

PHILOSOPHICAL TRANSACTIONS.

Monday, Decemb. 14. 1668.

The Contents.

The Description of a way, said to be New and Universal, for working Convex Spherical Glasses upon a Plain, for all practicable Lengths, without other Dishes, or concave Moulds. Two Extracts out of the Italian Giornale de Letterati; the one, about two Experiments of the Transfusion of Blood, made in Italy, the other, concerning a Microscope of a New fashion, discovering Animals lesser than any seen hitherto. An Account of two Books : I. A CONTINUATION of NEW EXPERIMENTS Physico-Mechanical, touching the SPRING and WEIGHT of the AIR, and their effects, by the Honorable ROBERT BOYLE, Oxford, 1669 in 4°. II. HYDROLOGIA CHYMICA, &c. by W. SYMPSON. London, 1669. in 4°.

The Description

Of a Way, said to be New and Universal for working Convex Spherical Glasses upon a Plain, for all practicable Lengths, without other Dishes or concave Moulds.

THIS Description is found in an *Italian* Book entitled *L'OCCHIALE all' OCCHIO, ovvero DIOPTRICA PRATTICA* del Carlo Ant. MANCINI in Bologna 1660. in 4°, which coming not into these parts, at least not to our knowledge, till now, could not be sooner taken notice of. It treats of Light; of the Refraction of Ray's; of the Eye and the Sight; and also of the considerable Helps that may be afforded to the Eye, to make it

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see what is almost incredible. Besides which there are deliver'd in it the *Practical* Rules for working Spectacles for all sorts of sights, and especially *Telescopic* Glasses for observing the Planets and Fixed Stars by Sea and Land; and others, to magnifie the smallest of near Objects thousands of times.

There being, among the rest, described by the Author a particular way, call'd by him *New* and *Universal*, for making Convex-glasses upon a *Plain* for all practicable lengths of Diameters of Spheres, without other dishes or concave Moulds; we shall, for the satisfaction of some of the Curious, that are not Masters of the *Italian* Tongue, and desire to know, what this way is, give it them in *English*, thus;

To give a Spherical Figure to a *Plain* by a *Plain*, (which at first sight may seem a Paradox) by moving one Plain upon another by a circular Motion, proceed to this manner: Let the piece to which the Glas to be wrought is fastned, be adjusted in the head of a Pole, which is to be of the length, the Semi-diameter of the Sphere of the *Lens* requireth; and, upon the Stool or Form, where you intend to work, let there be put a *Plain* of Iron or other Mettal, level to the Horizon; and perpendicularly over this *Plain* let the Pole be fasten'd to the Ceiling of the Room, if it be high enough; or to another steady fastning, lower than the Ceiling, if need be, after this manner: About the head of the said Pole let there be fasten'd a Frame, made of two concentrick rings or hoops, so that the one be mov'd within the other upon two Poles, and this other upon other Poles, movable between two small arms fixt to the Ceiling: which Frame you may imagine like that by which the Mariners Compass is kept Horizontal, or that, which they use in *Italy* for carrying Oyl-lamps by night Horizontally: Or the same may be done with a Ball moveable within two Circles fixed, and fasten'd on the top of the said Pole. All which will be better understood by the *Figures*, in the first of which, the *Lens* is T, cemented to the Piece E, fasten'd to the Pole S, which passes through the Center of the inner Circle B, moving upon the pivots I. H. (*Fig. 2.*) in the outer Circle A; and this is fasten'd in a Frame upon the pivots L M, in the arms C D, fixt in a wall, or above in the Ceiling (as hath been said) according to pleasure,

sure, or the conveniency of the place ; and above this Frame let a Pin be put through the upper Pole, to hinder its getting out of the Circle B. and to the end that it may be raised a little, but not to be made lower by the Work man.

Or else, let the Pole S. be thrust into the Ball O N. (*Fig. 3.*) movable within the two Circles P. Q. very well fixt to the two arms Z Z. and let those two Circles be made parallel, hindring the Ball to get out. But the Office of these two Circles may be perform'd by one alone, but larger, in the manner of a *Socket*, which may gird about such a part of the circumference of the Ball in the middle, as not to let it slip out. 'Tis enough, if the Ball do but freely move in it ; yet so as alwayes to touch it : which also is to be observed in the Ball with two Circles, by that means to keep alwayes the Center thereof, when it moves, just in the same situation.

