

# PHILOSOPHICAL TRANSACTIONS.

April 10, 1683.

## The CONTENTS.

1. *LUMBRICUS LATVS*, or a Discourse read before the Royal Society, of the Joynted Worm, wherein a great many Mistakes of former Writers concerning it, are remarked; its Natural History from more exact Observations is attempted; and the whole urged, as a Difficulty, against the Doctrine of Univocal Generation: by Edward Tyson M. D. Col. Med. Lond. nec non Reg. Societ. Soc. 2. Observations of the Eclipse of the Moon Feb.  $\frac{11}{2}$ , 1682, by divers learned Astronomers at divers places. 3. Observations of the same Eclipse at Dantzick by the judicious Astronomer Joh. Hevelius, as sent by Him to the Royal Society.

1. *LUMBRICUS LATVS*, or a Discourse read before the Royal Society of the Joynted Worm, wherein a great many Mistakes of former Writers concerning it, are remarked; its Natural History from more exact Observations is attempted; and the whole urged, as a Difficulty against the Doctrine of Univocal Generation: by Edward Tyson M. D. Col. Med. Lond. nec non Reg. Societ. Soc.

**T**He consideration of *Insects*, and their manner of generation, as it is a subject of curious speculation; so of late hath been much illustrated by the laborious researches of many inquisitive persons: whose travels



vels therein, tho' they have much advanced the doctrine of *univocal* generation ; and bid very fair for the exploding of that, too easily received, and common error, of their production from *putrefaction* , yet one great difficulty still remains with me, how to account for several of those, that are bred in *Animal* bodies not such as we may suppose to be hatched from the *eggs* of the like kind, that are received with the food or other ways ; but of whom we cannot meet with a parallel, or of the same *Species*, out of the body, in the whole world as is known besides. I shall instance onely in two, the *Lumbricus Latus*, and *Teres*. Of the former I shall give at present onely these remarks ; wherein it's difference from any other does more remarkably appear. 1. being *flat*. 2. *joynted* after a peculiar manner. 3. the great disproportion of both *extreams*. 4. the vast *length* 'tis often of. 5. the *head* so remarkably beset with hooked Spikes. 6. what has never that I know of, been remarked of this, or any other Insect or Animal in the World besides ; the great number of *Mouths* it hath ; more than the Poets fain'd *Briareus* had hands, or *Argus* eyes. *viz.* in every Joynt one. 7. That any *part* of the body being broken off from the rest, should still remain alive, and thrive.

All which *particulars*, besides what others may be added, if duely considered, will render it difficult to give an instance of the *like* out of the body, from whence, or from the *Seed* of the same, it may be any ways thought, this may be propagated here.

My other Instance is the *Lumbricus teres Intestinalis* ; which tho' it holds more *analogy* with those called *Intestina Terræ*, or common *Earth-Wormes*, as to the outward shape and form ; yet within are vastly different ; as by comparing the *Anatomy* of both, will appear. And I very much question, as to the contrivance of the inward *Organs*, whether we can meet with any parallel of it, in the World, out of the *Microcosme*, or Animal bodies, besides.



sides. For altho' different *Climes*, or different places of habitation might much affect the *outward* shape, and cause a difference; yet it is hard to conceive, how it should cause so vast an alteration, in the most principal *inward* Organs. However tho we are gravel'd, in assigning how first *this* sort of *Worm* should come into the body; yet being once there; there is nothing more plain, than that they are propagated by an *univocal* generation; there being so perfect a distinction of Sexes, *Male* and *Female*; and the Organs belonging to each so curiously contrived, so conspicuous and plain; that they may further illustrate the late Inventions of some; and do seem to shew, how solicitous *Nature* is in preserving, and propagating the meanest *Species*. But as in *this* *Worm*, there is a most evident discrimination of Sexes; so in *Earth-worms*, there is nothing of this nature to be found but they are perfect *Hermaphrodites*, each *Worm* having the Organs belonging both to *Male* and *Female*; which is common to them with *Leeches*, *Snails*, &c.

I shall give the observations I have made, upon both of them; such rather as may respect their *Natural History*, and may be most suitable to this occasion; than their *Medical account*; which it may be hereafter, I may more enlarge upon: Nor do I think this may be unserviceable to our faculty; for such hints as do improve the *Theory*, will the *Praxis* too.

I shall begin with the *Joyned Worm*; and shall pursue the *Method* I have already given, in more strictly considering those *particulars*, which I have laid down, to discriminate this from all other sorts of *Worms*. And the first is, it's being *flat*; hence call'd *Lumbricus Latus*, and by *Hippocrates*, *ταβία* i. e. *Fascia*, and by some in English, the *Tape-worm*. This flatness of the body, sufficiently distinguishes it from the others, which are usually bred in the body; and are either short, and small, and then called *Ascarides*; or longer, as the *Teretes*; which are so



called *κατ' ἐξοχὴν*, tho the former likewise, are round too. Nor is there any out of the body that I know off, that are thus flat. *Spigelius* (a) observed one *digitum minimum latum*. So *Platerus* makes that, which he observed to be as broad as his finger. So *Marcellus Donatus* (b) in a Barber at Padua, saw it *digitali latitudine*. Some compare it to the bigness of a Child's finger. (c) *Philibert Saraxenus* saw them *digiti medij latitudinem æquantes*. The breadth of this Worm is various; both in the several parts of the body of the same Worm; as also in one Worm, compared with any other. The longer the Worm is, the broader usually are the latter Joynts. That of (d) *Gul. Fabricius Hildanus* was *grana Sex latus*; and because this, and that other of *Spigelius*, are often referred to; I shall here give a part of the \* figures of both of them.

\* Fig. 7, 8.

2. The second particular I observed was it's Joynts. From these large *incisures* of the body, a great number, or genus of Animals, have the name of *Insects*. In *Earth-Worms*, *Leeches*, &c. The *Annuli*, which make up the length of the body, are very remarkable; but much different from those in our present Subject; they being more proportionate to one another; and not of so unequal a length. And in the *Teretes*, and *Ascarides* the surface of the body, seems more even, and smooth, and not divided after this manner. These Joynts are so set on, that the lines or extream edges of the former, come over the later, which is to be well observed, and may direct us to that part or extream, where we may suppose the head to be placed. These edges of the former Joynt, which shoots over the later, in some I have observed to be plain, and smooth; in others crenated, and indented; in all, by

(a) *Spigel. de Lumbrico Latop.* 12.(b) *Mar. Donatus de Medic. Hist. mirab.* l. 4. c. 26.(c) *Apud Hildanum Cent.* 2. *Obs.* 71.(d) *Obs. chirurg. Cent.* 2. *Obs.* 70.

drawing



drawing it through ones fingers from the Tayle to the head, you will find a great roughness; but if the other way, from the head to the tail, it seems smooth.

