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.

IN 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

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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 Glaſs 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 Glaſs, 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 Glaſs.

HAving Proſecuted the Experiments of Attrition on the outſide of Glaſs 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 Glaſs about ſix Inches Diameter, and having convey'd in-

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to the Body of it ſome Woollen Threads ty'd to a ſtick, 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 occurr'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 touched 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 abſorps 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 Glaſs exhauſted 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 Glaſs of a more ſutable form for a Repetition of the foregoing Experiment. See *Fig.* 1.

Fig. 1.

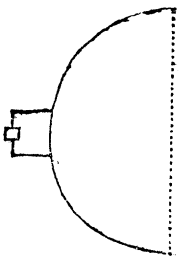
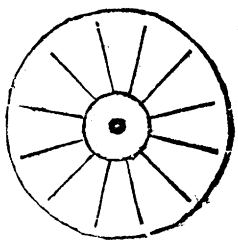


Fig. 2.



This Glaſs 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 Glaſs, 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 Glaſs, a motion would be given to the point of the Thread neareſt it within, and at the ſame time, if the Threads

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

THAT the *Effluvia* of Glaſs are very conſiderable in the Production of divers *Phænomena*, 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 coroberate 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 Glaſs 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 Glaſs 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,

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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 Glaſs, the *Effluvia* of which in a little time reaching the exhauſted Glaſs 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 Glaſs is ceas'd: But if the rubb'd Glaſs 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 Glaſs, which had lain by me exhauſted of its Air for more than ſix Months: This Glaſs having been rubb'd a little with my Hand to expel the Humidity on its outſide, I held it over the unexhauſted Glaſs 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 ſurpriſing to ſee what large Flaſhes of Light would be produc'd in the long Glaſs without touching the Glaſs in motion, nor was it ſelf either mov'd or provok'd by any immediate Attrition.