



## Philosophical Transactions

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*Traité De l'Organe de l'Ovie par  
Mons<sup>r</sup>. Du Verney. 8<sup>vo</sup>. A Paris 1683.*

THAT you may know w<sup>o</sup> to expect from Mons<sup>r</sup>. Du Verney's treatise of the *Organ of Hearing*, the First thing to be considered is, the Natural, and therefore the Best, *method* he hath taken in it. The Book is divided into three parts, the first of which contains his *Anatomical Discoveries* of the structure of the *Organ* it self; The Second part gives us the use of all the parts of that *Organ*, grounded upon the *Mechanism* of the whole; The Third and last part containeth the *Diseases* incident to this *Organ*, with a full description of the several causes which disaffect it, and the manner they act by, together with particular *Remedies* for each *Distemper*.

The *Ear* is first divided into the External and the Internal: the External is composed of a *Cartilage* covered with a *Skin* very delicate, under which you meet with another *Nervous* tegument, that immediately embraces the whole *Cartilage*, which after some few folds terminates in that part of the *Ear* which we call the *Concha*, from its resemblance to the entrance of a snail-shell: besides these it hath two *Muscles*; the First is made up of certain carneous *Fibres* fixt to that part of the *Pericranium* that covers the muscular *Crotaphytes*, and descends in a straight line to insert it self at the upper part of the second folding of the *Ear*: the Second likewise consists of five or six *Carneous Fibres* that take their rise from the upper and foremost part of the *Apopophysis Mastoides*, and descending obliquely for about an inch terminate at the middle of the *Concha*. *Arteries* it hath  
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from the *Carotid's* one branch of which passeth behind, and the other before, and the distribution of these is attended by *Veins* from the external *Jugular*.

The hole of the *Ear* is a *tube* reaching from the *Concha* to the *Drum* and consists partly of a *Cartilage*, and partly of a *Bone*: the Skin that covers it is furnished with an infinite number of *Glandules* of a Yellowish colour, each of which hath its *Tube* opening into the cavity of the *Ear*, and sending forth that yellow gley substance which is ordinarily found there: at the end of this passage is seated the *Membrane* called the *Drum* and is almost round, dry, thin and transparent, and is inclosed in a channel cut in the bone at the end of that *Tube*. After this *Membrane* succeeds a cavity which he calls the *Barrel*, from the likeness it hath to the *Barrel* of a *Drum*, being on the sides encompassed by the Bone, closed before by that *Membrane*, and behind by the surface of the *Os Petrosum*. This *Barrel* of the *Drum* contains in it five sorts of things remarkable, viz. Two *Channels*, Two *Apertures*, Four *Bones*, three *Muscles*, and One *Branch* of the *Nerve*. The *Channel* that goes from the *Ear* to the *Palate* he calls the *Aqueduct*, and denies it to have any *Valves* to hinder the passage of any thing from the *Ear*,

The *Apertures*, or *Windows* are situated in the *Superficies* of the *Os Petrosum* opposite to the *Drum*; the highest is the *Oval Window*, in the bottom of which is a small edge on which the *Basis* of the *Incus* rests; the other which is called the *Round Window*, has a small *Channel* in which is set a very fine, dry, and diaphanous *Membrane* like that of the *Drum*.

The first of the bones is the *Malleus*, the length of which is commonly about Four Lines (or Four of Twelve parts of an Inch) the Diameter of its breadth is the Third of its length; the second is the *Incus*, the longest of whose legs is joyned to the *Stapes* by the mediation of the Fourth bone.

Of the Three *Muscles* which are contained in this Cavity

ry, two belong to the *Malleus*, the Third to the *Stapes*; lastly, the branch of the *Nerve* which passes behind the *Drum* has been taken by some for the *Tendon* of the *Muscle* of the *Malleus*, is a branch of the Fifth pair.

The Two *Windows* open into a cavity which is hewn in the *Os Petrosum* and called the *Labyrinth*, divided likewise into three parts *viz.* the *Entery* of the *Labyrinth*, the three *Semi circular Canals*, and the *Snail-shell*

The entry of the *Labyrinth* is situated behind the *Oval Window* and hath Nine apertures, *viz.* the *Oval* one and Eight more, the First of which leads into the upper part of the *Snail-shell*, Five belong to the *Semi-circular Canals*, and the two last transmit two branches of the softer portion of the *Auditory Nerve* &c.