Let the *Plain* of the Iron, or other Mettal, on which the Glass is to be ground (F. in *Fig. 1.*) be plac'd level upon the Form G. to do which, I have practis'd the following Contrivance. Let there be prepared two square Planks of wood (FR) equally thick, long and broad ; but in the undermost let there be fixed a square *Ruler*, solid and firm, as long as is the thickness of both the said Planks ; and in the upper Plank let there be a square hole or groove so fitted, as that the Plank may steddily slide upon the said *Ruler* ; And to such *Rulers* (which may be called the *Regulators* of the 2. Planks) let there be made a ledge to keep the board more steddy and stiff upon the *Ruler*.

Further, let these 2. Planks have two Gutters (R. V.) of a *Figure*, going a cross from end to end ; into which may pass two wooden wedges, like Y (of which may be made four, to put one of them against another in the said Gutters.) And then, when you will place the Plate FT. level on these Planks FR, take a *Pendulum*, or other levelling Instrument, and adapt it upon the said *Plate*, which if it be not found level, observe on which side it leans, and adjust it by the wedges.

The use of this Instrument is very easie, since 'tis sufficient to guide with your hands the *Mallet*, fastned to the Pole upon the *Plain*, where the sand is spread ; making such turns, as they use to doe in this work ; and continuing so, till the Glass has taken

its Spherical Figure. It may be polliht upon the same *Plain* applying to it the Paper smoothly cemented on. But here it is to be consider'd, that the polishing, practis'd with this Instrument, is very long and tedious; so that I would advise, after the Glass is wrought to the perfect figure on the *Plain*, to make

* These *Gutters* the Author describes in another part of this Book; where he saith, That there must be a *Polisher* made in the form of a *Gutter*, excavated its whole length; which may also be hollow'd Spherical by means of a wooden Mould, turn'd of a Spherical figure by a *Gage*, fixt on a *Mandril*, and made to turn round: which he saith, may also be better perform'd upon certain square Stones of a peculiar kind, which, when he first attempted the working of Glasses, he made great use of.

use of certain *Gutters* * proportionable to the Sphere, whose Semi-diameter is represented by the length of the Pole above-mentioned; using for the rest, the rules known and observed in the grinding of Convex-Glasses.

So far this Author of this contrivance, which though it be Ingenious and Mathematical, yet is it conceived by skilful and considering Artists, that it will be very difficult to put it

into practise with Glasses of any considerable length; it being also much doubted, whether the Author himself hath ever used it, or seen it used in long Glasses.

An Extract

Out of the Italian Giornale de Letterati, about two considerable Experiments of the Transfusion of the Blood.

A Nno 1667. May 8. Here was made in *Bononia* at the house of Signior *Cassini* this Experiment, *viz.* There was open'd the carotid Artery of a Lamb, when the blood was let run as long as it could, into the right branch of the Jugular Vein of another Lamb, from which there had before been drawn so much blood, as was judg'd, it could be supply'd with from a Lamb of the like bigness, whose blood should be let out till it dyed. After this, there were made two ligatures pretty near to one another, in the vein of the Lamb, that had received the blood; and this vein was quite cut thorow between the two ligatures, to see what would happen thereupon. This done, the Lamb was untyed, which without any appearance of feebleness, went about, following those that had made the operation. It lived a long while

