

*Several Experiments shewing the strange Effects of the Effluvia of Glass, produceable on the Motion and Attrition of it. By Mr. Fr. Hauksbee, F.R.S.*

*Experiment I.*

*Containing farther Observations on the Attrition of Glass.*

**I**N the late Experiments, which seem something to Illustrate Attraction or Electricity, by the Ends of the surrounding Threads pointing to the Axis of the Affricated Glass, there is something farther very Remarkable, and worthy Consideration ; which is, That after the Attrition of the Glass has been a little while continu'd, and the Effluvia laid hold on the hairy or woolly Threads, (for I made use of such as we call Crewel,) that then, notwithstanding the rubbing was ceas'd, and the Glass motionless, yet all the Threads would continue their directed Posture for four or five Minutes, and sometimes longer, before they could disengage themselves from the Attracting or Electrical Effluvia. Moreover, if one's Finger (or any thing else is as well, for I have try'd divers things,) be approach'd near the pointing ends of the Threads, while the Effluvia act with so much vigour, as to sustain them directed ; that then, I say, they would flee and avoid a touch from it ; as if the North Pole of the Magnet was apply'd towards the South Point of a Needle : And at the same time, if the Finger is held near, at about an Inch from the end of the aforesaid Thread, it will there seem

to

to be attracted, it removing its self something out of its place to the approach'd Body. But if any thing is held between the Glafs and the directed Thread, then the Thread immediately looses hold of the Effluvia, and retires to its first Position; yet upon withdrawing the Interpos'd Body, (if it has not remov'd it self too far out of the Reach of the Effluvia) it will again return to its Tendency, and so remain, till the weight of its Body is too great for the declining strength of the Effluvia to support it in such a Direction. I have since try'd the same Experiment with a Globe Glafs, which when the Attrition was made, would in all manner of Positions attract the surrounding Threads, directing them towards its Centre.

### *Experiment II.*

*Touching the Direction of Woollen Threads every way from the Axis, towards the Circumference of an Affricated Glafs.*

**H**AVING Prosecuted the Experiments of Attrition on the outside of Glafs with some Success, Several notable Phænomena having been exhibited by them, (and I think what the World in a great measure has not been acquainted withal before,) I thought it would not be amiss to continue them a little farther, by trying what Appearances might be afforded by placing the Woollen Threads, as heretofore us'd on the outside, on the Axis within, and the Attrition to be made on the outward surface as usual; not doubting, if any such Effluvia were by that means emitted within, that then the Threads, which should be fix'd on the Axis, would extend themselves, and point every ways towards the Circumference of it. In order therefore to put it to the issue, I took a Globe Glafs about six Inches Diameter, and having convey'd in-

to the Body of it some Woollen Threads ty'd to a frick, which was plac'd in it as an Axis, and being fix'd on the Machine, the great Wheel was turn'd, and the Hand apply'd as usual, but soon I found the Inconvenience of a Glass of that form, the Threads entangling one with another, and there was no way to loose or separate them; however they seem'd then to me to be dispos'd (had they been at Liberty) to have answer'd my expectation. But this is not all that occur'd at that time, for bringing my Hand near the Glass, which was then at rest, I was surpriz'd to see a Motion of the Bodies within side; and upon enquiry, found it was occasion'd by the Approach of my Hand, since I could by a motion of my Finger towards the Point of any of the Threads that touch'd not the inside of the Glass (but nerely so was best) drive it any way; it seem'd to fly my Finger held on any side of it, and this without touching the outward surface by half an Inch or more. Now when this Experiment was made by hanging the Threads near the outside, it was very odd (as before related) to see them fly the Approach of a Finger; yet how much more surprizing is it, to see the same perform'd even when a Body so solid as Glass interposes; which shews the subtilty of the Effluvia, the Body from which it is produc'd seeming to be no Impediment to its motion: Besides it seems very much to resemble or emulate a Solid, since Motion may be given to a Body, by pushing the Effluvia at some distance from it: But what is still more strange is, That this Body (I presume to call it so) altho' so subtil as seemingly to perviate Glass, will not (as I have taken notice of in a former Experiment) affect a light Body thro' a piece of Muslin: Now whether the Muslin absorbs the Effluvium, or what other Laws it may be subject to, I cannot tell, but sure I am 'tis very amazing, and I think, with submission, worthy the Consideration of this Honourable Society.

