days
ore, and upon whom that yellow Juyce had
been tryed. The Operation was made
ordingly at the ſame time upon a Pullet,
ich did not only eſcape again, but was ſeen
next day and the following days by the
ole company to be very well ; as were al-
he other animals that had been wounded
in at the ſame time, and received of the
low liquor, though without the way of
nſuſion. Yet true it is, that one of the

Pigeons, that had been the ſecond time wou
ded, was found dead ſome time after its b
ing wounded, in a cloſe earthen Furnace, v
ry hot, and ſtanding cloſe by ſuch anoth
where I then diſtilled ſome ſpirit and oyl
Tobacco, and the death of which ought
be imputed to the piercing vapors of this
ſtillation, or to the exceſſive heat of the Fu
nace in which it had been ſhut up, whi
was found ſo hot, that the heat of it could n
be endured by ones hand; beſides that be
cloſed, almoſt no air could enter.

Which being thus paſſed, yet forasmuch
the reputation of Sign. *Redi* had acquir
him much eſteem and favour from many p
ſons in *Paris*, I perceived ſome of the co
pany yet inclined to doubt, whether this y
low Juyce were always innocent. Whereu
on, having by me 4 Dogs of different bigne
I preſs'd thoſe that ſeemed moſt to dou
that they would transfuſe or cauſe to be tra
fuſed ſome of that reputed poiſonous liqu
into all thoſe Dogs, or at leaſt into one or
ther of them; but how inſtant ſoever I w
no body would undertake it. It was
ledged, that thoſe Animals were too Rob
to Succumb under ſuch an operation, ſin
the Pullet, that had endur'd it, and twice
the yellow liquor, had eſcaped as well as
oth

ner Animals, that had been wounded again
he ſame time with it, and that had alſo re-
ved into them ſome of that liquor. Which
liged me to proteſt, it was not my fault that
was not experimented a freſh, and to pray
company to take the refuſal of thoſe per-
s for an acknowledgment of the innocence
the yellow liquor.

But not being ſatisfied herewith, I refer-
l the matter to the next day, and promi-
l to have ready new Animals, of a leſſer
e than thoſe Dogs; the more amply to ve-
ie the innoxiouſneſs of that Juyce by new
romiſſions thereof into wounds.

I had then prepar'd ſix Pigeons, and two
tlings; and engaged a perſon whom I knew
ſt favourable to Signor *Redi*, to make him-
f the inciſion, and intromit the yellow li-
or as he ſhould think beſt. He made ſuch
unds as he pleaſed, and he did even ſever
e skin of the fleſh round about the wounds
had made, and ſo far, that I could not hold
tell him ſmiling, he did more than Signor
edi himſelf ſaid in his Letters he had done;
d added, *Boni eſſe paſtoris tondere, non de-
bere*, A good Shepherd did Sheer, not Flea
s Sheep.

One of the Catlings was bitten in the Car-
lagineous part of the Ear, without any ap-

pearance of blood at the place of the bitin
and it escaped. The other, which was mu
less, and a very noted one by the blackn
of its colour and by having her ears cut
was purposely wounded on the upper p
of her neck behind, and also at the lower b
of the hinder part of the head; its skin also
separated from the flesh round about
wound, and on both sides, almost as far as
the fore part of the neck: And then as mu
of the yellow liquor as they would was
into both sides as well as into the wou
This Cat held down her head, by rea
doubtless of the pain she endured by hav
in a manner been flead alive; feeling also sc
pain in two other places, where she had b
wounded and flead. Some of the by-stand
began already to mutter, and said, I should
cast, and the Cat would certainly dye;
notwithstanding the Cat did not dye, tho
she was very little and taken out from un
her dam; and she was shew'd to the com
ny 24 hours after, found and safe, altho
she had neither suck'd nor eaten any thing
that time. And 'tis remarkable enough, t
this very Cat, having been returned to a F
ar to whom she belonged, and being gre
big, hath yet to this day the hind-part of
skull uncloſed at the place of her woun

d notwithstanding all that, & the falling off some flesh and skin, that were sever'd from e places where she was flead, she is very ery and full of play, and very divertising mick gestures.

The six latter Pigeons, that had been wound at the same time, and received of the yelw liquor, were likewise produced; and they ere yet kept five or six days with the other geons and Pullets that had been twice ounded before; among which was that also which the transfusion had been imitated. last they were killed, rosted, and eaten, good company, of which were some of ose that saw them wounded; and that found em very good and savoury meat.

Amidst all those Experiments I omitted not try, whether the heads of Vipers newly ead, having yet their necks on, with all their ellow liquor, would be able to kill Animals, y making them to be bitten by them. I tryed upon Pigeons and Pullets, by thrusting the eth into them as deep as I could. I employ- l also to the same purpose some whole Viers, which I had found dead among the live nes in the barrils, and which abounded in e yellow liquor. But this was always with- ut any inconvenience to the Animals bitten, o far was it from killing them.

I here pass by many other Experimer
made at my house, in the presence of seve
Physitians, that did all agree in making out t
innocence of the yellow liquor, and in asc
bing the poisonousness to the enraged spiri

Yet I must not leave here un-mentione
what was done by three young Physitians, w
being perswaded of the truth of my Expe
ments, as well concerning the innocence of t
yellow liquor, as that of bitings made wit
out the angred spirits, caused their fingers
be bitten, to strifes, by a dead Viper havi
yet all her yellow liquor, and that so dee
that the blood of it appeared to all: But th
found no other inconvenience by it, but wh
they might have felt from prickings made
a needle.

I had certainly made a far greater numb
of Experiments if I had not observed, th
Sign. *Redi* himself had already made ma
for me, and for the maintaining of my Sen
ments; and among others that of *pag.* 26.
his first Letter of Observations, where
saith,

Si mori un pollastro morsicato, &c. That
There dyed a Pullet bitten by a Viper, the poi
of whose teeth I had cut off; and out of wh
vesicles I had squeezed out all that ill juyce th
is there.

F

For, since by his own confession, there dy-
d. Pullet by having been bitten by a Viper,
points of whose teeth he had designedly
off, and all whose yellow liquor (which
calls the ill juyce, and will have to be the
y seat of the poison) he had carefully
ss'd out of the vesicles of her Gums; He
h no more ground then I, to charge the
th of the Pullet upon a liquor, which was
re no more, nor upon the points of the
th, which he had cut off. And he cannot
oid to accuse with me the vexed spirits of
e Viper, and to fall into my opinion, *viz*,
at the venom of the Viper is not a gross
tter, but something invisible and spiritual.
And to shew again, that Signor *Redi* hath
poured, without being aware of it, to justi-
my Sentiment, and that at the same time he
nifestly contradicts himself, by destroying
his last Letter his first Propositions, which
, *That all the venom of the Viper issues at the
st, or at least at the second biting, and that the
ird is venomous no more*, as he assureth to
ave often experimented; to shew that, I say, I
hall alledge the words of pag. 33, 34, and
5. of his last Letter, *viz.*

Su'l principio di maggio scelsi una vipera, &c.
That is, *About the beginning of* May *I chose a
Femal-Viper, one of the biggest and lustiest, and*

vexed her to bite ten Chickens, one after a
ther, in the right thigh; of which the first,
cond and third died almost in an instant;
fourth seem'd only to be sick; but the fifth and
the rest did not only not dye, but were not at
sick; and yet every time the Viper did bite
angred and madded her exceedingly. In
moneth of June *I repeated the Experiment*
five tame Ducks, bitten by one and the same
per, which also immediately after bit th
young Turtle-Doves. The first wounded d
three hours after; the second five hours afte
the rest escaped. 'Tis true, that the first m
tion'd of the Turtles dyed, but not the other t
Of twelve Ring-Doves at one time there d
but four; but the next day of twelve others th
dyed six. Of five Rabbets there dyed three
and of three Lambs the two last dyed; the f
of them dying two hours after it had been bit

These several Experiments directly co
trary to the first assertion of Signor *Re*
were capable to perplex any other head b
his. For first, he hath seen, that of ten P
lets bitten one after another by one only V
per, the three first dyed suddenly, and t
fourth was somewhat sick; He hath seen, th
of five Ducks and of three Pigeons, bitten o
after another by a single Viper, the two fi
Ducks dyed, as also one of the Pigeons, whi
ha

ld been bitten even after the five Ducks: He ſo ſaw once, that of twelve Pigeons bitten, our dyed; that another time of twelve there caped but the moiety; and that of five Rabets, likewiſe bitten, there were but two that aded dying.

