Nota. *This kind of* Concaves, *burning most forcibly of any fire we know of, even beyond that of a Wind-furnace, would be of great use, if they could be so contrived as to have a* focus *of any considerable largeness, to take in a good quantity of combustible matter at once.*

An Accompt of some Books.

I. *MARC. MALPIGII, Phil. & Med. Bononiensis DISSERTATIO EPISTOLICA De BOMBYCE, Regiæ Societati dicata. Printed at* London *for* John Martin *and* James Allestry *Printers to the R. Society, in* 4°.

THe Occasion of this Curious and Laborious Discourse will appeare from the Preface to it. The Book it self gives an Acompt of the Production, Structure, Food, Growth, Sicknesses, Workmanship, Changes, Generation, and Death of the *Silk-worm*; together with an accurate Anatomicall Description of all, even the minuter parts of that Insect, and the varieties of them in the severall Changes, it undergoes; where yet the Author in such particulars, which he finds himself short off, or not well satisfied in, with great modesty refers himself to the Assistance and farther consideration of that *Society*, to whom he dedicateth this Epistle.

He begins with the Eggs and hatching of the Silk-worms, observes the Changes of their Colour: then proceeds to the growth of the Young worm; the various tryals in feeding it with divers other leaves but those of Mulbery's; their sicknesses and the prognosticks of them; the casting of their skins, together with all the steps and the whole manner of the same.

In the Anatomicall Observations of the structure of this Insect; he takes notice, among many other things, of its *eleven* Rings or Incisures, and of how many small ones each of them is made up; giving their shape, different size, nature and composition. Then goes on to the Wrinkles of the Body, the Head, the Cranium, the Lip, Chin, Eyes, Teeth (cutting not by an up and down motion, but a laterall one) Hair, Leggs with their different shapes, articulations, claws, together with their posture and motion for Spinning.

Of their *Internal* parts, he obſerves the quality of the humor, found in them, *viz.* concreting by the warmth of on's hand, and leaving a cruſt: next, the mucous and roſy-color'd skin, ſuppos'd to be the new skin, found under the exterior. Then he deſcribes the various Muſcles, and Fibres, both parallel, and oblique, more or leſs, together with the inſertion of the Fibres in every Ring, and of every Ring in the Cavity of its neighbouring Ring, for producing the Progreſſive Motion of the Animal; the manner of which is deſcribed very particularly.

He paſſes on to the Veſſels moiſtening all the parts, obſerving their branches and *anaſtomoſes*; their termination in one common trunck, and the curious net-work they make. Theſe veſſels prolonged, he makes to be the *Lungs*, whoſe ſtructure for Reſpiration he diligently deſcribes, illuſtrating the ſame with Obſervations made of other Inſects, and with ſome Trialls ſhewing, both that Air iſſues out of their body, and that Oily liquors will ſuffocate them, upon the Accompt only of ſtopping the orifice of their Wind-pipe. He inquires alſo, Whether the *Motion* of the *Abdomen* be neceſſary in theſe Inſects for Reſpiration, and ſeems to incline to the *Affirmative*.

From the Lungs he goes on to the *Heart*, which he ſaith reaches from the head to the taile, being of a ſtrange figure, and rather *many* hearts, than one; whoſe motion of *Syſtole* and *Diaſtole* he deſcribes, taking alſo notice, how the Vitall humor paſſes from one little heart to another.

The *Ventricle* he obſerves to reach alſo from one extreame of the Worm to the other; deſcribing its ſubſtance, ſhape, fibres, and veſſels bedewing it, together with its reſemblance to the Ventricle of other Inſects: where he particularly notes the great voracity of the Silk-worm, affirming, that it will eat as much in one day, as its whole empty body weighs.

In the ſides of the Belly about the Ventricle he finds a *Woof of Veſſels*, containing the *Silky Juyce*; deſcribing their progreſs from the mouth downeward into the belly, and their ſtrange flexures and meanders; whoſe *end* he affirmes to have at length, after a long and patient ſearch, found out. Of theſe Veſſels he makes a large and curious deſcription, as alſo of their different Juyces, as the cauſe of the different ſorts of Webbs and Baggs.