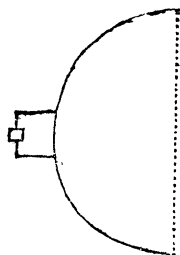
I have try'd the same with a Glafs exhaulted of its Air, but it afforded nothing worthy to be taken notice of.

*Experiment III.*

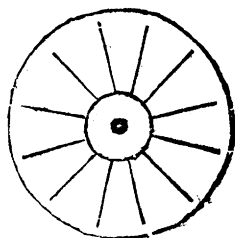
*Being a Repetition and Improvement of the former.*

I since procur'd a Glafs of a more suitable form for a Repetition of the foregoing Experiment. See *Fig. 1.*

*Fig. 1.*



*Fig. 2.*



This Glafs was screw'd by the Neck to one end of a Spindle, and had motion given it by the large Wheel as usual. This manner of fixing, and Figure of the Glafs, gave me the Liberty of rubbing it as well within as without, altho' on tryal I find, that either way is much the same; for when the Threads are held within, and the Attrition made on the outside, or the contrary, or the friction made on the same side the Threads are us'd, makes very little difference. To proceed: When the Threads were fix'd on an Axis within, and the Motion and Attrition made as usual, the Threads did then represent (as I before expected) a form like *Fig. 2.* And during its resembling that Figure, if a Finger was approach'd near the outside of the Glafs, a motion would be given to the point of the Thread nearest it within, and at the same time, if the Threads

the

were remov'd to the outside, and the Finger held within, the like motion would be given to them there. Generally the Threads seem to fly the Approach of the Finger ; yet sometimes I have seen them jump suddenly towards it, at more than an Inch distance.

To conclude this Experiment ; It is worth taking notice, That the Figures represented by the directed Threads, from, and towards the Centre, not only mimic, but seem most lively to resemble the centripetal, and centrifugal Tendencies of Bodies in their Motions either ways.

#### Experiment IV.

*Shewing, That the Effluvia of Glafs, are Capable of Performing the Office of Attrition ; Causing a Light, by falling on an Exhausted Glafs in Motion, (as if rubbed by the Hand.)*

**T**HAT the *Effluvia* of Glafs are very considerable in the Production of divers *Phenomena*, has already been abundantly prov'd ; but that they should act the Part of a Solid Body, by performing the Office of one, is still more admirable ; And that they do so, the following Experiment sufficiently demonstrates, and seems to corroborate a hint I gave in the 2d Experiment of their Emulating such a Body, by causing a Thread to fly the approaching Finger. I took a large Globe Glafs about 9 Inches Diameter, which having exhausted of its Air, I fixt to give Motion to it, by the Machine describ'd in *Philos. Transact.* Numb. 304. its *Axis* standing Perpendicular. Another Globe Glafs about the bigness of the former, was plac'd to give Motion to it by a new Machine, and was wrought with its *Axis* parallel to the Horizon. This last mention'd Globe, with its Content of common Air, was

was fixt to move within an Inch of touching the other. In these Postures the Machines were set on work, and the naked Hand apply'd to the unexhausted Glafs, the *Effluvia* of which in a little time reaching the exhausted Glafs in Motion, immediately produc'd a Light on that part of it nearest to the other, without the assistance of a touch from any thing else to influence it. This Light is pretty vigorous, and extends it self so far on the Globe as the *Effluvia* are capable to lay hold on't; It is nothing so much of a Purple Colour, as when it is caus'd by the Attrition of the Hands; but will continue, or live on the Globe for half a Minute or more, after the Motion of the rubb'd Glafs is ceas'd: But if the rubb'd Glafs is kept in motion, and the other at rest, the Light instantly dies, yet recovers again upon the first motion given it. After this I took a long Glafs, which had lain by me exhausted of its Air for more than six Months: This Glafs having been rubb'd a little with my Hand to expel the Humidity on its outside, I held it over the unexhausted Glafs in Motion, which at the same time was rubb'd by my Hand; It would now and then (for it was not constant) be very surprizing to see what large Flashes of Light would be produc'd in the long Glafs without touching the Glafs in motion, nor was it self either mov'd or provok'd by any immediate Attrition.

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