I cannot but be amazed, that all theſe Experiments have not been able to change his pinion, or at leaſt to ſuſpend it. Nor do I oubt but that the number of Animals that ed would have been much greater, if the itings had been made in other places but the gs. For, beſides that they have their bones, erves, and tendons, that are able to blunt he point of the teeth at the firſt biting; they ave alſo their Muſcles, which are very viſous, and therefore fail not to imbue the teeth f the biting Viper, thereby ſtopping in part heir Pores, and even hindring them by that ſcoſity from entring far in the enſuing bites, nd I likewiſe doubt not, but that will come o paſs more and more in the reiteration of heir bitings. Nor do I wonder, that the Ducks did not dye ſo ſoon as the Pullets or Pigeons, nor that there dyed leſs of them; for, beſides the reaſons juſt now alledged, they have their skin, bones, and all parts much harder, and far more difficult to be pierced by the Vipers teeth, than thoſe of Pigeons or Pullets.

Pullets. Now I do not find any part mor proper to try divers bitings, then the fleſh part of the cheſt, which hath neither Nerve nor Tendons, nor bones near, nor that Viſcc ſity found in the Muſcles of the legs.

Mean time theſe Experiments made b Sign. *Redi* himſelf, muſt oblige him, as far a I can judge, to relinquiſh his firſt Aſſertion And if he will perſiſt to maintain, that th yellow liquor is the true ſeat of the poiſor he muſt needs believe that liquor to be ir exhauſtible, and that always there ſucceec ſome freſh, in all the bitings of a Viper; o if he will abandon his opinion, and aſcrit the poiſon no more to the yellow liquor, h muſt find out ſome other ſubject to aſſign to, except he pleaſe to take mine, and t lodge it in the irritated ſpirits; in regard th he cannot find it in the yellow liquor, whic is no more there, after the ſecond biting (himſelf aſſureth;) and which muſt yet mo evidently be wanting there, when deſigned he had with care taken it out of the bags the gums of the Viper that bit the Pullet, an the bite of which was followed by the dea of the Animal bitten.

But if Sign. *Redi* ſhould now be in an hum to alter his opinion, and to judge the yello liquor to be neceſſary in all the bitings of

Vip

iper (though that be an impoſſible thing;) s opinion would never be received by diſ- ıtereſſed perſons, that have ſeen my firſt and ſt Experiments; among which perſons there 'e ſome, even of the moſt able, who, having ɛretofore examin'd the *Salival Glanduls* up- n the deſcription I gave them of it after I ad diſcover'd them, did there obſerve alſo ɔme ſmall *Lymphatic* Veſſels, more numerous ıen thoſe that had firſt appeared to me; and 'ho, having ſeen the laſt Letter of Sign. *Redi*, 'ere willing to ſuſpend their Judgment until ıe making of my new Tryals, which have al- ɔgether confirm'd them in my firſt opinion.

For, not to ſpeak of this, that in the pre- ɛnce of divers perſons, even of the beſt qua- ity, at ſeveral times and places, in divers aſ- ɛmblies, & even in the Conferences of the Ab- ɔot *Bourdelot*; I have ſwallow'd ſome of the 'ellow liquor taken out of the bags of the ;ums of many live and enraged Vipers, with- ɔut finding the leaſt inconvenience from it, ıo more then the Viper-catcher of Sign. *Redi*: I can boldly aſſure all the world, that at no ɛime, in no place, there ever dyed any animal ɔf all thoſe I have wounded, or ſeen wounded on purpoſe, and into the wounds of which that liquor hath been intromitted, although it had been drawn hot out of the Veſicles of

the

the gums of Vipers exceedingly vexed; so f
is it, that the Juyce of dead Vipers was ab
to annoy any animal. I can also assure, th
never any head of a dead Viper, whether t
Animal were who'e, or that head only wi
its neck, and though it abounded with th
yellow liquor, hath done any harm to man
any other Animal, bitten by it.

The yellow liquor, which I swallow'd
one of the conferences of the Abbot *Bourdel*
puts me in mind of a Letter, which M. *D*
Tapieres, a very curious, sincere and able
pothecary of *Bourbon l' Archamband*, he
written to him, which was there read, and
mong other things did relate, That in the ye
1630. he had taken a Viper, whose crook
teeth he had cut, and that he carried her in h
bosom; and that after two or three days, a fa
cy taking him to approach her to his fac
pressing her a little, she bit him in his lip, ar
thereby caused great pain to him; whereupo
he flung her to the ground and in his ang
crusht her in pieces; that his lip and fa
swelled; that a Ligature was made upon hi
that Treacle was given him, and some of
applied to the bite; that at the place of th
wound there appear'd a little bladde
whence issued two or three drops of l
quor of a dark yellow colour, and th

h

s face remain'd very pale for a moneth.
If my opinion be asked about this Expe-
nent, I declare that there is nothing in it,
nich I ought not to believe; and I add alſo,
at there hapn'd nothing in it, which agrees
t with the principles by me eſtabliſh'd and
intain'd. For, although the great teeth
that Viper had been cut, which might have
one further, and mingled the enraged ſpirits
the Viper with the blood of M. *Tapieres*;
et they had not cut the point of the ſmall
eth, which I ſhew'd in the ſame conference
ogether with the other neighbouring parts
n the teath of a live Viper, ſent to Monſieur
ourdelot by the ſame Apothecary that had
een bitten: of which ſmall teeth I have here-
ofore given the deſcription and figure, as
ell as that of the upper and lower Jawes, in
hich they are faſtn'd, as may be ſeen in my
natomy of Vipers, in the *Section* of the teeth,
nd the third *Cut* of that Book. For, al-
hough thoſe little teeth have not the length
nor thickneſs of the great ones; yet they have
he ſame ſhape and the ſame matter; for they
re bony, crooked, tranſparent, and very
harp; ſo that the vexed ſpirits may paſs in-
o them as into ſmall Funnels, and through
heir Pores, as they do through thoſe of the
bigger ones: But they cannot go very deep,

becauſe

becauſe their ſmalneſs permits them not t
carry their openings as far as into the fleſh
and all they can doe, is, to open the skin
Now to reaſon upon the accidents that be
fell M. *Des Trapieres* by this bite, as the
are ſet down in his Letter ; I ſee nothing i
them that is not very natural, and very credi
ble. For, although the angred Spirits ha
entred by the openings made by the ſma
teeth ; yet they could not penetrate the fleſh
nor mingle with the blood, becauſe thoſe a
pertures were not deep enough, and the
could do no more but to make their effo
'twixt the fleſh and skin ; whence follow'
the ſwelling of the lip and face, and the im
preſſion of the pale colour, which appear'
there during a moneth ; which acciden
might at firſt have been eaſily prevented b
one only doſe of the volatil Salt of Viper
which would have made the enraged Spirit
to tranſpire, that lodged between the fleſ
and the skin, and could find no entry to pa
further. As to the little bladder, which wasfo
med at the place of the bite, and the two o
three drops of dark liquor that iſſued afte
wards, that was nothing but a little ſero
moiſture that had been gather'd there fro
the neighbouring parts, and that had bee
cauſed by the compreſſion of the Ligatur
an

d by the bruising made by the teeth and wes at the time of the biting, and without y intervention of the yellow liquor, which sides its innocence, could not have entred rough such small apertures.

After so many Experiments, and upon so any Reflexions which I have made, as well n the yellow liquor, as on the irritated spi-ts of Vipers, I cannot comprehend, how ne Animals of Sign. *Redi* could dye all and ithout any exception by the intromission f the yellow liquor into the wounds, he had ade in them, and by the biting of heads se-er'd, or by that of entire Vipers that had een dead several days. I have too many ex-eriments to the contrary, and too many wit-esses, to put it out of doubt, and to fix me in y first opinion.

But, to the end that among the Truths by ne advanced, and consisting in matter of fact, he publick may find wherewith to be satis-ied; I thought my self obliged to explain my ense upon these matters, and to form to my elf the Objections, that may be made against ne.

I say therefore concerning the *Yellow Li-quor*, That nothing can act from it self, but ac-cording to its nature, the disposition of the matter of which it is composed, and the force of

of its activity. For example, you will no find in River Water, the taſte, ſtrength, no particles that are found in Wine, nor wil *that* inebriate like *this*: it hath not the acri mony nor penetrancy of Urine, neither th colour not bitterneſs of Gall: The Spirit c Wine, that is freed from the aqueous parts which hindred the Wine from producing th effects it was capable of, is much more ſub tile and ſtrong, then the ſame wine whence i hath been drawn: The Volatil Salt of Win hath quite another penetrating force than th Urine which contained it before its ſublima tion: And not to go from my ſubject; th volatil Salt of Vipers is very different fro the fleſh and bones of them, whence it hat been extracted; and, though in ſmall quanti ty, it will work more in a moment as well b its odour as its piercing vertue, than ten time as much of that matter, whence it hath bee drawn, could effect in many hours: The bi leous, ſharp, ſalt and ſpirituous ſeroſity, tha is often form'd in our bodies, will ſuddenl produce inflammations in the eyes, tumors i the cheeks, gums, throat, and many othe parts, as alſo Puſtuls, St. Anthony fire, an the Gangrene it ſelf; and all that it does b the compoſition of its parts, and the force o its activity; whereas the thick and viſcou

Phlegm

egme will do no ſuch thing, but chargeth
ure only by its weight, cold, and tenacity:
is Phlegme, I ſay, will ever be incapable
working with quickneſs, and it cannot
oduce any effect but very ſlowly, and in
portion to its power, which is extreamly
nfined.