3. Many, who have observed this *Worm*, do take notice of the difference of it's *extreams*; how much larger one is then the other; but not well considering the setting on of the *Joynts*, abundance have been misled into an error, by taking the *Head* for the *Tail*: and so have either mist of observing; or miserably mistaken in the describing the *Head*. Thus *Spigelius* (e) makes the slenderer part of the body to be the *Tail*; but confesses he could never observe the *head*, nor was he likely where he looked for it. *Amatus Lusitanus* (f) makes the head to be white, and *Verrucosum*, thence the body, he saith proceeded broad, and grew narrower towards the *Tail*; which does sufficiently shew his mistake; which I must needs take it to be; for in all I have hitherto observed, I constantly found that *extream* where the *Head* is set on (if we may allow it to have any) much smaller than the other; sometimes not half a quarter so broad; in others lesser or greater often according to the length of the *Worm*; But in all I take notice, if they are of any considerable length, that the *Joynts* towards the head are vastly shorter, than towards the tail. For in † one I have by me 24 foot long, there about five *Joynts* make an Inch; whereas the latter *Joynts* here are above an Inch long; but in some I have taken out of dogs, there were 30 or 40 sometimes above 60 *Annuli*, which towards the *Head*, did make up but the length of an Inch; whereas towards the *Tail* 6 or 7 *Joynts* did equal that measure and sometimes 3, so that gradually the *Joynts* seem to encrease both in length, and wideness, as they approach the *Tail*. But withall it must be observed, that according to the *Corrugation* or exten-

† Fig. x.

(e) *De Lumbrico Lato* cap. 5. p. 12.

(f) *Chrast. Medic. Cent. 6. chrast. 74.*



sion of these Joynts, their dimensions will be altered; which is most apparent in them when alive. That likewise there is a great difference of these Joynts in the various *Species* of this Worm; for I think there are more sorts than one. And as to the differences of them there are these I have taken notice of. 1. That in most the *Joynts* gradually, and very sensibly encrease in length. But in a vast quantity of this Worm voided by a person here in Town, but in several pieces, 2, 3, 4, or more or fewer yards long; I observed for a great length the Joynts much the same; but suppose I saw here neither the head, nor Tail. 2. In some those *orifices*, which I take for *mouths*, were placed about the middle of the Joynts, on the *Edges*; in others, about the middle of the *flat* of the Worm, near the Joyntings. 3. These juttings, or lips of the upper Joynts, over the lower in some, were plain; in others crenated; in others, the great protuberatings at the side rendered the whole Worm serrated. 4. Usually the same Joynt is much of a bigness throughout; but the upper extreame something lesser than the lower. But in one I took out of a Dog, I observed that towards the Tail, the upper part of the Joynt, by which 'twas fastened to the foregoing Joynt, was very slender; in the middle broad; and towards the other extreame grew Taper again; so that it did well enough resemble the || figure, which (g) *Cornel Gemma* has given of it; and is borrowed, and Copied from him, by *Aldrovandus*, *Spigellius*, *Sennertus*, and others. Not that the whole Worm, as he has made it, was so; but only some of the last Joynts. And in another I took out of the same Dog I could not observe the same thing; as neither did I in a third, I took out of another Dog, which was about two yards long; whereas these were each but about a foot or foot and half long; And this leads me, to consider

|| Fig. 9.

(g) *Corn. Gemma lib. de occultis Nat. Characteris.*



the fourth particular, I have proposed, the great length of this Worm.

4. Alexander <sup>(b)</sup> Trallianus in his Epistle to Theodorus, tells us, 'tis sometimes as long as all the Guts, *οἱ δὲ πλατέα ἐς ποσὶτον ἥκιστα μέγας, ἅτε καὶ ὅλῳ συμπαρεκτείνεσθαι τῷ ἐντέρω* not that it lies extended streight the length of the Guts; as those might think, who fondly imagined 'twas nothing else but a Mucous skin, or *Spolium* of the same: But it lies convoluted in several places; so that it often vastly exceeds the whole length of the Guts themselves. Thus <sup>(c)</sup> Pliny remarks, that there are *intra hominem Tania tricenis pedum, aliquando & plurium*. Platerus observed one forty foot long.

Thaddæus <sup>(k)</sup> Dunus saw voided by a woman one piece of this Worm five yards long; and another, above 20. yards long. Yet in neither he could observe either the Head or the Tail. So that it may be thought but some part of the Worm. But what <sup>(l)</sup> Olaus Barrichius tells us is remarkable; that a Patient of his, in a years time, has voided 800 foot of this sort of Worm; but in several pieces; and that 200 foot of it, he kept by him; and that hitherto he has not met with the Head. For the Patient observed, that alwayes in the voiding it, he perceived it break off; that he has not yet come to the end; and still goes on in voiding the same. Which I could parallel with an instance of a person here in Town, once my Patient; who has voided vast quantities of this Worm, for several years together; but in several pieces, 2, 3, 4. Six or more yards long; but all put together, would much exceed the length of that of *Borrichius*. <sup>(m)</sup> *Tulpius* saith he shewed in the Anatomy Theater, 40. yards

(b) *Ad finem lib. Mercurialis de Morbis Puerorum.*

(c) *Plin. Nat. Hist. l. 21. cap. 33.*

(k) *Thadd. Miscel. Med. c. 15.*

(l) *Vid Barthol. Aët. Med. voi. 2. Obs. 47.*

(m) *Obs. Med. l. 2. c. 42. edit Amstel. an, 1652.*



of this Worm; which was voided by one, in two days time. So that, if we should compare this, with those *Microscopical Animalcula*, observed in *Semine Animalium*, which according to <sup>(n)</sup> *Leuwenhoeck's* computation, if they were placed head to tail a great many Thousands would scarce make the length of an Inch; (they being so small, *ut judicem* (saith he) *millena millia arenam grandiore magnitudine non aequatura*;) we shall find here a greater disproportion in bulk, of these *Animals* in the lesser World, than between the *Ant*, and *Elephant*, or any almost in the greater. And it may be, is the only instance in *Nature* of one that has no determinate bounds in it's growth; at least that is known. For to be at any certainty I think is very difficult; since when it comes to any considerable length by lying in several Clusters, or *Convoluti- ons* in the Intestines; the descent of the *feces* especially being quickened by a Purge, will be apt to break part off; which yet still will live, and grow 'till quite carried out of the body. Besides I question whether all those pieces which are voided by the same person, may be allways reputed parts of the same Worm, or of different. Indeed <sup>(o)</sup> *Spigelius* spends a whole Chapter to prove *plures uno non nasci, nec in homine bis nasci notatum*. He quotes the Authority of <sup>(p)</sup> *Actuarius*, and gives his own reasons too, since nature allwayes makes fewest of those Animals, which are the largest; and those are also uniparous, not multiparous; and he thinks either the want of food, the straightness of the place, or the weakness of human Nature, not being able to bring them to perfection, and so great a length; will prevent the being of more than one. <sup>(q)</sup> *Hippocrates* or who so was the Author of that Book ascribed to him, asserts

(n) *Philosophical Transact.* No. 142. p. 1041. and 1044.