The implanted air he takes to be that contained within the above mentioned *Windows*, which being both closed, the one by the base of the *Stapes*, the other by a *Membrane* of its own, do sufficiently forbid any intercourse between that and the external air, and discouraging of the *Nerve* which passes along the *Musculus Mastoides* and the *Parotids* to the Ear, he deduces it from the second pair of the *Vertebral Nerves* which he says, *Dr. Willis brings from* the first.

The differences of this *Organ* in the *Fœtus* are that the bony part of the entrance to the Ear is nothing but an hard *Membrane*, that there is a ring which serves for a frame to the *Tympanum* separable from the *Os Temporum*, tho afterwards united to it, and that while the *Fœtus* is yet in the womb, the *Tympanum* is covered with a mucilagenous matter, which afterward hardens into a *Membrane*, though at length it totally disappears &c.

The *Small-bones*, the *Labyrinth*, the *Canals*, the *Snail-shell*, and other internal parts have the same Figure, and to appearance the same bulk in Infants wch they have in Men, and all that years contribute to them is Strength and Solidity. Having given an exact description of the parts of the *Ear*, he follows it with the use of those parts.

The external *Ear* collects the sounds, and augments the impressi<sup>o</sup>n by the various reflections the voice undergoes in its passage through the folds of it. The use of the *Muscles* he acknowledges to be obscure, though he guesses their action may be to contract, or dilate the *Concha* as the tremblings of the *Air* are strong, or weak.

In the Internal Ear, the *Tympanum* is stretched and made slack again, by the muscles of the *Malleus*, in the tension of it both the *Muscles* act, but in the relaxation onely the external, whose action it is to reduce it from a *Concave* to a *Plain*, all which is manifest from the insertion of the *Muscles*: the determination of which action he deduces, not from the will, but from the various dispositions, and appulse of the *Objects*, as a sharp note is caused by a body whose parts are so disposed as to be capable of very quick Vibrations, which they as suddainly impress on the *Air*; on the contrary, the flat note proceeds from the *slower Stroaks* of a body with parts that can onely be so agitated, to which differences the *Tympanum* readily complies, and does as it were put on their particular *Character*, this is delivered hence to the *Malleus*, and so forward, till at last the same fluctuation is caused in the *Os Petrosum*, and in the *Labyrinth*.

The *Aquiduct* serves chiefly for the ingress and egress of *Air*, to and from the *Cavity* into which it opens, and not to supply the defect of the *Tympanum*; which he argues from a deaf mans hearing the sound of an *Instrument*, then, and then onely when he holds the *Neck* of it between his *Teeth*.

The immediate Organ of hearing he perswades to be the three *semi-circular Canals*, they being found in all *Animals* and in some onely they; as in *Birds*, and *Fishes*.

From the Communication of the harder portion of the *Auditory Nerve* with the branches of the *Fifth Pair*, which are distributed to the *Organs* of the *Voice*, proceeds that  
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Sympathy between speaking and hearing; from the Communication of other *Nerves* follow the *Motions* of the *Body*, and even of the *Spirits*, which often accompany the sounds we hear as in the effects of *Musick* &c.

After the explication of the Structure and use of the *Organ*, follow the *Diseases* incident to it, where he observes the method he before made use of, and assigns *Diseases* to the particular parts in the order they lye, as that the external ear is subject most of all to a Pain which commonly seizes the *Concha*, and the whole *Ductus* even to the very *Tympanum*, and is attended with *Punction*, *Erosion*, *Tension*, a sense of *Weight* and *Pulsation*, each of which *Symptoms* he explains a part, asserting Pain it self to be the effect of the *Solution* of the *Continuity* of its parts, and what soever can procure the *one*, must necessarily produce the *other*.

The second Distemper is the *Inflammation* of the *Ductus*, caused either by the obstruction of the *Glandules*, the *Acrimony* of the *Humours* or sometimes by *Wormes*, which are either generated there *Equivocally*, or more probably hatched out of *Egs* of *Insects*, which flying about in the air in vast numbers may not unlikely lay them in the *Ear*.