So then, it is not the nature of the yellow
uor, to paſs ſwiftly to remote parts, and
re to act with vigor and violence;
ich is obſerved in the poiſon of a Vi-
. I ſay, that a tough, viſcous, and
manner inſipid *Saliva*, cannot make any
at progreſs in a moment. I affirm beſides,
t'tis impoſſible, it ſhould corporally en-
into the holes made by the teeth, which
very ſmall and almoſt inviſible, and that it
ould alſo paſs through the cavities of the
th, and much leſs through their Pores, if
y would have them paſs that way. I ſay
rther, *that* although the teeth of a Viper
ould be all over imbued with that Juyce at
e time of her biting; the skin of the Animal
tten, and the fleſh it ſelf, if need were,
ould keep it out of the bitten place, and
nder it from entring there; *That* though it
ould be able to enter, it muſt have a fit
lace to receive it, a great paſſage to go
rough, and a long time to arrive to the parts

remote; I ſay alſo, that though it were ar
ved there, (if that were poſſible,) it could
ver act beyond the forces, which nature ha
reſtrained it to.

Beſides, if this yellow liquor were capab
of any conſiderable operation, it would n
fail to diſcover it either in whole or in pa
when 'tis ſwallow'd and got into the ſtomac
where the place, the heat, and all thin
would ſeem to concur *either* to make it f
ment, if its matter were diſpoſed for it, *or*
reduce its power into action: For, by p
ſing out of the ſtomach into the inteſtins
would infect the Chyle, and make of it a p
ſon, which would be carried jointly with
through the milky veſſels, and through t
Thoracique Ductus's, ſo happily diſcover
by the illuſtrious M. *Pecquet*, to deſcend i
to the Heart with the blood, the which is t
matter, on which the poiſon of Vipers do
ſo particularly exert its dominion. And th
way is much more eaſie and large, than that
the opening, made by the teeth, by whi
this juyce cannot ſo much as enter. I ſay th
further, that, if it were ſuch as Sign. *Re*
makes it to be, it would, being taken at t
mouth and let down into the ſtomach, impre
upon the places of its paſſage, and thoſe of i
ſtay, ſome mark or other of its power, eſpec

all

y if it did contain any *Arsenical* Salts, nich would not fail, soon to manifest themves either by their taste or by some other ects: And yet all those that shall taste or allow this yellow liquor, shall never perive any malignity whether great or small, ither in the mouth, nor in the stomach, nor ewhere. I conclude therefore from all se considerations, that this juyce contains it no part at all, that is able to dissolve, or gulate, or discompose any part of our bo-; & that it hath not any quality, manifest or cult, to shew that 'tis capable of doing so. I add moreover, that this juyce, as flat and vous as it is, is always found so yellow in parts of *France*, that it can hardly be less our'd than 'tis in *Italy*; and that they both t have altogether alike qualities, or, at t, very near such. And it would be to purpose, to alledge in favour of Sign. *Redi*, t the diversity of places and climats, or t of aliments might be able to change the ure of Vipers, and cause that manifest difnce, there is between his Experiments mine. For, although some diversity may observed in other things, there can be id none in this; and if there could be some erence, it cannot be that the nature of the ow juyce, and that of the Spirits should

be *quite* changed; since we find in *France* t
same marks in that liquor, which Sign. *R*
hath found and described in that of *Italy*, a
since our Vipers, without any interventi
of that juyce, do kill as nimbly as his can d

But I think it would be much, if in the y
low liquor, or in the enraged spirits, th
could be observ'd any *small* degree of qua
ty, stronger or weaker in *Italy* than in *Fran*
For, I have by a great number of experime
made it out, that all the Vipers of *Fran*
though taken in very different places, and
ten such as are six score Leagues distant fr
one another, have their poison altogether
like, and do kill equally. Whence I infe
that the difference of the Vipers of *Italy* a
France, cannot be considerable; since *D*
phiné, which is a Province in *France* that f
nisheth us with many of them, and is v
mountainous as well as *Italy*, borders up
Piemont, which is the beginning of *Ital*
and that the same *Dauphiné* abounds in
pers in its utmost extremity; and since a
all Vipers, we get from thence, have their y
low liquor always very innocent, though h
colour'd. And I can truly say, that th
Vipers, that have serv'd me most both in
first and last experiments, were most of th
sent me out of *Dauphiné*, and that I was w
li

g to make use of such, as being commonly gger than most of those that were sent me t of *Poictou* ; that, at least, which serv'd to bite the five first Pigeons, which I spake in my first Experiments ; and that which the seaven last Pullets and Pigeons, were those of *Dauphiné*, and even of the bigger t that could be procured.

And it would have been to no purpose to ve used any tooth of a Viper sever'd from e head, and much less to wipe it dry with ne bread crums, in hopes it should kill any imal by pricking it therewith ; seeing the eth, that had of the yellow liquor upon em, without being separated from the dead ads, were not able to do any harm, no not ose of live ones, without the concurrence of e enraged spirits. And if sometimes I have ade use of bread-crums, sometimes of a fine nnen ragg, to wipe away all the yellow li-uor of the vesicles, that was never but in ve Vipers ; to shew, that it was not that li-uor which did kill, but the vexed Spirits nly, entring by means of the biting.

We are not to imagine neither, that a Vi-er teareth by biting, unless having made her o thrust her teeth into the flesh of some ani-al, you do immediately after draw her a-way by the rest of her body ; We are not, I

say, to pretend, that a Viper doth, by bitin
of her own accord, make any great openin
at which the yellow liquor is able to ente
For, she doth no more but thrust in her teet
far enough, and presently draw them out
gain, with as much ease as a Cat draws out h
claws when he will. Besides, you cannot pe
ceive but two very little holes, which do a
so seem as 'twere closed again by the flesh
and which would hardly be discern'd, if th
pain of the bite, or the accidents ensuing, di
not oblige us to look very narrowly to it.

We also never see, that the poison fasten
it self to the part bitten, nor that the evil be
gins by a mortification, or by a gangren
there. For, if that were so, and if the venom
did lodge at the entry, it would be muc
more easie to master it. I know also by ma
ny Experiments, that the poison never stay
at the place where it enters, but insinuates i
self very nimbly into the Veines, to mingl
with the blood; especially if the bite hat
open'd for it a passage free enough to arriv
there. I know, that there it produces after
wards those troublesome accidents, whic
ensue upon the biting; and that lastly it can
seth death, if it be not prevented by a quick re
lief. Which clearly shews, that a poison o
this nature must needs have dispositions t

pene

netrate, very differing from those that appear in a yellow liquor, that is incapable of sudden motion and operation.

It would also prove an useless labour, to ck at the place of the biting, in hopes of ting out from thence a Juyce, which could t enter there. And though I do not disve this way of succours on such occasion; t I know, that all what the sucking can do, to fetch out again part of the enraged spis, that had enter'd by the openings of the e. I know also, that a specifique remey, taken at the mouth, is far better.

I would be in vain, to object unto me the ample of the seed of Animals, which, notithstanding its viscosity, serves daily to opagate that *Species* which produces it; d that it could in like manner come to pass the yellow liquor to convey the venom in e biting. For besides that the seed is the ureſt and most elaborat part which an anial can produce; it is also accompanied ith store of Spirits; and there needs, bedes, the concurrence of many other means s well to introduce and to receive it, as to orm and perfect the *Fœtus*: There is morever necessary an assistance of abundance of pirits from the mothers side; a juyce proportionate and proper for its nourishment and

increaſe, and a ſufficient time for the ſam
Whereas the yellow liquor, *that* can paſs f
nothing but a juyce excreted out of the Sa
val Glanduls, after it had been ſent thith
from the brain and the neighbouring part
and *that* is deſtitute of ſpirits and of all d
poſition to act; wants alſo a paſſage ſufficie
to intromit it, and a place proper to lod
in. And if you ſhould grant it an entry, a
a place to ſojourn in; it muſt have a mu
longer time than the ſeed, of which I was ſpe
king. But with all this time and all the
ther circumſtances, it would ſtill be incap
ble of working any thing at all perfect, a
periſh of it ſelf; without any remarkab
production.