(o) *De Lumbric. Lato.* c. 10. p. 31.

(p) *Lib. 1. Meth.* c. 21.

(q) *Hipp. de morb. lib. 4.*



that 'tis bred in the Child whilst yet in the *Womb*, *γεννᾶται ἐν τῷ κοιλίῳ ἐν τῇσι μήτραις ἐόντι*, and assigns his reason for it, why onely then; and adds that it has been observed by *Midwives*, that upon giving Medicines to bring away the *Fæces* from new born Infants, they have brought away both the *round*, and *flat* Worms; which if true, what he afterwards adds, *sc. si non sponte exeat, vel expellatur Medicamentis, unâ cum homine consenesce*; *ἐννέσθαι ἀνθρώπῳ* here may be literally understood, in respect of the *Man*, as well as *Worm*; Since they are observed very often, if not most frequently in grown persons, as also *old men*. As *Gabucinus* mentions one troubled with them, who was 56. years old; which renders suspected the truth of this assertion: And *spigelius* upon enquiry of the *Midwives* both in *Germany*; and *Italy*, could never be informed that they observed these Worms in new born Infants. But as to *Spigelius* his reasons, why there should be no more than one in the body at a time; I shall onely give this answer, that upon dissection of a Dog I observed two entire ones; but each not much above a foot long. So that that answer he gives to that observation of (†) *Forestus*, who mentions twelve voided at the same time; that they were onely parts of the same Worm; tho often it may be true, yet sometimes it may be otherwise; Especially, where we see such prodigious quantities are voided of them. However this is undeniable, and must be allowed; that this Worm is vastly long, which plainly appears even by those pieces we see of them; for besides the instances already given, (†) *Simon Schultzius* mentions one seven yards long, and another nine yards. (†) *Clusius* tells us that the Duke of *Austria's* Cook voided pieces of this Worm, 6, 12, and 15. yards long. *Jacobus Oethaus* measured one 18. yards

(†) *Forestus. Obs. lib. 21. Obs. 26.*

(s) *Miscellan. Curiosa Germ. vol. 3. Obs. 229.*

(†) *Clus. in Morard. lib. 3. Simpl. Medic.*



long. (\*) *Alexander Camerarius* has seen them above twenty yards long. In the Palace at *Tiguri* is kept the figure of one 18. foot long: and abundance of more Instances I could give were it needful.

But I shall describe that piece of † *one* I have by me, voided by a young man about twenty years of age, upon the use of an *Emulsion* of the cold Seeds; which is enough for some, who are admirers of that *Philosophy*, hence to extol and magnify the power of *Signatures*. But to pass by here the *Ætiology* of his cure, as also the *Pathology* of the Symptoms he was afflicted with before he voided it; I shall onely take notice, that having dragged it from himself, not without some frightful apprehensions, that Guts, and all were coming out; he plainly perceived it alive, and to move; and having put it in a wide mouthed glass; it often endeavoured by raising it's body to get out; but the cold water into which it was put afterwards soon killed it. I measured it, and found it 24. foot, or 8. yards long. In it I numbred 507. *Joynts*. It's colour was extream white, being turgid with Chyle; it's body flat, about the thickness of half a Crown, where thickest; and the *Joynts* towards the Tail about  $\frac{1}{4}$  of an Inch broad; those toward the head about  $\frac{1}{4}$  as broad as those towards the Tail, and here the *Joynts* were not  $\frac{1}{4}$  of an Inch long, whereas those at the Tail were of a full Inch long, and something more, and from the head they seemed gradually to increase in length. The *Joynts* much of a wideness throughout; and the jetting edges of the former over the later usually plain and even; unless where the contraction of the body had rendered them a little crimped. The *flats* of both sides, just alike; and without any Spots, protuberances, or any thing remarkable, which might distinguish them, or be observed, onely a smooth Superfice; but about the middle of the edges of each *Joynt* I observed a protuberating

† Fig. 1.

(v) *Lib: obs. propriar.*



*Orifice*, which would easily enough admit a Hogs Bristle, and was open, and apparent to the naked eye. These *Orifices* were placed for the most part alternately, in one Joynt on the right side, in the following on the left. But sometimes I have observed them in 2, more seldom in 3 succeeding Joynts of the same side; but never in one Joynt more than once. These *Orifices* ('till such time as I am better informed) I take at present for so many *mouths*, and the reasons of this my present belief I shall give in what I am to discourse on in my 6th particular. But since I have here mentioned of what *length* they have been observed in *man*, I shall also add, how long those were I have seen in *Dogs*. For tho they are to be met with onely in the *Animal Kingdom*; yet in abundance of the Subjects of this, and those too of different *Species*, they are very frequent; In *Fishes*, as in the *Pike*, *Whitings*, *Bleakes*, *Crabs*, *Herings*, &c. and upon this Score sometimes they prove a great damage to the Merchants, as (\*) *Platerus* observes, they being forced to sling them away. In *Bleakes* in the Summer time, if you open those that leap and tumble on the water, from the torment they feel within; you shall almost constantly meet with this *Worm* which is a thing well known to our Watermen. In *Oxen* often they are observed likewise, not so much in *Calves*, but in *Dogs* very frequently; which (y) *Platerus* makes to be another sort of the *Tania*, and calls it *Ligula*, and saith 'tis *longitudine prioribus respondens minimè tamen latum, sed teres Lumbricorum instar, totoque ductu sibi simile*; and makes it *immobile*; all which are mistakes, as I shall presently shew. (z) *Simon Schultzius* mentions a lap Dog that in a short time voided nine yards of this *Worm* in several pieces.

I have oftentimes here seen them my self; but shall mention those onely, I found in *dissection*; as I met with the

(x) *Plater. Observ. Lib. 3. p. 891.*

(y) *Plater. Praxis Tom. 2. l. 2. c. 13.*

(z) *Miscel. curios. German. vol. 4. Obs. 120.*



first time two. There was indeed another piece, which I take onely as broken off from one of the former, because here both *Extremes* were pretty large, and the *Joynts* throughout proportionably long. But in the two others the disproportion was very remarkable; For besides observing here their *heads* hispid or thick beset with *haires* or small spikes, which I shall afterwards describe; I took notice that this *extreme* if extended, was very slender; and when a little contracted, the *Joynts* so very small, that they were scarce discernable by the naked eye; but where I could better distinguish them, between 30 or 40 made the length of an Inch; but towards the other *Extreme* or *Tail*, in one four, in the other 6, or 7 *Joynts* made that length; One of these Worms was scarce a foot long; the other not a foot, and half.

In another Dog, I since dissected, I found \*another Worm, with just the same *head*, but about five foot long; Towards the *head* in this 60 *Joynts* scarce made an Inch, but at the *Tail* about three did equal that space; and the *joynts* here were about a quarter of an Inch broad; and in the sides of the *Joynts* in this, I plainly perceived those *Orifices*, I at present call the *mouths*; and shall describe in my sixth particular. But as to the *Head*.