The third *Disease* of this part is its *Obstruction*, proceeding from different causes, as from bodies accidentally gotten into it, from the abundance and petrifying of the *Wax*, from a præternatural *Membrane*, carneous *Excrescences*, or swelling of the *Glandules*.

The distempers of the *Drum* are its *Flaccidness*, its growing *Callous*, too great *Tension*, and breaking, those of the internal Ear are the *Caries* of the bone, and *inflammation* of the *Membranes*; The Nerve is likewise subject to *Obstruction*, or *Compression*. Last of all he discourses of the *noise* in the *Ear* which is a *Symptome* attending most of the *Diseases* of it. The *Cases* he brings for the confirmation of all this, as likewise the *remedies* may be first seen in the

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*Author.* This Doctrine is all along illustrated with *Figures* of the *parts* in sixteen large *Tables*, in which each part is represented larger than in nature it is, for the clearer perception of it, as also of its connexion with, and relation to the other *parts*, he hath given us a new draught of the *Basis* of the *Brain*, which he exposes more to view by cutting off the hinder *Lobes*, and so placing the *Brain*, and *Cerebellum* in the same plain which he looks upon to be absolutely necessary for a true prospect of the *Medulla oblongata*, and the *Origine* of all the *Nerves* which proceed from it.

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*An Account of Two Letters of Mr. Perault, and Mr. Mariotte, concerning Vision; Printed at Paris 1682.*

**T**HE Occasion of these Two *Letters*, was an Observation of Mr. *Mariottes*, that any *Object* is not seen when the *Species* light upon the *Base* of the *Optic Nerve*. The Experiment upon which it is grounded is this: take a piece of white paper of Six Inches *Diameter*, and fasten it upon a dark coloured Wall, that it may be level with your Eyes take another small piece of Paper and place it towards your Left hand, at Two Foot distance from the former, but about Two Inches higher on the Wall: if you then remove to the distance of Eight or Nine feet, and close the left Eye, fixing the Right upon the smaller piece of paper, the Larger paper will quite disappear.

It is not at all doubted but the *Image* which should appear falls just upon the *Base* of the *Optic Nerve*, it is also certain that the *Retina* is to be found in that place, but the *Choroid* not; which gives a very fair suspicion to Mr. *Mariotte*, that the *Choroide* is the seat of *Vision*, and not the *Retina*.

The *Novelty* of this *Opinion* hath found many *Opposers*, and among the rest *Monseur Perault*, whose *Arguments* in the first *Letters* are in short reduced to Three Heads.

1. If the *Choroide* were the seat of *Vision*, its function would be hindered by the branches of *Blood Vessels* lying in the *Retina*.

2. The *Choroide* should not be rugged and unequal; nor hard



hard and thick ; nor have a slimy or dirtiness upon it, to hinder the Impression of light, nor want a Communication with the *Optick Nerve*.

3. If the want of *Vision* in the foregoing Experiment, may be salved by any of the Two probable reasons here offered ; then there is no need of discharging the *Retina*.

To the First of these Mr. *Mariotte* answers ; That there are defects in *Vision* caused by the *Blood Vessels* in the *Retina* (and he proves it by a remarkable as well as new Experiment) but these defects are not sensible when we look with both Eyes ; for there are no *Vessels* that lye so near the *Axis Opticus* as to hinder a direct view ; and in an Oblique, one Eye helps the other : it being difficult that the *Rays* should fall on a like *Plane* in each Eye. Again these *Vessels* that are nearest the *Axis Opticus*, are no bigger than a *Hair*, or the 240<sup>th</sup> part of an Inch ; and being in the surface of the *Retina*, are at some distance from the *Choroide*, so as to let *Rays* enough pass under, for the distinguishing of *objects* not very small. The *Vessels* also that carry the blood are clear and *Pellucid*, causing a *Refraction* that is helpful to *Vision*.

Here also may enter some general considerations as that the impression of a luminous *Object* remains sometime in the *Organ* : that some *Fibres* being strongly moved, others near them are also in motion : that the *Eyes* are always in motion, and very hard to be fixt in one place, thoit were desired.