If any ſhould ſay, That this yellow liqu
may have ſpirits proper and proportiona
to its nature, and that they are not wanting
make the poiſon work at the moment of t
biting; but that, being drawn out of the v
ſicles, and expoſed to the Air, thoſe ſpirits a
diſſipated, and thereby render it incapab
of all action: I anſwer, That, without ſtayin
upon what I have amply made out of its inn
cence in all kind of uſes, Signor *Redi* himſe
contradicts it, as I have mentioned above
ſince he pretends, that the Juyce even of ſuc
Vipers as have been dead for ſeveral days, &

that

at is dryed to boast, ceaseth not to insinuate
s venom without any intervention of spirits,
hen it is put into wounds. But, besides all
at, many Experiments have evinced to me,
at death follows the biting without any in-
rvention of the yellow liquor, and then
hen it hath been perfectly wiped away.
oreover, it is well known, that 'tis the na-
ire of spirits, to be in motion, to fasten them-
lves to, and to follow the parts that have
ost of them, as for example, the blood. It
also to be noted, that the spirits, that do
insinuate the poison, are not of the nature of
nose that follow the ordinary motion of the
lood of the animal; *that* they do not joyn
emselves to it, as those; and *that* neither of
hem have any union with the yellow liquor;
hich is but a meer excrement: But that the
Spirits, I speak of, do form themselves in the
oment that the Viper conceives the *Idea* of
evenging her self; and they need not the em-
barasment of such a dull and viscous juyce,
hich is not qualified to follow them, nor to
pass through the imperceptible pores of the
eeth, which the spirits only can penetrate,
no more then they can any ways enter through
he holes, which the teeth have made. In a
word; the nature of a gross, tough and vis-
cous juyce is not, to act, penetrate, and be
swift-

wiftly carried to the moſt remote parts of th body; but that belongs to ſpirituous ſub ſtances, to go and come where groſs corpo rall ones cannot. Theſe are the only ſpirits that can ſubvert the whole Oeconomy of th body; they are they, that diſturb the circu lation of the blood, and that corrupt it; they are they, that ſtop the natural and animal ſpi rits, and hinder them from paſſing to th parts of the body as they were wont to do and laſtly, 'tis by the let of them, that th death of the Animal uſually enſueth the biting

As to what may be objected, that 'tis very difficult, ſo exactly to evacuate the yellow li quor, that there remain none at all; and tha it may very well come to paſs, that a little o it intervenes in all bitings: I anſwer, that be ſides that this is alſo againſt the opinion o Sign. *Redi*, and which he hath renounced in his firſt Aſſertion; the Salival Glanduls. though many in number, yet are too ſmall and have too little capacity to contain juyce e nough to furniſh for that purpoſe; and that that cannot be expected but from great ani mals, that have thoſe Salival glanduls and the other parts far bigger: And though it were poſſible, they ſhould ſufficiently furniſh, I do maintain, that the impoſſibility of intro mitting that juyce, and its evinced innocence,

ought

ught to suffice for confuting this Objection.

Yet this I shall here say in favour of Sign. *Redi*, That I doubt not but that this yellow quor, as Salivous and Excrementitious as it s, contains its Volatil Salt, as well as all the ther parts of a Viper, and all the parts of nimals, and even all their excrements, and hat consequently it is to be reputed spiritu- us. But then, besides that these spirituous ubstances are never hurtful, they are yet too ntimately mixed and locked in with their natter, and they cannot produce their effects without being separated from it; which can- ot be but by a violent heat, and in vessels fit or it. I say therefore, that by art there may e extracted a true Volatil Salt out of this ellow liquor, & even without any addition r mixture of other matter; which may be pro- red to be of the same nature with that of the ther parts of a Viper; and that 'tis so far from being able to work like poison, that t'is very proper and effectual to master all the ill acci- lents, which the bite of a Viper may cause; of which I do accuse the enraged spirits alone. Since therefore Sign. *Redi* hath dried and aid aside the yellow liquor of two hundred nd fifty Vipers, and may easily obtain much more of it; 'tis in his power to extract such a salt out of it, when he pleaseth, to verifie

what

what I was just now saying. And if, to sav himself that labour, by reason of his other im portant occupations, he shall please to send me a competent quantity thereof, I do wit all my heart offer my self to prepare it fo him, thereby to let him see not only the in nocence of this juyce, but also the great bene fit, that is hid in it.

Concerning the *Bilious Breath* of a Viper that may be charged to intervene with thi yellow liquor, and to envenom it; I am c opinion, that that is nothing but a disguise c the enraged spirits. I assert, *That* the tru Breath of a Viper is ever innocent, how bili ous soever it be represented; *that* there is sues not any ill scent out of her throat, no out of her guts, nor from the parts made t void the excrements; *That* Vipers among c ther marks are in this different from Snakes that *these* have their excrements and the part containing them very fetide and of a smell o stinking Urine; whereas you cannot perceiv any ill smell in any part of a Viper; *that* th Spirits which carry the venom are quite ano ther thing than the breath coming from th Lungs; *that* those spirits have no union no correspondence with the Bilious humour *that* they are not formed but at the instant o the irritation; and lastly, *that* they need nc

such

ich thing as an excrementitious and uſeleſs quor, pretended to intervene, fit for noning but to gard the paſſage of the place, rough which the vexed ſpirits have enred.

But the better to ſhew the impoſſibility of he intervention of this breath, and to make t appear, that it never contributes any thing o the poiſon; you may take notice, that a Vipers head cut off, ſeparate from the Lungs nd all communication with the Gall, and inapable to yield any breath, and deprived even of all that yellow liquor; yet faileſ not to kill by its biting as long as 'tis alive, if the animal have been provoked; juſt as would come to paſs, if a bite were made by the head of a Viper that is whole and alive, if no remedy were applied.

Touching the Communication, that may alſo be pretended to be between the bladder of Gall and the yellow liquor, by reaſon of ſome reſemblance of colour; I ſay, that, beſides *that* my Sentiments in theſe matters are very conform to thoſe of Sign. *Redi*; *that* we have both of us juſtified the innocence of the juyce contained in the Bladder of Gall; *that* we have denied, there is any veſſel carrying this better juyce into the veſicles of the gums, to make that yellow liquor which is found

there;

there: and lastly, *that* we have unanimously contradicted the errors of the Antients about this pretended channel; besides this, I say the truth of what we have affirmed is very easie to prove, by tasting the yellow liquor of the Gall, which is very bitter and very sharp, though very innocent, and by comparing it with that of the vesicles of the Gums, which is very flat, though equally innocent. The same may be yet better made out by dissecting one or more Vipers; where, no more than in Serpents and all other animals, you will never find any vessel, that carries this bile of the Bladder of Gall to the Gums; and you will there see nothing but veins and arteries filled With true blood. Of this there will be no doubt, if you please only to taste it; for you will find nothing but the ordinary taste of blood. To be yet more assur'd of it, you may taste all that runs out of the body of a Viper when the head is sever'd from her; for you shall find no bitterness at all, nor other tast but that of blood. And besides, having amply verified, that the yellow liquor comes from the Salival glanduls alone, and having given a very exact description of them; I think it needless to say any more of it, what ever the Antients may have written, or the Moderns may say of that subject.

To

To come now to the *enraged Spirits* of a viper, which I do assure to be the true and only seat of the poison; methinks Sign. *Redi* hath no reason to oppose my opinion, when I do interess in it the imagination of the Viper, or her *Idea* of revenge, for the formation of those Spirits. I might here alledge what *Van Helmont* saith in his Chapt. *De Tumulo Pestis*, viz. That not only the *Idea* and the Imagination of terror are formed in the inward *Archeus* of the person invaded by the Plague; but that the Toad, which hath, *as he saith*, a perpetual hatred against man, finding himself taken, and hanged by one of his hind-legs, and in a condition of dying, conceives an *Idea* and an imagination of terror by the sight of the man, that often presents himself before his eyes, and whom he looks upon as his capital enemy, and that the same *Idea* or the same phancy of terror, which the Toad hath conceived by this means, forms in him such impressions and qualities, as are permanent even after his death. Then this Author will, that of this body, that dyed in those *Ideas* of terror, mingled with the parts that have issued thence, and with the wax that shall have received them, you shall make Trochesque's, which being taken inwardly, and carried about you, or applied, shall have the virtue

virtue of curing as well as preserving from the Plague, by mortifying by their Specifique quality the terror which the inward *Archeus* of the person may have conceived of this evil. Now since this Sentiment of *Van Helmont* hath found place in the minds of many men, very capable to judge of it; who have been thence induced even to make exactly that preparation of Toads, which he hath taught in the same *Chapter*, and which I can assure I have my self made to satisfie the desire of very able Physitians; having also known many persons giving great credit to it, and carrying continually about them of those Trocheſques whilst there was talk of the Plague; methinks, that the formation of the enraged spirits, which I ascribe to the *Idea* and imagination of revenge, conceived by the Viper when she is vexed, is incomparably more maintainable, and much easier to be comprehended, as well as the entry of the angred Spirits through the Openings made by the Teeth; because not only these Apertures are wont to be deep, but also because the teeth being hollow, serve for a Funnel to intromit those spirits, that accompany the biting, and that produce afterwards in the body bitten those dismal effects of vengeance which the Viper had conceived when she

fel

lt the ill done her; And the letting in of
ose Spirits through the cavity of those
eth is so much the more easie, because there
also at the end of each great tooth a hole,
hich, though very small and almost undis-
rnable by the eye, may yet be discerned by
Microscope, & hath accordingly been late-
seen in some publick Assemblies at *Paris*,
the presence even of persons very affecti-
nate to Sign. *Redi*.