5. The head of *Nile* does not seem to be more perplex'd, and obscure to the Antients, then that of this Worm, which has created as many Controversies among *Anatomists* of late, as that has with *Geographers* of old. And those too who have had the advantage of observing vast quantities of this Worm, after their most strict enquiries, and most diligent research thereinto, have at last been forced to confess, that they are still at a loss, and know nothing certain of it; and what they propose, they deliver rather as a conjecture at random, than any thing as an establish'd truth. And many, as most of the Antients are utterly silent in it. <sup>a</sup> *Spigelius*

<sup>a</sup> *Spigelius de Lato Lumbrico c. 5. p. m. II.*



who has wrote a whole Book of it, and with the greatest accurateness of any before him; yet tells us, after he had delivered the opinions of those before him, *ego autem quam nunquam caput videre potuerim, non levi ratione conijcio, huic esse parvum in acutum desinens, & rostratum, ut alijs lumbricus est*, and acquaints us that *Gabucinus* did seem to give it *rostrum acutum*, and to compare it to that of the *Acus marinus*. But as I shall shew in my last particular: 'twas *Gabucinus's* opinion that this *Worm* was nothing else than a *spolium* of the Intestine, which included the *Cucurbitini*, which gave it life and motion.

But in *Hippolitus Brillus*, who sometime before had wrote a book, *de Vermibus in Corpore humano genitis*, I find nothing besides Quotations, and they too nothing remarkable to our purpose. <sup>b</sup> *Amatus Lusitanus* makes it *Verucosum et album ex quo Corpus latum procedebat, & quo magis ad caudam accedebat, eo strictius evadebat*. Which addition as I have observed destroys the truth of his observation. <sup>c</sup> *Rondeletius* saith 'tis *longum, parvum, oculis destitutum*, and indeed what use of eyes it should have, I cannot see. So <sup>d</sup> *Forestus* observed it *in mucronem tanquam subulam desisse*. <sup>e</sup> *Welschius* thinking all this nothing, tells us that all before, observed these *Worms* to be ἀκέφαλοι, and that the first that discovered, and gave them a head was *Tulpius*; and since that, *Jo Mich. Fehr*. I shall therefore give their observations of it; and then deliver what I have observed my self.

*Nic. Tulpius* a noted Physician, and Burgomaster at *Amsterdam* in the former <sup>f</sup> Editions of his *Medical Observations* makes this *Worm* to be <sup>\*</sup> *Biceps*; and to have two heads, placed like the Horns of a *Snail*; not that he ob-

<sup>b</sup> *Amat. Lusitan. Cent. 6. curat. 74.*

<sup>c</sup> *Rondeletius lib. de dignosc. morb. c. 17.*

<sup>d</sup> *Forestus Observ. lib. 26. c. 36.*

<sup>e</sup> *Welschius de vena Medinensi cap. 4. p. 130. 131.*

<sup>f</sup> *Anno 1651, 1652. &c.*



served it so himself, but had the relation of it, and figure, from *Henricus à Rugen* a Kinsman of *Augerius Clusius*, who voided it. But *asseverabat ipse satis sanctè inhæsisse illud ipsum Caput, quod exprimit figura*; and he saith, *erat autem hoc Caput, ut breve, sic utique planum ac latum & ejusdem cum reliquo Corpore coloris*: one of the heads was broken off by the violent straining in the voiding. *Altero interim illæso, sed circa apicem summè villoso; attamen sine ullo oris hiatu, quo dum caret, quid verisimilius, quàm ipsum ali solo suctu.* To this I shall add, what *Joh. Rhodius* has delivered; which favours this opinion of a double head; where he tells us, that *Adrianus Spigelius* upon dissection of a *Lap-Dog* which dyed of an *Epilepsy* in the year 1622. that he found the Intestines full of this sort of Worms, *sed imprimis Latus Lumbricus ijs adhæsit, capite bifido, qui veram candidi coloris fasciam referebat*, but notwithstanding these *Authorities*, I shall still suspend my belief of these double heads till better Information. And indeed *Tulpius* himself seems to me to suspect the truth of the Observation, having in the <sup>b</sup> last Edition of his Book wholly left it out; without taking any notice of it, and given another very different; and in the same figure, he has erased the former heads, and clapt on a \* new one, to the old body; quite different from what was before; and that we might not mistrust <sup>\* Vid. Fig. 4<sup>d</sup></sup> this, he tells us that this head is *non fictum, aut pictum, sed genuinum, & prout id ipsum dum Corpori etiamnum inhereret, à Francisco Vicquio, Arnolde Tholingio, alijsque quam plurimis Medicis coram conspectum, idque non semel atque iterum, sed tertium, nam toties infectum hoc excrevit Uxor Gul. Smithij.* His description of it is very short. *Erat autem caput hoc non minùs acutum, quam planum, & ore admodum exili, planè eadem formâ, quâ ejus Iconem, dum adhuc reperet, æri incidit Solomon Saverius, cuius ejus abunde peritus.* But by all I can see in his figures, I can't but think, he is at the wrong

<sup>g</sup> *Joh. Rhodij Obs. Med. Cent. I. Obs. 59.*

<sup>b</sup> Anno 1672.



end; for by considering the prominence of the *Joynts*, the placing of it's *Spots*, and difference of it's *ends*; I should sooner by half look for it at the *smallest* extreame which he makes the Tail, than the other where he has now placed it.

Jo. <sup>i</sup> Michael Fehr a German *Curioso* in his Treatise de *Hiera picra sive de Absynthio* in the year 1644. he observed in a piece voided by a Patient about 6. yards long, a head much different from that of *Tulpius*; he describeth this Worm *cum collo sensim angustiore, & rotundiore in minutissimum capitulum atrum, & verrucosum, trium Papaveris seminum aptè conjunctorum formam exprimens, desinentem:*

|| Vid. Fig. 5.

*cujus* || *iconem ob raritatem hic addidimus.* Indeed I must confess that account I had from the women who first observed it, and the Patient who voided that *Worm* I mentioned to have by me eight yards long; and was given me by my worthy Friend Mr. *Houghton* an Apothecary, seemed agreeable to this, tho when I first saw it I could take notice of no such thing; and therefore am apt to think 'twas onely some Thrumbs of the inward coat of the Intestine, which might stick to the hooks here, which might make this figure. For in the heads of all I have had yet an opportunity of seeing; I could never observe any such thing.