To the Second head he answers, That the concavity of the *Choroid* cannot be very rugged ; for upon the dissecting an Eye, and removeing the *Retina*, the surface of the *Choroide* has reflected an *Object* as distinctly as a concave *Speculum*. That there appears no soyls or dirtiness, till the outward *Cuticle* be broke, and then the *Organ* is disorderd. As for the thickness of it, he says he finds it in a man but as a sheet of Paper, or the *Pia Mater* in the brain. That the *Blood Vessels* are weaved together

gether with the *Nerves* upon which Account there may be as true a fence of Light in them as there is of Pain in the hand (which is also full of *Blood Vessels*) when it is prickt with the point of a Needle: and perhaps the presence of *Veins* and *Arteries* in a member, is absolutely necessary to sensibility. The blackness of the *Choroide* may make its niceness of fence, as we see Paper blackt easiest fires. He says the *Choroide* does communicate with the *Optick Nerve*; by which *Nerve* he does not understand the *Marrow*, or inner part of it, which is insensible; but the *Membrane* (being part of the *Pia mater*) which incompasses it, and is the true *Organ* of fence not only in the *Eye*, but also in the *Ear*: whereas the *Marrow* of the *Nerves* contain only spirits and liquour useful to motion.

To the Third head, where Mr. *Perault* gives reasons why there is no Vision upon the *Base* of the *Optick Nerve*, as first supposing that Vision is to be made on a smooth surface, the *Optick Nerve* which is a bundle of *Fibres* is not smoothe'd at its first entring the *Retina*, but afterwards when the *Fibres* are dissolved, and spread into a Coat, as when Rags are made into Paper.

Here Mr. *Mariotte* (If I rightly comprehend him) denies the *Retina's* consisting of *Fibres*, affirming it to have nothing but a Mucousness with some *Veins* and *Arteries*.

But if I am not mistaken (in an Experiment of Dr. *Briggs's*, a *Retina* put into a Glass of fair Water, and drawn about under Water, both for the Expanding and Magnifying it, appeared plainly to have a fibrous texture, like that of a piece of very fine Lawn.

In the Second place, Mons<sup>r</sup> *Perault* supposes that the *Choroide* being pierced by the *Optick Nerve*, there may come a light thro the parts of the Eye, the back way, into the *Optick Nerve*, which would spoyl the sense of another light coming thro the *Pupil*.

But this Mr. *Mariotte* will by no means agree too.

*Historia Naturalis Helvetiæ Curiosa, Authore  
Job. Jacobo Wagnero M. D, Tiguri,*

THE Author professes that he undertook to write the *Natural History of Switzerland* upon the Invitation of my Lord Bacon, and with an Intention thereby to promote a true *Experimental Philosophy*.

He divides his *Book* into Seven *Sections*. In the First he lays down the Antient and Modern Limits of *Helvetia*, together with the general qualities of the Soil.

In the Second he speaks generally of the name of the *Alps*, and their height, difference of seasons and fruitfulness, of *Ice* remaining intire Two or Three Hundred years, in which some of the Cracks have been observed to be three or four Hundred Ells deep, of the Cold of the *Labinae*, or Heaps of *snow* rolling off the *Mountains*, and bearing down *Woods* and *Villages*: of Caverns, Grottes, and great Receptacles of Waters, of the fall of the Earth or part of the *Mountains* doing often great mischief.

In the Third concerning *Waters*, he enumerates the *Lakes Rivers, Cataracts, Baths* hot and cold, Medicinal Waters to drink, Salt and Bituminous Springs, Petrifying waters, Springs rising and intermitting at certain seasons, waters causing a swelling under the throat, miraculous or fabulous waters, among which he speaks particularly of the Lake of *Pilate* said by Thirty Five several Writers to cause Tempests, rain, Thunder &c. if any thing were cast into it; but the *Author* from his own experience refutes this Error, and assures us that he found it a very tame *Puddle*, not deserving to be called a *Lake*.

In the Fourth; He treats of Living Creatures first of the *Men* and their *Size* at présent (tho he mentions the *Bones* formerly found of supposed *Giants*) of their *Courage* and *Strength*, of their *Longævity*, *Prolifickness* and *Ingenuity*: Of their *Cows* and the *Advantages* they have from them, of the *Hair-Balls*, found in them, whereof the Author took seven out of one *Stomack*; of the *Spleen* of an *Ox*, weighing *Thirty* pound. The other *Beasts* more peculiar to the place are large *Staggs*, *Bears*, *Wolves*, *Wild Cats*, *Beavers*, *Linx's*, *Marmots*, *Martrees*, *White Hares*, *White Squirils*, *White Moles*, *White Weasels*, the *Roe-Buck*, the *Ibex*, the *Rupicapra* in which are found the *Balls* called *Gems-Kugels*. Besides these there are sometimes *Moschelaphi* generated of a *Stag* and a *Cow*, and *Hippotauri* generated of a *Bull* and a *Mare*.