What shall we say of the imagination of
right and Constraint, that a Toad also im-
resses in a *Weesel*, which having seen and
en seen by that ugly animal, at a certain
ason of the year, and always in summer, can
t avoyd to run a pretty while round about
making a continual shrill noyse, as if she cri-
l for help, whilst the Toad remains move-
ss with his throat open; and which after a
ng troublesome motion is constrain'd to
me and render her self into that throat.
he thing is too well known in divers places
f *France* to doubt of it; and I can assure to
ve heretofore seen it my self; and that af-
r I had well observ'd and withal wondred
the force of those *Idea's*, appearing in the a-
itation of the Weesel, and in her being con-
rained to fall into the mouth of the Toad,

I had the satisfaction to kill the Toad i
that moment, and so to save the Weese
which quickly run away, finding her self d
liver'd by the death of the animal, which w
followed by the extinction of those *Ideas*, th
before had had so much power over her. Th
effect cannot be adscribed to the foam, n
to any material part of the Toad, since t
Weesel flyes from him naturally, and falls n
into his mouth but in spight of her teeth. B
sides that the foam of the Toad, which t
Weesel failed not to meet with in his thro
can work nothing, seeing the Weesel sav
her self immediately after the death of the
nimal. We therefore must needs seek f
the cause of all these effects in the Sp
rits.

More-over, what will Sign. *Redi* say
a mad dog, which, in the pervertion of
his senses and of all the ordinary functio
of his body, breaths after nothing but m
chief, and makes it his business to redu
into the same miserable condition all m
he sees, and even his own master, as well
all animals he can come near and bite ?
then the mad Dog hath the power to ma
pass the same *Idea's* and the same imaginatio
which have seized on him, into all the cr
tu

és that he can come to bite, and into man
nſelf, though of a very different ſoul and
cure from his, by doing no more than with
edge of his teeth to touch the ſuperfice of
e skin, and that through his cloaths that
y retain and wipe off all the foam, adhering
the teeth, and lyable to be accuſed of ha-
ng a hand in the miſchief; as is very well
ſerv'd by *Van Helmont* in the ſame Chap-
? If, I ſay, this dog hath the power of
mmunicating his evil to all ſorts of animals,
om one to another, without a limit, and
thout excepting any kind; Why ſhou'd he
ink it incredible, *that* a Viper is able by
r biting to carry her enraged ſpirits into
e bodies of ſuch men and other animals as
e can light upon; *That* theſe ſpirits are
pable to kill the animal bitten; and *that*
ey effect this by the perturbation and cor-
ption, they introduce into the whole maſs
blood; foraſmuch as they do manifeſtly
nder its circulation, and the communicati-
n of the natural ſpirits, that were wont to
e conveyed into all the parts? Conſidering
ithal, that they do not extend themſelves as
r as thoſe of the bite of a mad Dog; ſeeing
one of the Animals bitten by a Viper, have
ny venom diffuſible either by their biting,

or otherwiſe, as long as they live, and tha
they may be ſafely handled, and even with
out danger eaten after their death.

I ſay beſides, that if it be true, that a ma
who hath at all times the ſame ſpitle and th
ſame teeth, & who hath them not pointed nc
ſhaped like thoſe of a Viper, is capable t
introduce the Gangrene, and to cauſe deat
it ſelf by a bite made by him in a rage; wher
as another and longer bite, made by the ſan
man not enraged, is not accompanied wit
any ill accident, and is healed like a ſimp
wound; This being true, I ſay, we ought t
think it neither ſtrange nor impoſſible, th
a Viper, which hath long and piercing teet
and which ſhews the force of her being ve
ed by the nimbleneſs of her biting, ſhoul
be able, by biting when enraged, to mal
animals feel the mortal effects of her vexe
ſpirits.

What ſhall we ſay of the pricking of a *T*
rantula how ſlight ſoever? ſhall we declare
to be exempt from the *idea* and imaginatic
of this little animal, ſince it impreſſes it
ſtrongly and differently upon perſons th
have been pricked therewith, inſomuch th
it perverts in part the ſenſes and ſpirit
conforms them to his ſtirring and skippi
natur

ıture, and conſtrains them at certain and
:t times to continual dancing for ſeveral
ays, and which having left a contumacious
even of the ſame *idea's*, faileth not to pro-
uce the ſame effects every year, and, if you
ay believe Authors, as long as the *Tarantula*
veth, and until the ſame *idea's* be extinct by
s death. And though I doubt not but
nat Sign. *Redi* hath ſeen very many examples
f perſons pricked by *Tarantula's*, there be-
g ſtore of them in *Italy*; yet I ſhall not for-
ear here to recite that of a *Neapolitan* Soul-
ier, who hath been theſe four years among
ıe *French* infantry. This Souldier, whom
is Camarads call'd *Tarante*, becauſe he had
een pricked by a *Tarantula*, is ſtill to this
ery day in the Royal Regiment of *Rouſſillon*.
e never failed to feel every year at a deter-
ıinate time (*viz.* about the 24*th* of *July*)
ıe effects of that ſting, which he had receiv'd
efore he came into *France*. He was always
ıre of the time about two or three days near
t. And when the *ideas* of the ſting were
ound exalted to a degree capable to pro-
luce their effects, he began to dance, and
leſired to hear without interruption the Vio-
ins, which the Officers of that Regiment cau-
ed to be play'd for him out of charity; to

which he anſwer'd continually, keeping tim
very well, without being tired, for thre
days, eating and drinking, without interrup
tion of his dance; and being very impatie
of any diſcontinuance of the play of the Vi
lins, and that the more, if the intermiſſi
was any thing long; for then he became alt
gether livid, and fell into grievous ſwoun
ings. He pleaſed himſelf whilſt he dance
to have in his hands ſeveral naked ſword
one afer another; to ſee about him ma
Looking-glaſſes, to behold himſelf in the
dancing; to be environed with much peopl
and, that he might hinder them from goi
away, to take from them their Gloves, Ri
bons, and ſuch other things; being very car
ful to keep all he had taken from them un
the fourth day, which being come, his e
gerneſs to dance abated, and at length qui
ceaſed; he remembring all he had done, a
knowing all that were about him, to eve
one of whom he rendred very exactly a
without any miſtake all he had taken fro
them, though he had to do with a thouſa
people. After which time, he paſs'd the r
mainder of that year, and the whole interv
of his Paroxyſmes with out any inclinati
to dance. He was naturally melancholic

appearance of no great parts, neither had learn'd to dance. He hath been seen thus ncing every year by thousands of people, d particularly in the Camp Royal *Anno* 70. where the King himself and the whole ourt saw him. And this hath been so beficial to him, that the ordinary time is past is year without any assault of this evil, hich he had great apprehensions of, finding mself at that time engaged in a march, d fearing he should want Violins at the me that the fit should take him.

Now since the pricking of this Animal, ough very small, and in a manner like that a small fly, being made even thorough ockings or cloaths, is able to act equally pon the body and the mind of the person ung ; as leaving behind such long and rong impressions, and causing such irksome eturns ; To what can we adscribe all those ifferent effects, if it be not to the *idea* or imagination of the animal stinging, or of the erson stung. 'Tis needless, to alledge ere the effects of the *idea* or imagination of Vomen with Child, nor of that of *Jacob's* heep. I think I have said enough to justie the possibility of the *idea* or imaginatin of a Vipers revengefulness, for the for-

ming of angry ſpirits, ſufficient to imput unto them all the venom, and to exclude fro it the yellow liquor.

After this, Sign. *Redi* muſt not wonde if I, *who* make profeſſion of Chymiſtry, (c which I have the honour to read publick L ctures in the Garden Royal) *who* doe ever day exerciſe my ſelf in ſeparating the ſpiri tuous parts from the groſs ones in mixt ina nimat bodies; and *who* have not been abl to find in any corporeal and ſenſible matte the true cauſe of the ſtrange and ſuddain pro ductions, obſerved in the biting of a liv Viper; If I, after all this, I ſay, have thoug my ſelf obliged to ſeek for it in the *Spirits* if having found it there, I have abandon' his party, and communicated to the public the diſcovery I have made.