I shall therefore now deliver my observations of the heads of this *Worm* as I have seen them, in three several ones I have taken out of the bodies of Dogs upon dissection; and it being so, makes me to be something more at a Certainty; where I know I have them whole. And altho all three, did exactly agree; yet there being some circumstances, which attended the one, tho not the others; yet being very material to our purpose, I shall recount them here. And it was in a Dog I opened at our private meetings, at the *Anatomical Theater* of the Colledge of Physicians, where I observed this *Worm* alive in the *Ilion*, not lying streight.

i Jo. Mich. Fehr de *Hiera picra seu de Absynthio* p. 125.



but in many places winding, and doubling! Having taken notice how the Joynts were, I traced it up, by carefully opening the Intestine, to the smallest Extream; where I expected the *head* to be; and which did ly towards the *Duodenum*; whereas the broader end was downward towards the *Rectum*; and this broad end was free, and did nothing adhere; whereas that smaller extream did so firmly stick, and had fasten'd it self to the inward coat of the Intestine, that it was not without some trouble, by gently raising it with my Nail, that I freed it from it's adhesion. Having lifted it up, I carefully viewed it; and did observe neither that *Biceps* in *Tulpius's* first figure, nor the head like a *Tricoccus* as in *Nich Fehr*, but a very slender body; which being alive, it would sometimes shoot out a considerable length; at others retract it in again, and so very much alter it's figure, by becoming *broader*. But whilst I was doing this, by it's wrigling it's body, it happening to fall off my finger; it presently took hold again, and gave me as much trouble to free it a second time from it's adhesion, as at the first. Other observations I then made of it's *motion*, and of the two single *Joynts* which were broken off, which I shall mention in my *last* particular: as also of those *Orifices* at the sides, which I shall discourse of in my *next*; and for the present I put it into Spirit of Wine, that I might more carefully view it with a *Microscope* at home. And in doing this, making use of some extraordinary good ones, it very plainly appeared as is represented in my 11<sup>th</sup> *Figure*, thick beset with two orders of *spikes*, or *Hooks*, whereof the larger did arise from the Center or Middle, spreading themselves over the edges of the circumference; the other which were lesser issuing out about the middle from the Center, and were shorter, as is seen in this *Figure*, and are represented sideways in the *twelfth*. I could not upon my strictest Enquiry and with extraordinary Glasses too, inform my self of any *Orifice* here, which we may suppose to be the *mouth*; onely a little indenting there was,

in



in the Center, occasion'd by the issuing out of the *Spikes* thence. This end was not perfectly flat, but a little globous, and I could perceive by the swelling a little below on the neck, and wrinkling of the Skin, as in the *Figure*; how it did shoot out, and contract it's *neck*, as I observed it when alive: For some little space here, I could not observe with the glasses any *Joints* at all; but after, very thick set, and small, and gradually increasing in length, as they descended towards the *Tail*.

The *heads* of the other two Worms exactly appeared the same in the *Misroscope*, as this described. And afterwards by carefully viewing them by my naked eye, I could observe these *hairs* or *Spikes*. What therefore *Tulpius* saith in his first Observation of this Worm, of the *head* that was entire, and not broken (and I am pretty confident was the onely one it had) that it was *circa apicem summe villisum, attamen sine ulla oris hiatu*, is true enough. And that passage in *Spigelius*, who having given the different opinions of others concerning the *head* of this Worm, adds, *a multis verò creditur caput esse exiguum cum paucis quibusdam pedibus more aranearum*, must be understood of the *Spikes*, we have described, and will hold good; tho it seems not much regarded by him.

It was objected by some ingenious persons, who had been acquainted with what I observed concerning this *head*, whether these *Spikes*, or *hairs* might not be like the small feet of the *Tick* or *Ricinus* for it's fastening it self the better to help it's suction. And indeed were it *blood* it lived upon, the case were plain; but since 'tis *Chyle* what service they could do it in this, I do not see; for when they fasten, the *head* is deep immersed in the inward Coat of the Intestine; and so may be thought for that time, to get but a very inconsiderable scoop, if any; and nothing in proportion to what is requisite for so vast a long body; and what it is often observed to be turgid with. Upon the whole, what seems most agreeable to me, and to be the true *use* of this



part we call the *head* is this ; that by the means of these *hooks*, and *Spikes* it might fasten it self, and so prevent it's too easy *ejection* out of the body. For it being so very long, and large too, and it's body in many places winding, and *convoluted*, the descent of the *faces* upon all occasions would be apt to carry it out with them ; had it not this hold, which is so fast, that rather than loosen it self, *parts* of the body are sooner broken off, which we frequently see in the stool. When it penetrates the coat of the Intestine it contracts it's *hooks* in, and draws up it's head to a point ; then expands them, and takes firm hold of the Membrane, by darting it's several *poniards* into it ; which excites those intolerable *pains*, which those that are troubled with them, so much complain off ; that I have known it to that extremity, that some have been scarce dissuaded from offering violence to themselves, to free themselves, as they thought, from a great misery, and hence it is that this Worm is of so difficult a *cure* ; that tho by Medicines, and Purges, vast quantities at times may be brought away ; yet some can hardly get a perfect cure all their life time ; as I know of one who for above twenty years has been afflicted with it ; that has had the advice of several able, and eminent Physicians. And indeed all, who have wrote of this Worm, do make the same *Prognostick* of it ; that the *Story* of *Hippys Reginus* in \* *Alian* is not insignificant, where he tells us ; that a Woman being troubled with this *Worm*, and the most skilful Physicians despairing of helping her ; she went at last for a cure to the Temple of *Aesculapius* at *Epidaurus* ; but the *God* being absent, his *Servants* there advised her to sit in the place, where he used to do his *Cures* ; and then cutting off her head, one of them thrusting his hand into her belly, pulled out a huge *Worm*, and then endeavour'd to place her head on again, but could not ; but the *God* by this time being returned, he severely check't them, for

\* *Alian. Hist. Animal. l. 9. c. 73.*



rashly attempting what *Art* nor *Human power* was able to do; and having set it on himself, he dismiss the woman perfectly cured: But since in this *head* we find no *mouth*; we must seek it somewhere else, and I come now to discourse of it, which is my sixth *Particular*.

I am very sensible with how great difficulty my present thoughts concerning this will be received; how obvious to all 'twill be to raise objections; and how liable I am to the censure of many of a long Magot, in proposing so many *mouths*. But before they pass too severe a sentence on me; I would let them know, how little obstinate I am in any *Hypothesis* of Philosophy; how mistrustful of my own eyes where I have reason to think, that *others* are quicker sighted. And a notion tho never so fondly received at first, yet is as easily repudiated by me, upon better information. What I here offer if true, others will find it likewise; if not, I think my self as little obliged as any of them, to believe it. But why at present I think those *Orifices* in every Joynt to be so many *mouths*, I shall now give my Reasons.