Of their *Birds* the chief are the *Yellow* and *Black Eagles*, the *Vultur*, the *Hawk*, the *Falcon*, the *wild Duck*, several sorts of *wild Geese*, the *Pelican*, the *Cock* of the *wood*, the *Wood-Pecker*, the *Red-leg-Partridge*, the *Ring Ouzel*, the *Bittern*, the *Grouse*, the *Horn Owl*, the *Raven*, *Pyrrhocorax*, *Merula Torquata*, *Lagopus* a *white Bird* as big as a large *Pidgeon*, having the *legs feather'd*, &c.

The *Fishes* (tho not communicating with the *Sea* in 500 miles) are *Salmon*, *Barble*, *Trout*, *Carp*, *Perch*, *Guiniad*, *Lamprey*, *Lampern*, *Mullet*, *Eelpout*, and the greatest of all the *Silurus's*, &c.

The *Crefish* are some of them *red*, when they are *raw*, and some *Azure* coloured, some of them are not *red* after *boyling*, they are taken notice of to have *three teeth* in the *Stomack*, and the *Males* to have a *double Penis*.

Among the *Insects* are described the *Musca Aquatilis aestiva major* of *Moufet*. A *long fly* with *red Wings* and the *Carabus*, there are also mentioned *three sorts* of *Locusts*, the *Spanish fly*, the *Evechur*, the *Oyl Beetle*, the *Cervus Volans*, a sort of *Scorpions*, not *poisonous* and without

Tail, the *Pituo campi*, and Snow Worms.

*Serpents* there are, no doubt, but the Author takes pains to prove the existence of *Dragons*, with Feet, and without Feet, Wing'd, and without Wings, as big as a May-pole, but the Authorities are either old Histories, or Stories at the second hand, with few Circumstances.

In the Fifth *Section* he speaks of the *Trees* &c. As the white and red Fir-tree (from the colour of their Bark) these are the most natural to the Soil, one of which he says grew to the height of 160 feet, and 24 feet in the Circumference, the *Pinaster*, the *Pinus Montana tertia*, C.B; the *Larch-tree*, out of which comes the Venice Turpentine, and upon the Trunck whereof grows the *Agarick*.

Here is subjoyned an Alphebetical Catalogue of the of the chief of the *Alpine* Plants, which are growing in *Monte fracto*, and other places.

The Sixth *Section* is concerning *fossiles* where there is a large Catalogue of the less pretious Stones; but among the Stones of value are reckoned the Amethyst, the Carbuncle, Cristal, which is denied to be made out of Ice or Snow.

In enumerating the *Lusus Naturæ* its less doubtful whether the square Stone Dice found about *Baden* are natural or not. But the natural *Urns* said to be found neer *Geneva* and other places, are positively affirmed to have been taken up full of *Bones* and *Asbes*.

Among *concreted juices* is reckon'd *Sulphur Vivum* and *fiores Sulphuris Nativi* found at the *Baths*, and a true *Nitre* taken from the Decoction of the fountain of *Scolij* or *Scul-tini*.

*Golden Sands* are found in the River *Rhine*, the *Emma's Urtena*, *Urfa*, *Arola*, and *Addua*, Mines of *Silver* have been discovered in several places, but the digging them has not turned to profit. There are also Mines of *Lead* and *Copper* but not so plentiful as those of *Iron* and *Steel*. Tho Ships do not use to appear under this head, yet the Author here relates the famous Story of a Ship found 150 foot

foot under ground, near *Bern*, in the Year 1460, about this there have been many conjectures, particularly, one of *Moretus*, that the lakes at the heads of several Rivers might formerly have been joyned together, so as to make the way Navigable between *Geneva*, *Bern*, and *Constance*, but this the Author wont believe.