Fig: 5

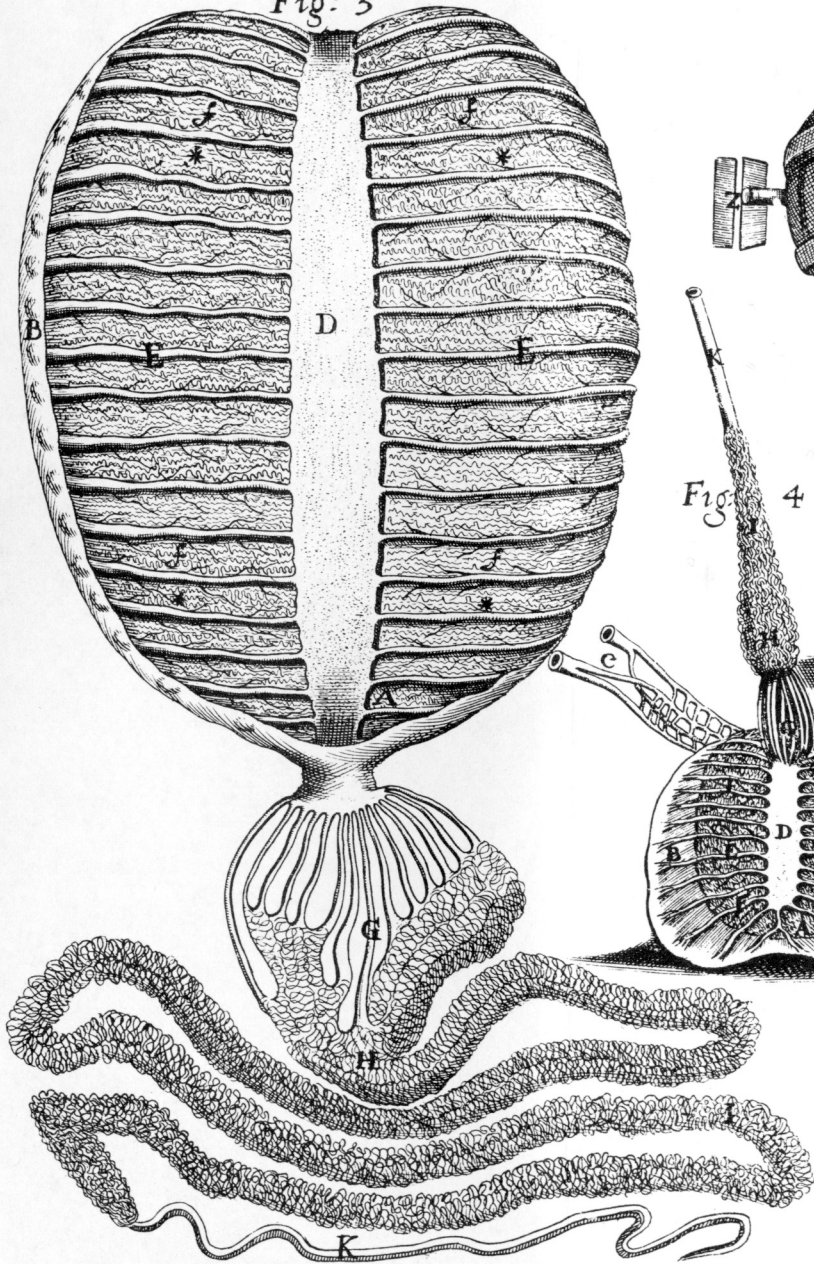


Fig: 3

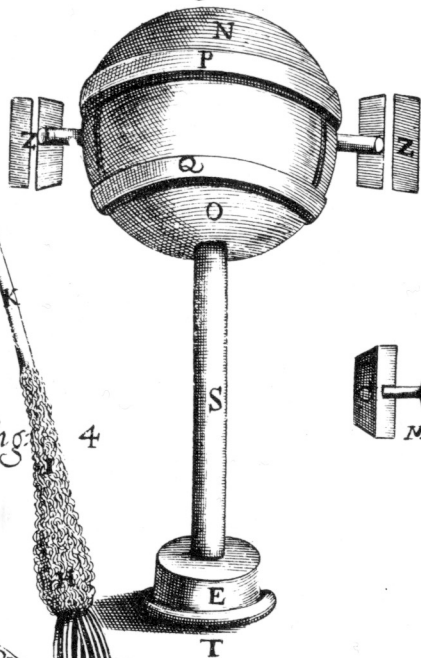


Fig: 2

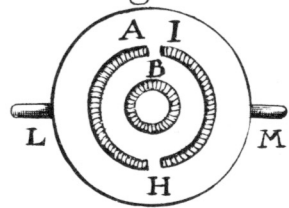


Fig: 4

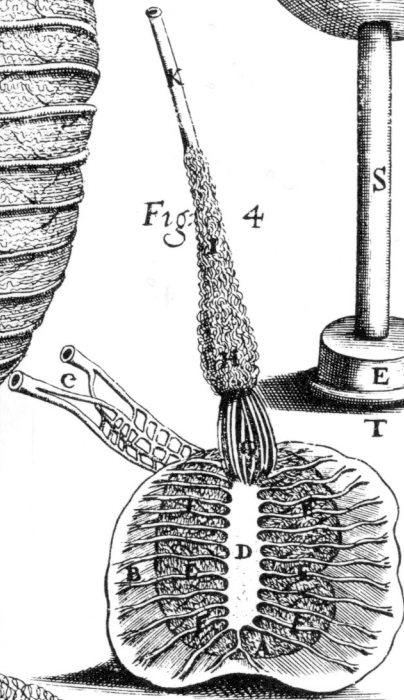


Fig: I