Neither

Neither is he wanting in giving an accurrate accompt of the fine texture of the *Spinall Marrow*, and the *Cranium*.

But from the Anatomy of the parts he proceeds to their *Feeding*, and obſerves the various ſpace of time for it.

He takes further notice, that though *Stench* be no prejudice to them, yet a *Southern* Wind and an extreme *Hot Air* make them ſick. He informes us alſo, how they are ordered after they have fed enough, and are ready to ſpin; as alſo, *how* they ſpin, what motions and poſtures they uſe in that work; how they apply their feet and claws; how they hold their head and other parts of the body; of what figure their Webb is; in what time the Bagg is finiſht, together with the difference of the Silk on one and the ſame bagg, and the conjunction ſometimes made by *two* worms in ſpinning *one* bagg, which he ſaith cauſeth ſuch an intanglement that the Silk cannot be wound off.

He forgets not to ſet down the *gradual Change* of the Silk-worm, after 'tis exhauſted by ſpinning; how all the parts are altered, the teſticles enlarged, and the whole diſpoſed to aſſume the form of the *Aurelia* or *Chryſalis*, diveſting it ſelf of its coat in the ſpace of 1. min. 10. ſec; the manner of which he very curiouſly deſcribes, having attentively beheld it himſelf. He adds, how the Wings and other parts are form'd for the *Papilio* or *Butterfly*, and how indeed the Wings are latitant under the ſecond and third Ring of the Worm, before it works the bagg.

Of the *Aurelia* he deſcribes its ſhape and all the parts, and particularly the remaining *Veſtigia* of the ſilky Inteſtins, the Ventricle, and the concrete melleous Juyce therein, together with ſome though rare and ſcarce perceptible motion of the Heart. Then, how the *Aurelia* changes into a *Butterfly*, and in what time, *viz.* in the ſpace of 10. days in Summer, and in a Months time in Autumne and Winter. Where he adds, how the *Eggs* begin in the Femals upon their change into *Aurelia's*, and how at laſt the Butterfly breaks out by the meanes of its Claws and a ſharp liquor.

To this he ſubjoyns a particular deſcription of the form of the *Butterfly*, and all its parts; of the Motion of its Heart, of the differencing marks of the Male from the Female; of the curious

ſtructure

structure of the *Ovarium*; the parts of generation; the coit, and the strange length of the time of it, the Male beating his wings about 130. times in one copulation; the multitude of Eggs amounting to 300. 400. sometimes 500; and the death of the poor Fly, following 5. days after the coit in Summer, but not before the 12th day in August.

He omits not to instruct the reader of the ways of *keeping* the *Eggs*, and the manner of ordering them for Hatching: where he takes notice of one kind of Butterfly in *Sicily*, which is made *twice* fecund in *one* year, *viz.* in the end of Aprill, and the end of August.

He concludes with the way of *Winding off* the Baggs, and informes us, how many threds together will make good substantiall silk; where he affirmeth, that sometimes he hath reckon'd 930. *Bononian* feet of silk, wound off from one bagg, without the exteriour *lanugo*, and the inmost last part, which both together might make a fourth part of that length more.

II. DESCRIPTION

II. *DESCRIPTION ANATOMIQUE d'un CAMELEON, d'un CASTOR, d'un DROMEDAIRE, d'un OURS, et d'une GAZELLE. A* Paris *1669. in 4°.*

THe Obſervations of theſe Animals diſſected were made in the Royall Library at *Paris* by ſome of the Ingenious Philoſophers there.

Of the *Cameleon* (which they ſay was an *Egyptian* one; they alledging, that there are two other ſorts, one of *Arabia*, and another of *Mexico*) they chiefly obſerve: *First* that its contrary motions of Swelling and Un-ſwelling are not made as in other animals, dilating and preſently after contracting their breaſt for Reſpiration, in a conſtant and regular order; ſince they have ſeen it ſwell for the ſpace of above two hours, during which time it would indeed un-ſwell a little, but almoſt indiſcernibly, and alſo a little ſwell againe, but with that difference, that the dilatation was more ſuddain and more viſible, and that by long and unequall intervals; they having alſo obſerved it to ſubſide for a long time, and much longer than ſwell'd.