I have already observed them to be of *two sorts*; that in several Worms both from human bodies, as also in those of *Brute Animals*; they are placed much about the middle of the Joynts on the *edges*; most frequently alternately, in one joynt on the right hand, in the other on the left sometimes in two, seldom in more on the same side; they are protuberant something like a \* *Papilla* and in the middle a *foramen* easily enough to be perceived by the naked eye, and will readily admit a Hogs bristle. In the other sort, these protuberances are placed about the middle of the flat of the Worm, towards the upper part of the Joynt, and seem to be represented by *spigelius*, *Sennertus*, and *Tulpius* in their figures of this Worm; tho with some mistakes; and is that, which *Authors* mean by their *maculae nigricantes* in their descriptions of it. <sup>1</sup> *Olaus Borrichius*

<sup>1</sup> *Bartholin. Aët. Med. vol. 2. Obs. 47.*



observed here sometimes three, sometimes more, *non nunquam eadem sexangula.*

At present I shall chiefly insist upon the former sort, which has occurred most commonly to me: And a short black line here, placed transverse to the body, I think was the first that gave me notice of them: Tho since in others, I have not so constantly seen it; but onely a protuberant *Orifice* about the middle of the edges of the *Joynts*. These *protuberances* by *Franciscus Sanchez* in the || figure of that part of this *Worm*, 16 foot long, which he gives us, || *Vid. Fig 6.* are plainly represented; but he does not describe them or take any notice of the *Ostia*, or *Foramina* in them. But that they are so many *mouths*, I shall argue, First, from the great quantity of *Chyle* they are often turgid with. Secondly, from the great *Appetite*, but more often *Thirst*, but almost always that *Emaciation* which they occasion. Thirdly, that there is no other *mouth* besides observed. Fourthly, that no *uses* can so fitly be assigned to these *Orifices* as their being *mouths*.

As to the *first*, none, who have observed them, but must confess that they are often very *turgid*; as that I have by me eight yards long, at first did very plainly appear; and having put it into Spirit of Wine, I found after a little while it had muddied it, by spewing out a large quantity of a *Chylous juice*, which made a deep sediment at the bottom: as likewise it did a second time, having changed the old, and put it in fresh Spirits. Whence all this should issue, I cannot see, but by these *Orifices* at the sides; which first I supposed had received, and licked it in. And being in so large a quantity how otherwise could it be well received into the body; but by these many *mouths*; which being always open, and lying of all sides too, do greedily exhaust, and devour the best part of the *Chyle*, and nutritious

*m Fr. Sanchez de morbis internis. l. 3. c. 14. p. 131.*



aliment. That hence may be well accounted for, that *Appetitus Caninus*, that great *Thirst*, that *Atrophy* I mention in my second particular, and are often observed in those, that are afflicted with this *Worm*. Indeed <sup>n</sup> *Spigelius* thinks this *Boulimy*, and *Atrophy* are occasioned not so much by the *Worms* devouring the *Chyle*, as 1. Corrupting it, 2. Hindring it's distribution by occluding the *Meseraick* veins, 3. By it's creating a false sense by the motion in the *Guts*. All which reasons do nothing move me. And <sup>o</sup> *Galen* is expresse that it is by devouring the *Nourishment*, and so is <sup>p</sup> *Aetius*, and twenty more, that I could name. But had they but one *mouth* how could they do this? But having as many, it may be as the *Lacteals* themselves; 'tis no wonder that they rob them, and by their nimble supping it up, prevent it's passing into them. That thence we must necessarily expect an extenuation of *our* own bodies in proportion to the increase of *theirs*; since the nourishment we receive is but what they leave us; and that too none of the best; and corrupted likewise with their recrements. 3. I argue that these *Orifices* are so many *mouths*; for if we do not admit them to be such, I know not where in the *whole* body to find them besides. For in that part we call the *head*, even our *Microscopes*, as I have observed, cannot discover any; and those too, that guessed it to be there; they all acknowledged it to be very *small*, and it being so, and but *single* too; I cannot see, how it can take in so great a quantity of *Chyle*, which would be necessary for maintaining so great a body of so great a length: For it can only lick up no more, than what just comes in it's way; that the open mouths of the numerous *Lacteals*, would be too hard for it; and quickly starve it. Besides since it nuzzles its *head* so deep in the *Coats* of the *Intestines*,

<sup>n</sup> De Lumbrico lato c. 5. p. 50.

<sup>o</sup> Gal. lib. de Theriaca ad Pisicem.

<sup>p</sup> Aet. lib. 9. c. 40.



at that time at least it may be thought incapable of getting scarce any thing at all : But the *use* I have assigned that *part* I am apt to think will satisfy others, as well as at present it does my self. Therefore 4. Why I think those *Orifices mouths* is, because I cannot think what they are besides. For to take them for so many *Vents* of their excrement, would be more unreasonable ; since 'tis pure *Chyle*, which they receive ; which will not afford much, at least so gross an *excrement*, as to need so many, and large *Orifices* for the voiding it. And why so many *Anus's*, when but one *mouth* ? Tis easier to imagin them *Bronchiæ* or *Lungs* ; which in *Insects* are observed in all the *Annuli*, or Joynts of the body ; but withal I must observe, with how much *difference* from our subject. For in them, you shall constantly see these *Orifices* of both sides in each *Annulus* ; but in our Worm never but of one side : In those, they are not near so open, and large, as in this Worm, even so much, that I cannot see, how it can be avoided, but that the *Chyle* must slip into them ; and so spoil them for being *Lungs*.

And indeed what use can we imagin of such here, which must almost constantly be occluded either by filth or *Chyle*. If I misremember not, by pressing them gently with my fingers when fresh, and turgid, I observed *Chyle* to issue out of them. <sup>a</sup> *Philip. Salmuthus* seems to hint so much where he tells *us lactei quid emisisse observavit*, and <sup>r</sup> *Olaus Borrichius* observed them *semper liquore crassiusculo plena*, so that that chylous *Sediment* in the Spirit of Wine I had immersed them into, came hence. I think I have little reason to doubt.

Upon the whole, what I have here offered, I think is sufficient to render my conjecture probable. And yet I have more reason to add why these *Orifices* should be

<sup>a</sup> *Salmuth. Cent. 1. Obs. 95.*

<sup>r</sup> *Apud Bartholin. Acta Med. vol. 2. Obs. 47.*



*mouths*; because the Joyns when broken off, yet still do live; and that too, as may be thought for some considerable time; which they could not, unless they had *mouths* in each; which might receive the aliment for the support of it. Which brings me to the *last particular*, I proposed for the discriminating this *Worm*, from all others out of the body, and shall now discourse of. But since it has been so stiffly maintained by *Authors* of great note both modern as well as the *Antients*; that the *Worm* it self scarce lives; but is onely a *Spolium* of the Intestine, or at least it is not *one* but *many* *Worms*, included in that Membrane; I shall consider how unlikely all such Opinions are, and wide of the truth; and then deliver my own Observations of it.

*Hippocrates*, or who so was the Author of that Book, amongst his Works, tells us that this *Worm* is οὐκ ἰδνται ἐντέ-  
ρου λευκόν *quasi album ramentum Intestinorum*. And *Aetius*, and *Paulus Aegineta* are express that 'tis onely the inward Coat of the Intestine turned, and changed into the figure of an Animal; and many more are of the same Opinion not worth mentioning; it seeming so absurd, as *Mercurialis* observes. He rather thinks it to be the *Mucus*, which lines the insides of the Intestines, and defends them from any asperities of the *feces*. And abundance there are of this opinion. But *Franciscus Valleriola* seems the most of any, to play the Philosopher; and labours to shew, how this *Pituita* of the Guts, may be formed into a Membrane, and then endeavours to account for (*sed Dis invitis*) how these Incisures, or jointings of the body, might happen likewise. \* *Felix Platerus* is very positive, that they are no *Animals* at all; that they have no motion. *Sed ex una tantum crassa, alba, mucosa membra-*

f Hipp. l. 4. de morbis.

c Mercusat. de morb. pueror. lib. 3. c. 7.

v Valleriol. obs. Med. l. 1. obs. 9.

x Plater. obs. lib. 3. p. 891.