Yet I am not over-much ſurpriſed, tha Sign, *Redi*, being in this matter prepoſſeſs' by corporeal groſs things, ſtill perſiſts in h ſentiment, ſince in the preparations, that d altogether depend of my profeſſion, an which I ought to know well, he rejects ſp rituous ſubſtances, which he reliſhes no ſticking only to the more material, whic are the leaſt, and in very ſmall quantity which doth not keep him from believin

ther

them to be the best. You may see, what he writeth of it about the end of *pag.* 76. and at the beginning of *pag.* 77, of his first Letter of Observations, in these words.

In queste nuè naturali Osservationi ho consumato gran quantità, &c. That is, *In these my natural Observations I have spent a great quantity of Vipers, making of them daily a very great slaughter; and, to extract the subtile from the subtil (if I may so speak) I always laid aside and kept all their flesh and bones, which being dryed in a Furnace, and afterwards by a quick fire with long and great labour burnt and reduced to ashes, I thence drew the Salt with Fountain-water, and purified it, and reduced it into a kind of Chrystal,* &c.

Those that know all the parts of which the body of a Viper is composed, will certainly wonder, that a person so judicious and knowing hath not found, that the chief and best part of a Viper consists in its volatil Salt, and that that Salt would not fail to avolate and to be wasted by that preparation or rather destruction, which Sign. *Redi* hath used to extract the Salt of Vipers. They will quickly see, that when he would draw the subtil from the subtil (as he speaks) he did quite

quite the contrary, and expelled and dissipated the volatil and better parts, returning only the gross, the fixed and the least. They will soon judg, that he would not have given himself all that labour and pain, which he saith he hath taken, to succeed so ill in his work; and that he had done much better, with silence to pass over his process, then to publish it. The way, by him taken, will be found, I think, received from the Antients, who knew not, that all Animals abound in *Volatil*, and have little of *Fixed* Salt: And his preparation, which is very easie, would have pleased better in those times, especially in *Italy*, then that great and laborious Preparation of the Salt of Vipers, which was made with so great an *Apparatus*, and of which I have already given my thoughts, when I discoursed of the Remedies drawn from Vipers.

I also foresee, that Sign. *Redi* will not receive any greater advantage by striving to attribute to himself the first discovery of the *Salival glanduls*, which I found on both the Temples of both Male and Female Vipers, and which I have described and delineated in my Anatomy of Vipers: For, he will not be able to perswade it to those, who shall

see

ee *pag.* 44. of his first Letter of Observations he discourse following;

Se non stimassi vergogna scriver senza altra riprova, &c. That is, *If I did not think it a shame, to write, without other proof, what came into my phancy, I might say perhaps, that that yellow liquor is by no other way intromitted into the abovesaid gums of the teeth but by those* Salival Conduits, *found out by the famous* Thomas Wharton, *and shewn in this Court by* Lorenzo Billini, *a learned young man and of great expectation, in other Animals besides Man, and particularly in Staggs, and Wood-peckers: Moreover that under those Gums there are two small Glanduls, found by me in all Vipers. Yet* I *would not have you rely upon this thought of mine, because it may prove a Chimera, as* I *believe it to be one,* &c.

I cannot comprehend, how Sign. *Redi*, after he hath spoken of the *Salival Conduits* as of a thing that came into his phancy, and by a *perhaps*, that is to say, not knowing it; and who declareth, that he was asham'd to write of a thing without verifying it; who exhorts his friend to whom he writes, not to relye on his thoughts, and who adds, that it may prove a Chimera; I know not, I say, how,

how, after he hath written all this, he can pretend to be the inventor of the *Salival Glanduls* and their Pipes: For *pag.* 55 and 56. of his first Letter speaking of the yellow liquor, he adds,

E questo veleno altro non è, &c. That is, *This venom is nothing else but that liquor, which humects the Palat, and stagnates in those gums that invest the teeth, not transmitted thither from the Bladder of Gall, but bred in the whole head, and conveyed* perhaps *to the gums by some Salival conduits, which* perhaps *are there inserted.*

Where the word *perhaps*, yet twice again repeated, doth sufficiently shew, that Sign. *Redi* did speak of the *Salival conduits* no otherwise than as of a thing he was not at all assured of. And though he may say, *that* he hath had thoughts of it sooner than I, (who have not medled with Vipers but some years after his first Letter,) *that* what he had written of it gave me from that time occasion and a desire to seek for those Pipes and the Glanduls that might convey thither the yellow liquor; *that* the belief, he had of the Generation of this juyce in the whole head, induced me to search for the Salival Glanduls higher and farther off than the place *under* the bottom

bottom of the veſicles ; and *that* I doubt not, that himſelf might have found theſe true Glanduls, if he would have taken pains for it. I anſwer, that, ſince he hath *not* done it, he ought not to be offended at my having labour'd for him, and ſucceeded in ſo doing: Neither hath he any right to deny, that I have firſt found, deſcribed, and to the life repreſented the two heaps of Salival Glanduls of a Viper with all their Veſſels, as well for forming, as conveying the yellow liquor into the Veſicles that cover the great teeth.

As to what Sign. *Redi* ſaith of me, ſpeaking of the Authors of my Book, that I have changed the words, *under the bottom*, into thoſe, *at the bottom* of the veſicles of the gums, and there ſought in vain for the two ſmall Glanduls, which he aſſures to have found there in all Vipers: I anſwer, that whilſt he is critical as to the letter of the words, *I* keep to the truth of the matter of fact: And I can aſſure, to have ſearched with much care, not only *in* the whole bottom of the veſicles, but every where *under* the bottom of them, but have not found any, whether great or ſmall Glanduls, nor any thing of the colour of a Glandul, nor that came any way near to their form.

I put it then for a truth, that there is not to be found any Glandul neither *in* nor *under* the bottom of the veſicles, and that *under* the bottom there is nothing but *the* gristly bone that gives the ſhape to the noſe of a Viper; *the* two ſharp ends of the two advanced bones of the skull, to which the two great teeth are firmly annexed; *the* conduit of the ſmell, *that* of the hearing; ſome ſmall vein, ſome little Artery, ſome little Nerve, the extremity of a Muſcle, and the two ends of the Salival Channels that diſcharge into the veſicles; as you may ſee it in a manner deſcribed in the Anatomy made of it by me.

After this, Signor *Redi* himſelf ſhews, that it was impoſſible, there ſhould be Glanduls *under* the bottom of the veſicles, ſince he ſaith, *pag.* 38. of his laſt Letter.

Ne io poteva mai ſcrivere, &c. that is, *Nor could I at all write, that thoſe Glanduls lay in the bottom of the veſicles, if I was of opinion, that the yellow liquor did run into them after it had paſſed through the Salival conduits, which yet I imagined might have their Origin from or connexion with thoſe two Glanduls ſeen by me, and therefore muſt needs be in a ſcituation a little diſtant from the veſicles, and not in the bottom of them.*

For

For since he saith, to have meant, that the yellow juyce took its course thorough the salival conduits before its coming into the vesicles: He cannot find a way long enough, or a distance great enough, for the need of long conduits, from the place *under* the bottom unto that which is in the bottom of the vesicles: For, there would have needed nothing but a little opening in the same bottom, to receive the juyce issuing out of the two little Glanduls he hath spoken of. And he shews sufficiently, that he cannot maintain those two small Glanduls *under* the bottom, where he would have them to be, since now he will needs have them a little distant from the vesicles, that he may find, in the intervall, a space sufficient for the vessels that are necessary to the course of this yellow liquor. Besides, that it is altogether impossible for two small Glanduls to furnish all that yellow liquor, which presents it self in the vesicles; since the two great heaps by me found in the two Temples and behind the Orbits of the eyes of a Viper, can hardly furnish each about a drop in the space of 24 hours, after the vesicles have been well voided. Moreover, it is very easie to judge by what *Sign. Redi* saith in his First Letter, that he understood not, the Salival Glands were seated, as they

they are, on the two Temples, nor so near the skull; since he saith, that what came into his phancy, was, that the head of a Viper did not convey that yellow juyce by certain salival conduits. For if he had been of another mind, he would not have spoken but of glands; or, at least, he would have begun with them before he had spoken of the conduits, which shews also sufficiently, that by this means he hath as 'twere inverted the order of nature: For, instead of placing the Glands close to the skul, and afterwards the salival conduits; he hath begun with these, and would have them immediately to receive the juyce of the Brain, and to carry them to the vesicles of the gums; and that his two pretended glanduls are seated between the extremity of these conduits, and the bottom of the vesicles; though none be there, and it would be altogether useless, they should be there, because there are none but they that can at the beginning suck & digest the humidities of the brain and the neighbouring parts, and send them into the vesicles of the gums by the conduits appointed for this office.