Secondly, that the grains in the Cameleons-Skin were diverſly poſited, and of a blewiſh-gray, when the animall was in the ſhade moveleſs, and had not been toucht a long while; but that the pawes underneath were white-yelowiſh, and the ſpace between the graines, of a pale and yellowiſh red: and that the ſaid gray, coloring him all over when at reſt, and remaining on the inſide of the skin, when flead, (which ſeem'd to argue, it was the naturall colour) did, when expoſed to the day-light, change in the Sun, ſo that all the places of its body, ſtruck by that light, took, inſtead of their blewiſh gray, a browner gray, approaching to a minim; but the reſt of the skin, not ſhone upon by the Sun, changed its gray into divers brighter colors, which formed Spots half an inch big, of an Iſabella-colour, by the mixture of the yellow pale in the graines, and the light brown in the ground of the skin: the other skin, not ſhone on by the Sun, and remaining of a gray paler then ordinary, being like cloath mixt of wool of divers colours, the ground continuing

as

as before. The Sun ceasing to shine, the first gray return'd by little and little, and being then toucht by one of the company, there appear'd presently many very black spots on his shouldiers and forefeet, which hapn'd not, when he was handled by those that took care of him. Being wrapp'd in white linnen for 2. or 3. minutes, he was taken out whitish, and having kept this colour a while, it vanisht insensibly: which Experience refutes those, who give out, that the Cameleon takes all colours but white. Having put him on divers things of several colours, and wrapt him up in them, he assumed none of their colors, but the white, neither took he this, but the first time of the trials.

Thirdly, the structure and motion of his Eyes, turning two different ways at one and the same time; which yet is not true of the Cameleons of *Mexico*. Where 'tis observ'd, that the necessity, impos'd by nature on all other animals to move both their Eyes together the same way, is not caused by the conjunction of the Optick nerves, because that also is found in the Cameleon it self.

Fourthly, his way of taking hold of the small branches of Trees, like that of a *Parret*, who puts two of his claws before and two behind, whereas other Birds alwayes put three before, and one behind.

Fifthly, his having no Spleen; a very little Heart, and exceeding little Brain, in which appeared no mark at all of any sence for Hearing, this animall neither receiving nor giving any sound.

Sixtly, his Tongue being furnisht with and fastned to a long tromp, serving to lanch it out, for the taking of flyes, on which he feeds, and not on Air alone; the Obsevers having found many flyes in his stomach aud Guts; and taken notice also, that this Cameleon, they discourse of, voided divers stones of the bigness of a pea, which he had not swallowed, but bred in his gutts, seeing one of them, being dissolved in distilled vinegar, inclos'd the head of a fly.

By which Observations it appears, that though *Orators* have lost those pretty subjects to exercise their Eloquence upon, concerning the Wonders of the food, and of the Change of Colours in Cameleons; yet *Philosophers* doe now meet with new

new particulars, touching the motion of his Eyes and Tongue, and the manner of altering his Colour according to his passions, which are no less capable to employ their Witt; as is at large and learnedly deduced by the Authors of these Observations.

In the *Castor* they note;

First, his two sorts of *Hair*, one short, soft and fine, to defend him from cold; the other long and thick, to receive the mire, in which they often wallow, and to hinder it from getting to the skin.

Secondly, his Teeth, formed after a peculiar manner, exceeding fit to cut Trees, which they doe to build themselves lodgings to breed their Young ones in; for which purpose Nature hath also furnisht them with such fore-feet as exactly resemble the hands of a man; the hind-feet, proper for swimming, being formed like those of a Goose.

Thirdly, his Bladders containing the *Castoreum* (distinct from the Testicles) of which they found four great ones about the lower part of the *Os pubis*, of which two were above the other two, but closely joyn'd to one another, the two upper being likely to prepare that matter, and the two other, to bring it to the perfection of more consistence, and unctuousness, as also of a stronger sent and deeper yellow colour; for which purpose the two latter are of a glandular composition. But under this second sort of sacks they found yet another long one, full of liquor, more yellow and liquid, and more elaborate, then that in the former; of a different smell, and like to the yolk of an egg; of which they write from *Canada*, that *Castors* use it to make themselves an appetite, when they want it, and that they squeese it out by pressing with their paws the bladder, which contains it; and that the Savages anoint with it the Gins they set for these animals, to draw them thither.