The last *section* is about *Meteors*, where is mention'd among other things strange *Thunder* and *Lightning* hapning in the *Winter* time, as well as the *Summer*, and doing much hurt, as also *Hurricanes* raising up the water of some lakes like a *Pillar* into the *Clouds*, and sometimes pouring it down again at a distance upon the land.

III. *Johannis Jacobi Zimmermanni*  
*Cometo-scopia : Or three Astronomi-*  
*cal Relations concerning the Comets*  
*that have been seen in the years 1680,*  
*1681, 1682, Printed at Stutgard in 4<sup>o</sup>*  
*Anno 1682.*

THE *Author* of these *Descriptions* divideth every *Relation* into three parts; first an *Historical Account*, when and how the *Comets* appear'd, and in what manner he observ'd them. Secondly an *Astronomical Calculation* of their places and motions; and thirdly an *Astro-Theological Prognostick* of their *Effects*. Concerning the first *Comet* which was seen A<sup>o</sup> 1680, he says it was observed by himself no sooner then the twenty third of *November*, at St. *V.* at Five a Clock in the Morning, tho others pretend to have seen it eight days before: nor could he observe it longer then the twenty fifth or twenty sixth of *November*, by reason that its motion was towards the *Sun*, and having taken its distance from some *fixt Stars*, he found by *Trigonometrical Rules* that its place was then in 8° 8' of *Scorpius*, with South Latitude of 2° 31'. Also by some other *Observations* communicated to him, the *Comet* was the sixteenth of *November* in 1° degree of *Libra* Latitude  $\frac{1}{4}$  degrees *Austral*: From whence by the Analogy of its *Diurnal Motion* of five degrees, it should have been the fourteenth of *November* a little above the least *Star* in the left Wing of *Virgo*, as the first term or place of its Appearance. The  
*Prognostick*

*Prognostick* which he gives, is grounded upon the Vulgar Supposition that *Comets* are Signs of such mischiefs and miseries, as happen to men after a dissolute and irregular life, and upon this ground he believeth that the *Vision* shewn to the *Prophet Jeremiah* Chap. 1. Verse 11 to the 13 was nothing else but the sight of a *Comet*; And though (as he saith) he doth not like the common *Astrologica Juggling-Purse* (so he calls it) where according to the Division of the heaven in twelve *Houses*, and the Distribution of the *Countries*, to the Signs of the *Zodiack*, the Superstitious *Fortune-Tellers* do *prognosticate* things, which have no reason nor grounds neither in nature or experience, yet it seems he cannot forbear himself to make use of the same *Trifles*, when he says that *Virgo* being a Sign of *Sterility*, *Libra* a Sign of *Justice* and *Death*, *Scorpio* an house of *Mars* and Sign of *Poysons*, the *Comet* must signify *War*, *Famine*, *Sickness*, or a great *Plague*. As for the *Natural* cause of this *Comet*, he thinks, that in the same manner, as the great *Conjunction* of *Planets* in *Sagittarius* did produce a *Comet* in the year 1663. So by a new *Conjunction* of *Sol*, *Venus*, *Mercury* and *Luna* in the same *Sign*, and in opposition to *Jupiter* the like *Effect* might be taken notice of.

The second *Comet* as some *Astronomers* do believe or rather the first *Comet* only continued in the same *motion* (as the *Author* thinks) did appear again Seventeen days after, that is the  $\frac{1}{2}$  December 1680 but more clear and evidently the  $\frac{1}{2}$  of *December* when the *Author* by his *Orthogonium* (an Instrument made of good strong wood, whose *Radius* was six foot long) observed for many days the distance of the *Comet* from several *stars*, and found by *Calculation* its *Longitude* and *Latitude*, according as he puts them down in the *Table* Page 93. The last time he made his *Observation* was the *Thirtieth* of *January*, so that the *Comet*, taking all its duration together, did last about 82 or 84 days: and considering its motion in which it past thro almost nine *signs* of the *Zodiack*, its *Angle* of *Inclination* to the *Ecliptick*,