But when Sign. *Redi* accuses me of having taken the bottom of the vesicles for that which is *under* the bottom of them, and of not having rightly understood, as he speaks,

hath

the *Tuscan* tongue; I may say, that himself hath not very well apprehended, nor duly explained the *French* terms, used by me; since he hath at the end of *pag.* 35. and at the beginning of *p.* 36. of the same last letter.

Sovra de chi gli, Autori delle novelle experience affermano, &c. That is, Whereupon the Authors of the New Experiments do affirm, that they could never see such Glanduls as I had named; but that instead of them they had found two others, which they call Salival, thus by them described, *p.* 31.

For neither in all that he hath afterwards taken the pains to transcribe out of my book on that subject, nor in all the rest of my *Section* upon the Salival Glanduls, he can have read, that I say to have found *two Glanduls*, but, *Glanduls*; there being a great difference in good French, between *Deux Glandes*, and *Des Glandes*, *two Glands*, and, *Glands*. And when, describing the Glanduls, I say, that they are seated on the two sides of the *Cranium*, I say afterwards, that there are many small ones joyned together, which may be call'd *Conglomerate Glanduls*. And yet more; I speak of an *Heap of Glanduls*; so far am I from speaking only of one or two Glanduls, as Sign. *Redi* hath represented me to have done.

And since, in hopes of better maintaining

his cause, he hath given himself the trouble of copying word for word in his last Letter, only the most general place of my Book, and that which was the least contrary to [illegible] *Section* of the Salival Glands. To shew therefore on my part, that the Glands, found by me, are very different, and that even they are quite another thing, than the two small ones spoken of by him; I thought my self obliged to transcribe hither out of my book what he thought not necessary for him. For in the same *Section*, *p.* 30. (in the English version, *p.* 33) I speak thus of the salival Glands.

These Glands are found in all the heads of Vipers, both Males and Females; they are seated on both sides, and joining to the skull, in the hind-part of each round of the eyes, and at the same height with them. There are many small ones joined together, which may be call'd Conglomerate Glands, *that are easily distinguishable by their form and colour, which is different from the Muscles, neighbouring to them, and of which there is one, that may be call'd* Temporal, *which in part covers them by its extremity. This heap of Glands appears there of the bigness of the neighbouring eye, and extending it self in length, continues its progress in the Orbit of the eye, below and in part behind the eye. Each Gland hath its little Lymphatique vessel which*

hich parts from it as from a little Teat, and ts disgorging it self into a greater vessel, that uns all along and under these Glands, and pas- th into the Vesicle of the Gum, and terminates the midst of the Articulation, which the root the great teeth makes with the advancing cor- r of the said Orbite, and with the little Bone, hich by its other end is articulated in the mid- e of the upper jaw. This principal vessel, which ing consider'd alone, is very little in appear- ce, but is not so in effect, seeing it receives the scharge of all the small vessels that come from ch Gland, empties it self into the bag of the ms, and carries thither that Salival *juyce, hich may have qualities approaching to those the* Saliva *or Spitle of man, or of the foam or ivel of divers other Animals.*

The Nerve, which serves in the Nostrils the faculty of Hearing, *runs for some ce along these Glands, which are also, as have already said, small Veins and Arte- es.*

But having well consider'd the substance, qua- y & scituation of these Glands, *we judged their rmation not to be in vain; but that their e, in all likelyhood, was, to receive the midities both of the Brain, the Eyes, and e neighbouring parts; and that their dis- arge was very convenient, and even very*

necessary to the parts, which receive that liquor; as well for moistening the ligaments of the great teeth, and to keep them in a condition of bending at such time when the Viper will bite, as for bedewing and increasing the teeth, which Nature hath formed and set in the midst of this Juice.

For the rest, examining and tasting the Glands as well as the Juice, we found the taste altogether like that of the Gums, which Sign. Redi *hath described; namely, very near the taste of the Oyle of Almonds, without all bitterness, though it leave, a while after, a little acrimony in the mouth, such as may be discern'd in all kind of Spittle.*

I could add here, what I said of the Salival Glands of *Snakes*, their difference from those of Vipers; and I could acknowledge, that I believe my self to be likewise the first Discoverer of them. But because so prolix a Citation might prove tedious, and that those that desire to have more light therein, may easily find the rest in the above-cited *Section* of my Book, I shall not transcribe it hither.

Mean time 'tis very easie to judge from my whole Discourse, and from the exact Description, made by me, of these *Glands*,

an

nd their neighbouring parts, that they ere not known to me by *Phancy*. Their situation very distant from that place nder, and even from the sides of, the ottom of the vesicles of the gums, shews fficiently, that they are neither *in* nor nder the bottom of those vesicles, as Sign. Redi hath pretended; and their great umber makes it appear, that 'tis quite a-other thing, than the two litle Glanduls e speaks of, and which are not to be found either.

I intreat the Reader, well to consider hose I have discover'd, as they are re-presented in my *third Cutt*, as well in that art where the Temples are of a Head cut, ark'd C, (where their shape and scitua-ion is represented to the life, as they new themselves before they are sever'd;) s in the inclosure of a Vipers sceleton, which is there also exhibited; where he ay see them in their upper and lower ppearance, drawn out of the Head, and y their ligaments fastned to the hind-part f the Eyes, and to the body of the Brain. came not to the full knowledge of them ill after much pains, and a very long and articular search. I did not content my elf to seek a great while in the bottom,

and under the bottom of the vesicles o
the gums; but, to find these Glands, I hav
sected and dissected a great number of Vi
pers heads, as dextrously and nicely as
could; and I have used all means well t
examine them; among others, I caused ma
ny heads to be gently boyled in a littl
water, *as well* to consider the divers su
tures of the skull, and to separate all th
parts from it; *as* to remark well the for
and the connexion of these Glands, to drav
them out whole, and joined, as they are
to the Eyes, and to divers bodies of th
Brain, to which the marrow of the Spin
is annex'd; and to have all these parts en
tire, and such as I have caused them to b
engraven.

Me thinks, that all these cares, follow'
by so good success, may well deserve, m
Discovery of this great number of Saliva
Glands with all their vessels, should no
be envied me by Sign. *Redi*; considering
I do sufficiently appear to him incapable o
envying him any of those fine things, h
hath already found, or may find hereafter i
his curious re-searches.

There remains no more for me to do, me
thinks, than to satisfie Sign. *Redi* as well
concerning the Uncertainty, wherein he is
touching

ouching the Power of the Volatil Salt of Vipers for the curing of their bitings; as bout the Objections, by him made againſt ny Experiments of the Head and Neck of Viper, for curing Doggs bitten by it, and which I have alſo thought ſhould be efficacious to cure men in the like caſe.

He oppoſes nothing to the Vertue of this Volatil Salt, but that he remits the Reader o the time he will take, Chymically to prepare this Salt, and to make the Experiment therewith. But he ſaith, that he hath made many tryals with the Heads and Necks of Vipers, and found firſt; That, having made two great Doggs aforehand to ſwallow, each the head and neck of a Viper, and, afterwards cauſed both of them o be bitten by other Vipers, thoſe Doggs dyed not: And that, having cauſed to be bitten two other Doggs of the ſame bigneſs, that had eaten neither head nor neck of a Viper, they dyed neither. He ſaith further, that having made a Pullet to ſwallow one head of a Viper, and a Capon two, and cauſed them to be bitten, they both dyed ſoon after. He adds, *that* having the next day made ready ſome heads of Vipers, he cauſed them to be forc'd down the throat of two little Doggs, of which he cauſed

the leaſt to be bitten in the legg near the *anus*, and the other, in the tongue, and that they both dyed; *That* he made the ſame Experiment upon eight Pellets, two Kitlings, two ſmall Rabbets, and ſix Pigeons, even with rubbing the place bitten with the blood of the Viper; *That* alſo the ſix Pigeons were bitten by the heads of Vipers, dead ſeveral dayes before, and that all theſe animals dyed; *That* laſtly, he had fed two Pigeons for three dayes with the fleſh and broath of Vipers, and being bitten thereupon, they dyed likewiſe, this aid notwithſtanding.

For Anſwer to all theſe Experiments, I make uſe of the ſame *Generals*, that Sign. *Redi* hath done againſt mine, which are to be found *pag.* 16. of his laſt Letter; where he ſaith: *That* a Viper more eaſily kills leſſer Animals by his biting, than great ones; that, according to the bigneſs of the Animal bitten, and according as the place wounded is more or leſs provided with veins or arteries; that, if from the wound of a Viper much blood iſſueth, the Animal not only dyeth not, but does not ſo much as feel any great inconvenience; that it alſo falls out ſometimes, that the Animal bitten eſcapeth, after it hath endured ma-

ny

ny mortal symptoms; and that this may come to pass by the sole assistance of Nature.