Fourthly, his *Testicles* not fastned to the Back-bone, as several Authors affirme, but on the sides of the *Os pubis* about the groyne, altogether hid, and not appearing at all, no more than the *penis*, before the skin was remov'd. The *Penis* contrary to that of a Dogg, which goes from the *Os pubis* to the Navil, descended here downeward to the vent of the excrements, at which hole it did terminate.

Fifthly, the *Heart* had its left Auricle bigger than the right (which is also found in some other animals;) whereas in Man 'tis contrary. They found no *foramen Ovale*, which many Authors assure to be in all Amphibious Animals, and even in Men, that are *Divers*, and stay long under water. But it may be, that this *Castor* having been kept divers years from going into the water, that hole had been closed.

But we must proceed to the *Dromedary*, wherein is chiefly noted; *that* it hath but two small hooffs on the end of his feet, the soles of them, flat and large, being very fleshy, and covered onely with a soft, thick and little callous skin, proper enough to march in the Sands of Asia and Africa; *that* the six *Callosities* of his Leggs being open'd, their substance was found to be between flesh, grease and ligament, some having a collection of a thick purulent matter mixed; *that* that Callosity under the Breast, strongly fastned to the *Sternum*, was considerably bigg every way, and much suppurated; *that* his inward parts were like enough to those of an Horse; but that in his 2d Ventricle there were many square Openings, being the Entry of about 20. cavities, made like sacks, placed between the two membranes that compose the substance of the whole stomach, in which sacks, as in convenient receptacles, 'tis probable that Camels doe for a long while keep the water they drink in great quantity, when they meet with any, for a supply in dry and desert places; *that* the *Lungs* had but one lobe; *that* the *Heart* was extraordinary bigg, *viz.* 9. inches long and 7. large; *that*, contrary to other Tongues, which are every where rough from within outwards by store of small eminences tending from *without* inwards, a part of this *Tongue* had them from *within* outwards *&c.*

The *Bear* hath a very particular structure of his *Leggs*, and their substance, very good to eat, is a kind of thick fattish ligament, out of which may possibly issue that moisture, which Authors say is suckt by this Beast for its nourishment in winter. Its *Claws* differ from those of a Lyon; by being more equall and more compact. The *Teeth* differ from those of a Lyon in this only, that they are less. The *Thorax* consists of 14 Ribbs. There appeared no distinction in his *Gutts*, as in other animals; they

they were 40. foot long, whereas thoſe of the *Lyon*, formerly diſſected by the ſame Obſervers, had but 25. The *kidneys* had a very peculiar ſtructure, *viz.* a membrane containing 56. ſmall kidneys, actually ſeparate from one another, each cover'd with its proper membrane; here and there connected by very fine fibres; every one having a large *baſe* outwards, and ſtreightning it ſelf inwards; that *baſe* being in ſome a Hexagon, in the moſt a Pentagon, and in others Square; and the whole repreſenting as 'twere a ripe *Pine-apple*: therefore probably ſo bigg, and divided into ſo many ſmaller kidneys, that it might containe and evacuate the greater plenty of ſeroſities, to be found in a Bear, becauſe he hath but little of inſenſible tranſpiration, by reaſon of the thickneſs of the habit of his body, not favourable for it. The *Brains* they obſerv'd to be 4. times bigger, than that of the Lyon they open'd. The *Eyes* exceeding little, the *Chryſtallin* very odly ſcituated, and drawn on one ſide of the *Axis* of the Eye.

But that which is particularly taken notice of in the deſcription of this Animall, is, 1. The ſtrength of its Temper and conſtitution, by which it is able, though it have but a little ſtomach, and ſtreight gutts (among which there is no *Cæcum*) to digeſt with eaſe all ſorts of edibles, raw fleſh, Fiſh, Lobſters, Inſects, Herbs, Fruits, Hony; ſupplying by the force of his temper the defect of a commodious ſtructure. 2. The ſmall capacity of its *Liver* and *Spleen* to receive excrementitious matter; which argues, that the action of the naturall Heat is ſo well regulated, that 'tis not ſubject to defect or exceſs. 3. The ſingular faculty of encreaſing to a great bulk, by which, though it be born exceeding ſmall, it grows a very big animal, its natural moiſture being ſo perfect, as to render the parts capable to extend themſelves, and to increaſe their magnitude without leſſening their ſtrength.