*tick* in the Morning appearance did not exceed three  $\frac{1}{2}$  degrees, but in *apparitione Vespertina*, the Angle was above 28 and almost 29 degrees, its *Nodus Australis* was according to the *Roman* Observation in 8 degrees of *Libra*, but afterwards its *Nodus Boreus* in  $18^{\circ} 19'$  *Sagittary*, and by this reason and its *Diurnal* motion, the *Comet* passed by the *Sun*, in a distance of 11 degrees, just when the shortest day was in the year: its *Progression* being first slow, but from the *Sun* much increased and swifter. Concerning the *Theory* or figure and line of its *motion*, he saith, that neither an *Arch* of a great, nor lesser *Circle*, nor a straight line will do the business; but rather a certain crooked line turned after an *inflection* like a *serpent*, which never yet was known in any other *Comets*: or it must be supposed, that two different *Comets* have appeared, one in the Morning, and another in the Evening, as *Mr. Cassini* doth conclude, tho' the Author himself is persuaded by the *Analogy* of the *motion*, *quoad Longitudinem*, that only one and no more appeared at that time; its *Tail* being in the Morning directed towards the *West*. but in the Evening to the *East*. Also the seventeenth of *December* its *Tail* seemed to be divided into two parts, from the bottom to the top, by a *black streak* passing through the middle. The length being sometimes of Sixty, and the breadth of four degrees. About the substance and original cause of *Comets*, he hath no mind to say any thing, as being doubtful what they truly are, the dispute of their *Parallax* not being yet fully decided, and so of their matter whether *Aethereal* or *Elementar*, the *Question* not resolved. But to shew the agreement of this *Comet* with others that have been observed, he hath composed a convenient Table, containing a *List* of all *Comets*, that ever have been described by *Historians* and *Astronomers*, putting down first, the year before or after *Christ* when they have appeared. 2. The Place or Country where they have been seen. 3. The *Authors* which have made mention of them. 4. The *month* or time of the year when

when they did first arise. 5. The time of the day whether in the Evening or Morning. 6. The name and shape of the *Comets*. 7. The Situation or to which part of the *Horizon* their motion did proceed. 8. The whole *Arch* or Quantity of *Degrees*, which they did run through or in want of that, the *Sign* of the *Zodiack* to which they have a relation. 9. The Number or Quantity of *Days* which they did last. 10. The *Degree*s of their swiftest motion. 11. The *Degrees* of the length of their *Tail*. 12. The direction of their *Tails*, to any part of the *Heaven*. And 13. The Effects, mischiefs, and strange accidents that have hapned after their *Appearance*. Among these some have been observed in the shape of the *Sun*, some of the *Moon*, and *Venus*, sometimes there have been three or four *Comets* together, as in the year 843 and 1529 &c. So that the Number of all in the space of 4000 years does amount to 370 *Comets*. To which now must be joyned another or the third *Comet* that was seen in the year 1682 in the month of *August*: The *Author* made his first *Observation* the  $\frac{1}{2}$  day, though at *Nuremberg* it was discovered the  $\frac{1}{4}$  its place was found the  $\frac{1}{2}$  at night a quarter after one, to be in  $11^{\circ} 29'$  *Leonis*, with *North Latitude* of  $26^{\circ} 10'$ , its *Tail* being almost fourteen degrees long, its *Head* like a *Star* of the first Magnitude, the *Angle* of *Inclination* to the *Ecliptick* of  $20^{\circ} \frac{1}{2}$  degrees. Its motion was the swiftest in *limite maxime Boreo*, so that every day it went forwards seven degrees, the *Tail* and *Head* had also the greatest brightness at that time. From whence the *Motion*, *Tail* and *Light* seemed to decrease proportionally, till the  $\frac{1}{2}$  of *September*, which was the last day it could be seen by the *Author*, having run over 94 degrees in twenty four days. The *line* of *Direction* was in *Opposition* to the *Sun* as usually it is in *Comets*. The *Prognostications* which after the Description of the second and this third *Comet*, the *Author* hath added, are upon the same grounds as the former, drawn out of the Nature of *Hieroglyphical* Signs and Images,

ges, that commonly are to be seen in the *Celestial Globes*. He explains this among other *Questions*, whether *Comets* if they be *Natural Bodies* that have their regular motions like other *Stars*, (so that the time of their appearance may be predicted) yet their *signification* and *influence* may not have the same force as if they were some extraordinary products of Nature; and he concludeth that they may serve like an *Alarm* in a *Clock work*, to stir up the *world* to a better contemplation of *Heaven*.

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