As to the two other *Generals*, which he alledgeth in reference to the letting in of the yellow liquor; I did not think fit to alledge them here, *both* because I agree not as to the possibility of the fact, *and* that I have elsewhere declared my self sufficiently about it; as also that they make not to this purpose. But I think it more material, to add here two other *Generals* to those of Sign. *Redi*, and to say: That the biting is more or less noxious, not only according to the place bitten, but according to the degree of the Vipers being vexed when she is to bite, and according as her teeth have more or less penetrated. And reasoning particularly upon these experiments, I say, *that* the dogs which I had caused to be bitten every one thrice, & were cured by making each of them swallow the head and neck of a Viper, were of a very midling size, *that* it is very difficult to found a certain judgment upon the great ones, which Sign. *Redi* hath used, as 'tis also, to pass it upon them that had swallow'd the head and neck of a Viper, and those, that had not done so, *that* all the other little animals, which he employed, as well the Pullet and the Capon, as the Pigeons, Catlings, Puppies, and little Rabbets,

Rabbets, had not of themselves strength enough to resist for a time the enraged spirits, nor to find the effect of the remedy; especially that which was bitten in the tongue. For, I firmly believe, that there is no animal, great or small, which being fiercely bit in the tongue by a Viper well vexed, can avoid death, what aid soever you minister to it, because of the nerves, veins & arteries, disseminated through the tongue; and because that the angred spirits finding a free entrance, produce there all the effect they are capable of, with so much violence and nimbleness, that nothing is able to stop them. But in all curable bites I shall not easily be induced to renounce the help, which may be given by the head, neck, heart, liver, and divers other parts of a Viper (especially of her that made the bite) for the cure of the animals that have sufficient strength to resist a while, and to expect the benefit of this kind of remedy. I believe also to have great cause not to exclude from it man himself; as also to prefer the parts of the same Viper that hath bitten, to those of others; because they must needs have greater cognation and more consent with the vexed spirits, that issued from her. Concerning which I think it not amiss, to impart to the publick an accident that hapn'd in the Royal Laboratory of this City, whilst my last experiments were making.

A young man that had made a good progress in his studies, desirous to perfect himself in both ways of Pharmacy, and chiefly addicted to my course of Chymistry, was near me, in the midst of a great Assembly, on the 2*d* day of my experiments. After I had made some, whilst I was entertaining the company, the fancy took him, in imitation of me, yet without my knowledge, to take a Viper with his hand, and to seize on her head: which he did not with that caution that is necessary, as not holding her so fast but that the Viper took her opportunity, and struck one of her great teeth very deep into the middle of the upper part of his left fore-finger. Having been made acquainted therewith, I remov'd, as much as I could, all fear from his spirit, and advised him to betake himself to the necessary remedies. The credit he gave to the truths contain'd in my book, often read by him, induced him to say, that if I thought well of it, he would eat the head and neck of the Viper that had bit him. Commending his courage, I seconded his good inclinations; for, I caused slightly to be broiled on coals the head and neck of the said viper, and made him eat and swallow it hot, in the midst of the company, adding to it the heart and liver broiled likewise. After which I said, I doubted not but what he had done would be sufficient to cure him; yet to be the

surer

surer, I would give him some volatil salt of vipers, especially he being a person whom I did much esteem, and for whose health I had and ever should haue a great concern. I thereupon immediately gave him a dose of fifty grains of this volatil salt, dissolved in four ounces of water, and assured him there was not any danger after this. The young man remained in the midst of the company, & stirr'd not from the place, till the meeting ended, and then he took a little fresh air. He was afterwards a couple of hours in the Royal Garden and the Laboratory; during which time he now & then found some little sickness about his heart; but being come to his own lodging, he was ready to sup as he was used to do, and would have done it, if I had not thought it better for him to take another dose of the same volatil salt, which had so good effect, that the next day, after he had dined well, he came again to our meeting; which did much surprise all those that had been witnesses of the bite. Since that time he hath ever been very well. Now though his wound appear'd much deeper then that of the German gentleman, that was bitten the 1*st* day of my former experiments; yet had he none of those grievous accidents, that befell *him*, & were by me described in my book: for he had no other pain but that of the hole of the bite, nor had he so much as a Fever. The wound only

only rendred some drops of blood, by means of the ligature, I caus'd to be made on the top of his wounded finger, which did never swell, and heal'd up as if it had been made by the prick of a pin, without any Cicatrice appearing; so far was it from a Gangrene, or Scar, as some fancied he would have.

The thing hath been too publick, not to be credited every where; and I think not, that Sign. *Redi* himself will doubt of it; but rather that all things have concurr'd together to verifie all I had advanced in my book, of which he hath contested some particulars, and could not resolve himself about others. However, if he have by him any remedies, more quick and more sure for the cure of the bites of Vipers, the publick will be much oblig'd to him when he shall please to impart them, as I very willingly communicate these I have experimented. I shall not speak here of divers Experiments lately made upon Vipers by very able persons at *Paris*, which confirm not only the perfect innocence of the jellow liquor that is in the vesicles of the Gums, but which warrant at the same time my adscribing the venom to the enraged spirits. These truths will be better received from their hands, and they will be much more advantagious to me, than if I did attempt to publish them now. For doubtless there will be found in them very

ry curious things, and they are like to be of more importance than what I might be able to say of them. Besides that I am far from usurping the honor due to others, and from attributing to me the obligation, which the publick will owe them for it.

For a conclusion of this discourse; *since* Sign. *Redi* hath not found in the whole body of a Viper any other part but the jellow juice to which he can assign its venom; *since on my part* by the new experiments, he hath desir'd of me, I have sufficiently justified the innocence of the jellow liquor in the Vipers of *France*, and the great conformities, there must needs be in the same with that of the Vipers of *Italy*, asserting withal the venomousness of the angred spirits causing the death that ensueth the bite; and *since* lastly the Vipers of *France* do kill as soon and in the same manner as those of *Italy* do, and even without any intervention of the jellow liquor: These things being so, I esteem, that Sign. *Redi* would do very well, if, to satisfie *on his part* the expectation of the publick, and without adhering any longer to the jellow liquor, which is so reasonably contested, he would take the pains to labour to find out some new subject, that might be common to the Vipers of *France* and those of *Italy*; that might have the same disposition of matter, and the same power

power of acting nimbly; and that might with reason be equally declared the true seat of their venom; to the end that afterwards he might as justly exclude from it the enraged spirits, as I now exclude from it the jellow liquor. But if on the contrary it comes to pass, that he can find none other, I believe not, that for the future he hath any ground to maintain his opinion, no more than to contest mine.

Concluding this dissertation I shall say, that the contrariety of opinions, which is between Sign. *Redi* and me, in the most essential things of the Vipers poison, may also be observed upon another account about the same animal: For, the more *he* expresseth *p.* 39. of his last letter, the aversion and hatred he hath against it, the more I esteem it, and the greater pleasure I take to handle, to examine, and to prepare it. Nor can I sufficiently praise the excellent qualities, which so rare a subject possesseth, nor the admirable remedies which it furnisheth: Which are the considerations, that have heretofore induced me, and oblige me still to call the Viper one of the chief Pillars of Physick.

It may be, that for this once Sign. *Redi* will not doubt but that a discourse as rude as this, compos'd among coals and furnaces, which I have seldom quitted of late, is mine. He will doubtless judge, that, if more understanding men had put their hands to it, the reasonings thereof would

would be more subtile, the style more polite and the expressions more elegant; and the *Greek* and *Latin* quotations would not have been spared therein, both to strengthen the argument thereof, and to adorn & enlarge the volume. But for all the contrarieties, which the different conceptions have bred between Sign. *Redi* and me I shall always have a very great and a very disinterress'd esteem for him; and so much the more because I have great reason to conceive some good opinion of my book, since it could deserve that so intelligent & famous a person hath vouchsafed to read it again and again with pleasure, as he saith himself, that he hath taken the pains of transcribing many pages out of it word for word, and hath made it famous by his answer, and by that also which a person of great parts, and a high reputation hath made to it, address'd to himself on this subject. I cannot but much glory in it, and highly declare my self his obliged. And if it should come to pass, that the diversity of his experiments, the force of his arguments, or the esteem he hath acquired among the Learned, should carry the bell from me in the spirits of all the world; the victory, which he should thence obtain, would not be much less advantagious for me, then if the truth of my experiments, accompanied by my reasonings, had been able to ballance or even to prevail over his Sentiments and the writings of so Illustrious a Person.

FINIS.

I
Charas
1673

Ann Chambers

274.