*nâ constantes*, and that they are *Ligulae, fasciæ membranaceæ ex Chylo genitæ*. But those many Physicians, who have observed it to move, and therefore to be an *Animal*, and alive; do easily confute him, as <sup>y</sup> *Gabucinus* mentions one voided by a Child two years, and four months old; that being put into water lived almost a day. And a remarkable instance I had of it, in † that I met with upon † *Vid. Fig. 21* dissection of a Dog in the Theater of our Colledge; where several of the Members were present. I shall therefore mention what particularly I observed of it; and the manner how it did perform it; which was very pleasing; and in different forms. For tho' all was performed by contracting, and shortning the *Joynts*; yet sometimes it rendered the body that was flat, round, and a Cylinder; other times it made a deep hollow or concave, on one side, and a Convex on the other; but most times there was a bellying out at the edges, about the middle of the *Joynts*; and tho' that part towards the *head* was very slender; yet upon Contraction it would become as broad as the last *Joynts*. This contraction of the *Joynts* I sometimes observed, at several places at the same time, at some distance from one another; which must needs much advantage it's progressive motion: since being of so great a length, otherwise it could make but small advance; which is perhaps requisite, that it might recover it self, when the descent of the *Fæces* do drive it downwards. And for the advantage too of it's motion; at every *Joynt* there is a prominence of the former, over the later; which like so many Scales on the belly of other *Reptiles* do perform the use of *Feet*.

But I find that those who admit this *Worm* to be alive, have several of them very different thoughts of it, and many there are, who do assert, that 'tis not one, but

y *Gabuc. Comment. de Lumbricis. c. 13.*



many Worms, linked together. Thus <sup>a</sup> Antonius Benivenius gives an History of a Woman, who upon drinking the Bath-waters of Avignon, voided several *Vermes Cucurbitinos*, qui ita inter sese (dum sc. alter alteri mordicus inhaerent) jungebantur, ut cum sua ipsi serie quatuor Cubitorum longitudinem excederent, unum tantum Corpus, unum duntaxat vermem putares. So <sup>a</sup> Aldrovandus judges it: ex multis, si longus fuerit, vermibus, *Semini Cucurbitæ* similibus, sibi que invicem arctè coadunatis, constitui. Arnoldus <sup>b</sup> Villanovanus mentions that it was the opinion of some, quod isti Cucurbitini generantur in ventre cujusdam maximi Lumbrici, qui aliquando emittitur longior uno, vel duobus brachijs. And Morardes tells us how that in a large Worm were observed abundance of these Cucurbitini. And this <sup>c</sup> Hieron. Gabucinus delivers as his opinion, where he tells us, ego verò nil aliud latum Lumbricum esse existimo, quam, ut inquit Hip. pocr. abrasionem veluti Intestinorum albam tota complectentem intestina, intra quam Cucurbitæ semini similes animantes procreantur, & quidem vitam sensilem viventes. And a little after he adds, si quis vero totam illam abrasionem animatum viderit, sciat non abrasionem illam, id est latum vocatum Lumbricum, sed Cucumeris similes Animantes intra ipsum vivere; He all along denies the *Lumbricus Latus* i. e. that *Spolium* of the Intestines, as he calls it, to be an *Animal*; but that it receives all it's sense, and motion from those Cucurbitini included in it. This he very plainly, as he tells us, discovered in a part of this Worm, shewed him by a person, that voided it. His Words because the Book is not very common, I shall mention. *Hæc autem portio sese commovebat, quo factum est, ut avidius motus ipsius causam vestigare; diligentissime tandem perquirens per ejus totam cavitatem Cucu-*

(<sup>a</sup>) Beniv. Exempla. Med. observ. 87. p. m. 277.

(<sup>a</sup>) Vlyss. Aldrovand. de Insectis lib. 6. p. m. 651.

(<sup>b</sup>) Arnold. Villanov. Brev. lib. 2. cap. 21. p. m. 1329.

(<sup>c</sup>) Galuc. de Lumbr. alvum occupantib. Convent. c. 3. p. m. 34.



*meris similium Animalium seriem sese moventium, ipsi motum præstare conspexi: quæ ex ea veluti ex quodam lectulo prodibant, interdum unum, duo simul interdum complicata, plerunq; quatuor plurave: atq; eam abrasionis portionem, quæ vacua ab hujusmodi Cucurbitinis segmentis animatis erat, nullo pacto moveri, imo subsidere.* Which last particular if it was so, is something remarkable to his purpose; but I very much suspect it; because in that I met with in a *Dog* in the Colledge Theater, whilst alive, and in my hand, a joynt. or two fell off; but I could no waies observe any Membrane hanging to the foregoing joynt, out of which it might slip, but it broke off entire. And altho there were two Single *Joynts*. which I found in the Intestin, upon the first opening it, yet there was nothing I could see affixt to the last, which might include them. And indeed the setting on of the *Joynts* here, is such, that seems to me sufficiently to shew, That this *Worm* cannot be a continued membrane, articulated only by the severall *Cucurbitini* included in it, since there is so large a protuberance of the lower Extreme of the foregoing joynt, over the upper part of the following; which I plainly perceived in this *Worm*. If only a Membrane, why constantly, and thus regularly a difference of both extremes, as to their length and breadth? How happen the *hooks* at the head? How are those *orifices* formed at the Edges, or on the Flat of the *Worm*? And if it was so, as *Gabucinus* imagined, I cannot think but I must have perceived something of it, in those severall peices of this *Worm*, which I have observed: and especially in that eight Yards long, where I opened severall joynts, and could find no such thing. That Mucous matter therefore, which is observed to be voided, by those, troubled with them; which he tell us the women there, take for the beds of this *Worm*, may be better accounted for; it being likely in a great measure to be but the *Mucus* of the Intestines themselves, or a slimy *Spoilum* cast off from these *Worms*. Thus *Leeches* I have observed being put into water, do cast out a slime, which covers



vers their body's, which afterwards they slip off, and is found in the bottome of the Glafs in the form of a mucous Coat. So *Earth-Worms* do void a large quantity of a mucous liquor, at several parts of their body; so *Snails*, &c. of which more in my *Anatomy* of those *Animals*. Upon the whole, I see nothing why we may not justly ascribe that life, we find here, to the *Lumbricus Latus* it self, and not to any *Animals*, we may fancy it pregnant with. And what I do give to the *Whole*, I must attribute likewise to the several *parts* of it, even when separated from the rest of the body; and can't but think that they do live likewise. Not that I think those *Cucurbitini*, are to be reckoned as the *partus* of the *Latus*; which that passage, in *Aristotle* seems to intimate, where he tells us that it does ἀποτίκτειν ὄιον σικύς σπέρμα, *aliquid simile semini Cucurbitæ parit*. For *Hippocrates* denies this of the *Latus*, tho he does allow it to the *Teretes*; where he saith ὅτι αὐτὸν ἐξοργύλαι τίκτουσιν, αἱ δὲ παλῆαι ἔκ ἐτι. Neither likewise are they to be thought a fourth *species* of *Worms*; as many would have it.