The *Gazelle* or wild African Shee-goat (the ſame with the *Dorcas* or *Strepſiceros*) was of the bigneſs and ſhape of an Hind, its hair fallow, except that of the belly, which was white; its Eyes big and black; the Horns black alſo, ſtreak't croſs--ways, 15. inches long, very ſharpe, pretty ſtreight, but a little turned outwards about the middle; in part hollow, and by a

sharp bone fastn'd to the Head. Tooth-less in the upper Jaw, as being of the ruminating kind. Very cloven footed; and smal-hoofed before, but thick-flesh't on the hinder parts of the leggs, like a Camel.

As to the inward parts, it had a *Liver* shaped like that of a man, divided into two Lobes; and in the hollow part of the Liver there were two *Lymphatick* branches, which fastn'd the trunk of the *Vena porta* to the superiour Orifice of the Stomach. The substance of this Liver plainly appeared to them glandular, each grain of it being pierced, as they thought, in the midle, by reason of a little red cleft they had, whence issued blood, when pressed. And the cause, why these glandules seldome appeare vnsevered one from another, may be, that when the animal is in health they are spungy and fill'd out with bood, which they are not, when it is sick, or emaciated, *&c.*

III. LABYRINTHUS ALGEBRÆ, Auth. *JOH. JAC. FERGUSON. Printed at the* Hague *in* 4°. 1667.

WHat we mention'd in *Numb.* 46. p. 931. sect. 8. about new methods, pretended by some to be found out for giving the Roots of all Cubick and *Bi-quadratick Æquations*, albeit those Roots are Fractions or Surds, Binomials or Residuals; We find since to be already accomplished by this Dutch Writer; upon the Cursory perusal of whose Book we take the first part of it to be, as follows.

1. He shows, how to extract the *Square* and *Cubick* Roots out of *Binomiall* and *Residual* Numbers, as a *medium*, which he afterwards hath occasion to use.

2. Then proceeds to give one general Rule for finding the Roots of all *Quadratick* Æquations, and commends the worth of his method from the easiness, although you be incumbred with Fractions or great Numbers either in the Coefficients or Absolute.

3. He gives one General Rule (where others make more Cases of it) for finding the Roots of all *Cubick* Æquations, in which the Second term or *Quadratick species* is *wanting*, and then shows, how all other *Cubick* Æquations, wherein it is *present*, may

may be reduc'd thereunto, by taking it away. Moreover, when ſuch Æquations, wherein you are incumbred with *Fractions* or *Surds*, either in the Coefficents or Roots, are propoſed, he goes on to find the Roots, ſought in his own method, and when not explicable but by a *quàm proximè*, according to the general method of *Vieta*, in the uſe of which method, he, determining the number of Figures in the Root, takes away the trouble of all the ſub-gradual Punctations.

4. When he comes to *Bi-quadratick Æquations*, he intimates, that all ſuch Æquations may be reduced into two *Quadratick* Æquations, but not without the aid of a *Cubick* Æquation: And firſt, when the ſecond Term or *Cubick Species* is not wanting, he ſhews how to find the ſaid *Adjutant Cubick* Æquation, by placing the two higheſt Terms of the Æquation on one ſide, and the reſt of the Termes on the other, and then finds ſuch Quantities, which, added to either ſide, render the ſame capable of a ſquare Root; and this preparation being made, he thereby obtains the *Cubick* Æquation and the Root thereof, which ſerves for the purpoſe premiſed; to wit, to divide the *Bi-quadratick* Æquation propos'd into two *Quadratick* Æquations, and ſo ſolved.

Further, in regard that all Æquations are more eaſily ſolv'd, when ſome of their Terms are wanting, than when all are preſent; he proceeds to ſhew, how to take away the *ſecond* Term, and, ſuppoſing it gone, gives eaſier Rules for finding the aforeſaid *Cubick* Æqua-

Æquation; by aid whereof, the propos'd *Bi-quadratick* Æquation may be divided into two *Quadratick* ones, as before.