But they are onely the *Joynts* or *pieces* broken off from the *Latus*, and when they are voided in the Stools, are a sure sign of a Joynted Worm. And the cure must accordingly be adapted. But that all these single *Joynts* whilst in the body do live, besides those considerations I have already delivered to prove that in every joynt there is a *mouth* for receiving the food; and no doubt answerable Organs for the digestion, and distribution of it; so I am the farther induced to believe it; because it has been often observed by my self, and others; that both single *Joynts*, and oftener larger pieces have been voided alive; and where vast quantities of this *Worm* too have been voided at the same time; in abundance of pieces, I have observed them

d *Arist. hist. Anim. lib. 5. c. 19.*

e *Hipp. lib. 4. de morbis.*



almost equally turgid, and alike filled with Chyle in proportion to the magnitude of the parts. Now I cannot think that in voiding it can always be broken into so many pieces; and if it be done sometime before, and they lye dead in the body; they must be emacipated, and different from what they appear. But that observation, I have already often mentioned of that *Worm*, I met with in the *Dog*, I dissected in the *Colledge Theater*; does furnish me with something apposite to our purpose. For here about the middle of the *Worm*, as it lay in the Intestine about a foot and a half from the *Tayle*, or lower Extrem, I observed two single *Joynts*, about  $\frac{3}{4}$  of an Inch long; alive, and which continued their motion briskly for  $\frac{1}{4}$  of an hour, or more in warm water. That these were broken off from the *Tayle* I nothing question; being in all respects so like them. And that it must be done sometime before, I am apt to think, because they were so remote from it. For they could not otherwise easily, being but single *Joynts*, make so great an advance, being upon all occasions liable rather to be driven down, not being able as I could observe any ways to fasten themselves, and so resist the force of the descending *Faces*. Which is the reason when broken off, they are so frequently voided.

Upon the whole I have been sometimes apt to think, what *Analogy* there may be between this *Joynted Worm*, and *knotted Plants*; of which each *Joynt* can so easily propagate its self. And whether it may not be thought an *Animal Plant-Animal* or *Zoophyton* bred in *Animal* bodies, since so large, and frequent *detruncations* of the body, does not destroy the life of the whole. Which I think can scarce be instanced in any *Animal* besides.

But my *design* here, is not the raising of any *Hypothesis*, but the enquiring into the truth of those of others. It being much easier to spy others faults, then to avoid them our selves. In what I have said I have done the former; but



but can no ways secure my self as to the latter. But in the whole, if I have not hit the mark; I have fairly aimed for it, and it may be some help, and direction to others in prosecution of this subject. And what I have laid down I think I have made out, how different *this* sort of *Worms*, bred in *Animal* body's, is from *all others* hitherto observed out of it; from whence or any *Seminal matter* of it, it may be supposed to be propogated.

And how strange soever what I have here related of the *head*; of the many *mouths*; of the great *length*; and other particulars of this *Worm* may seem to others; who will be presently apt to censure it, as Romance, and Fable; I shall onely add that Saying of *Pliny*, *Mihi contuenti se persuasit Rerum Natura, nihil incredibile existimare de eâ.*

The Anatomy of the *Lumbricus Teres* or Round Worm will be given in a following *Transaction* by the same learned Person.



# THE EXPLANATION OF THE FIGURES.

## FIGURE I.

**R**epresents that *Worm*, or rather part of a *Worm*, voided by a young man in *London*; which was eight yards long, which I still keep by me. The *lesser* extreme, is that part towards the the *Head*; the *broad*, the *Tail*. The *Protuberances* about the middle of the edges of the *Joyns*, are the *Orifices* I take for *Mouths*.

## FIGURE II.

Represents that *Worm* I took out of a *Dog* I dissected in the *Colledge Theater*, which was about 5 foot long; and was alive. The *small End* shews the *head*; as it appeared then to the naked *Eye*; and is represented magnified by the *Microscope* in the 11, and 12 *Figures*. The *Protuberances* at the sides, are the *Mouths*. The *broad End*, the *Tayle*, as in the first *Figure*.

Figure 3, 4, 5, represents the figures of the *Head* of this *Worm*, which are given us by *Nich. Tulpius*; and *Jo. Mich. Fehr*.

FIG.



## FIGURE III.

Represents the two *Heads*, which *Tulpius* in the former *Edition* of his *Observations*, gave to this *Worm*, where he makes it a *Biceps*.

## FIGURE IV.

Is the Picture of the *Head* of this *Worm* which *Tulpius* gives us in the latter *Edition* of his *Book of Observations*.

## FIGURE V.

Shews the *Head* of this *Worm*, as tis delineated by *Joh. Mich. Fehr.* which appears like a *Tricoccus*.

## FIGURE VI.

This *Figure* I met with in *Franc. Sanchez* which tho rude and plain, yet very well represents those *Orifices* which I take for the several *Mouths* of this *Worm*.

The *Figures* 7 and 8 are those of *Adrian Spigelius*, and *Gul. Fabricius Hildanus*; where the *Mouths* seem to be placed on the flat, not in the *Edges* of the *Worm*, I have observed them so in some, but those by me, being dry and so not fit for an accurate draught, for the present I have made use of these.

## FIGURE VII.

A piece of this *Worm* as delineated by *Spigelius*.

## FIGURE VIII.

A part of the same *Worm* as tis Pictured by *Fabricius Hildanus*.



## FIGURE IX.

Is the Figure of this *Worm* in *Cornel. Gemma.*

The following *Figures* represent parts of this *Worm*, as viewed by the *Microscope*.

## FIGURE X.

Represents the *Protuberance* or *Papilla* about the middle of the *Edges*; and in it the *Orifice*; which I take for the *Mouth* of this *Worm*.

## FIGURE XI.

Is the *Head* of this *Worm* as it appeared in the *Microscope*, in three several ones I took out of the body, upon *dissection*, wherein is observable, a double order of *Spikes* or *Hooks*; the longer arising from the *Center*; the other more towards the edges, which at pleasure it can contract in, or protrude, and with them, part of the *Neck* too, as does appear by swelling out a little below, as it is very curiously deliniated, as likewise the other *figures*, by my most ingenious Friend and accomplish'd Gent. *Rich. Waller* Esquire.

## FIGURE XII.

Is a side prospect of the *Head* and the *Hooks* in it, of the same *Worm*.

OBSER.



Fig: 1.



*Philosoph. Transact. Numb 146. Tab. 1.*