And then, in regard it often happens, that Æquations are not otherwise explicable than by a *quàm proximè*, he proceeds according to the General method of *Vieta*, as in *Cubicks* last above mention'd.

The whole Doctrine is illustrated with great variety of choice Examples, and the Author intending hereafter to treat more fully of *Algebra*, promiseth to extend his methods to Æquations of *higher* degrees, and to render the same more general. The remainder of the Book doth principally treat of *figurate* Arithmetick.

And here we think it fit to intimate, that divers good Treatises of *Algebra* have been lately publish't in *Low Dutch*. This Author cites Questions out of the 3d *Century* of *Questions* in the *Officina Algebræ* of *Marten Wilkins*, which we have not seen. *Gerhard Kinkhuysen* hath of late years publish'd several distinct *Quarto*-Books, *viz.* A *Tract* of *Analytical Conicks*: A *Collection* of *Geometrical Problems*, *Analytically* solv'd; as also such an acceptable *Introduction to Algebra*, that by the encouragement of some of the *R. Society* it hath been Translated into *Latine*, and fitted for the Press; to which will be annexed the *Methods* and *Examples* of *Ferguson* about the *Roots* of *Æquations*. And we have little reason to doubt, but that the just now mention'd *Introduction* will meet with such an acceptance, as shall quicken the Stationer

Stationer to proceed in the Tranſlation and Printing of the reſt of the Books above-mentioned, or others of the like kind.

Ferguſon about the Matter mention'd is more full than either the *Algebra* of *Frans Van der Huips*, an *Octavo* Book in *Low Dutch*, 1654. or *Kinkhuyſen*: neither do we find, that *Ferguſon* aſcribes the Invention of thoſe Methods to himſelf.

IV. *AN ANSWER* to *HYDROLOGIA CHYMICA*, of WILLIAM SYMPSON, by ROBERT WITTIE, M. *D. Printed for* John Martyn *at the* Bell *without* Temple-Barr, *in* 8° 1669.

The Learned Author in this Anſwer undertakes to prove, that all the Mineral Ingredients, which he in his Firſt Book on this Subject affirm'd to be in the *Scarborough-Spaw*, are really there, and that his Antagoniſt himſelf, unawares, acknowledges them to be there; ſo that the judicious Reader of both theſe Authors will find, that the difference between them, whether in the Matter, which concerns thoſe Ingredients of the ſaid waters, or in that which reſpects the two ways of practiſing Phyſick, the *Galenical* and *Chymical*, is indeed not ſo great, as the heat of Contention ſeems to make it.

And certainly, if the Profeſſors of this Art would but lay aſide Animoſities, perſonal Reflexions, and private Conſiderations; and withall acknowledge, as they ought, that new and great diſcoveries may be made

made by careful Obſervations and Experiments, they would eaſily agree and joyn together, not only their Parts, Natural and acquired, but alſo the two ſo much celebrated methods of adminiſtring Phyſick, for curing both acute and chronical or contumacious Diſeaſes; which is the true way to do ſervice indeed to Mankind, and to entertain and raiſe the Credit of that Profeſſion.

Nota. *By the overſight of the Printer, ſome Lines were left out to the breach of the Senſe, in the Authors Animadverſions upon Mr. S. his Epiſtle, at the bottom of the* 3d *Page, which may be thus corrected*; Like that of the Travailer that went from *Jeruſalem* to *Jericho*, who fell among Thieves that ſtript and wounded him, 'tis no fault of mine; my work ſhall be like that of the Samaritane, *&c.*

ERRATA.

NUmb. 48. p. 962. l. 7. *l. Genetricem.* In the preſent Numb. p. 981. l. 18. *l. ſcaled wings.* p. 983. l. 31. *l. occaſion'd.* p. 987. l. 26. *l. beſides thoſe of.* p. 992. l. 3. *l. Shoulders.*

LONDON,

Printed by *T. N.* for *John Martyn* Printer to the *Royal Society*, and are to be ſold at the *Bell* a little without *Temple-Bar*, 1669.