

white Tail, much narrower than the Mock-Sun, but which I took to be a Segment of the white Circle which I once saw entire in *London*. Had the Air been clear, I doubt not but much more of the Phenomena of the *Parbelia* might this Time have been observed: and I hope, that from our Neighbourhood some Member of the *Society* may furnish us with a fuller Relation. But how to explain these Appearances, and account for the Magnitude of these Circles, is what seems still wanting.

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III. *An Account of two Mock-Suns, and an Arc of a Rainbow inverted, with an Halo, and its brightest Arc, seen on Sunday and Monday, Octob. 22, & 23. 1721. at Lyndon, Comitatus Rutland, communicated by the Rev. Mr. William Whiston, M. A. sometime Professor of the Mathematicks in the University of Cambridge.*

ABOUT Ten o'Clock in the Morning, on *Sunday, Octob. 22. 1721.* being at the House of *Samuel Barker, Esq;* of *Lyndon* in the County of *Rutland*, after an *Aurora Borealis* the Night before (Wind W. S. W.) I saw an Attempt towards two *Mock-Suns*, as I had done sometimes formerly, of which I immediately inform'd *Mr. Barker*, though without any great Expectations of what followed. About  $\frac{1}{2}$  or  $\frac{3}{4}$  of an Hour after, I went to view the Heavens, and then found the Appearance compleat; and when *Mr. Barker* and others of the Family were call'd, we all saw it, and all saw

saw indeed what we had none of us seen before ; I mean two plain *Parbelia*, or *Mock-Suns*, tolerably bright and distinct ; and that in the usual Places, *viz.* in the two Intersections of a strong and large Portion of an *Halo*, (*Fig. I.*) with an imaginary Circle, parallel to the Horizon, passing through the true Sun. I call this Circle here *imaginary*, because it was not itself visible, as it sometimes has been at such Appearances. Each *Parbelion* had its Tail, of a white Colour, and in direct Opposition to the true Sun ; that towards the East was 20 or 25 Degrees long ; that towards the West about 10 or 12 Degrees ; but both narrowest at the remote Ends. The *Mock-Suns* were evidently red towards the Sun, but pale or whitish at the opposite Sides, as was the *Halo* also. Upon casting our Eyes upward, we saw an Arc of a curious *inverted Rainbow*, about the Middle of the Distance between the Top of the *Halo* and our *Vertex*. I mean this, when Allowance is made for the usual Inequality, that appears between the same Number of Degrees, nearer to and remoter from that *Vertex*. This Arc was as distinct in its Colours as the common Rainbow ; and, with the like Allowance as before, of the same Breadth. The red Colour was on the Convex, and the blue on the Concave of the Arc ; which seemed to be about 90 Degrees long : Its Center in or near our *Vertex*. On the Top of the *Halo* was a kind of inverted bright Arc, though its Bend was not plain. The lower Part of the *Halo* was among the Vapours of the Horizon, and not visible. The Angles, especially as more exactly measured on *Monday*, near Noon, when the same Appearance return'd again, but more faintly, were as follows : Sun's Altitude  $22^{\circ} \frac{1}{3}$  ; perpendicular Semidiameter of the *Halo*  $23^{\circ} \frac{1}{3}$  ; Distance of the *Rainbow* from the Top of the *Halo*  $23^{\circ} \frac{1}{3}$  ; Semidiameter of the Arc of the

the *Rainbow*, if our *Vertex* be suppos'd its Center, 21°. The *Phanomenon* lasted each Day for an Hour and an half, or two Hours. What was most remarkable on *Monday* was that the Wind, which on *Sunday* had been almost insensible, was now become sensible, and changed to N. N. E. that the *Halo* was sensibly become *oval*; its shorter Axis parallel to the Horizon; and the two *Mock-Suns*, which were then but just visible, especially that on the East, were not in the *Halo*, but a Degree or two without it, which I ascribe to the unusual Shortness of the Horizontal Diameter; which Position of the *Mock-Suns* does not appear to have been hitherto taken Notice of by any, though it was now very sensible.

On *Thursday* Morning, *Octob.* 26. as I was coming in the *Northampton* Coach towards *London*, about 9 o'Clock, the *Halo* returned larger and clearer than before; and the two *Mock-Suns* just attempted an Appearance therein, as on *Sunday*; but the Air becoming thicker and thicker towards Rain, I saw them no more. I add nothing to this Account, but only, that *Aug.* 30. before, I saw at the same Place *Rutland* a remarkable *Halo*, whose upper Part had its inverted Arc reddish within, and pale without, but brighter and more vivid than ever I saw in my Life: That we had there, *Sept.* 11. in the Evening, the lightest and most remarkable *Aurora Borealis*, with its unaccountable Motions and Removals, that ever I saw; excepting that original one, *March* 6, 1718: That it was seen in *Northamptonshire*, at the *Bath*, and elsewhere: That the *Vertex* of the Columns which shot upwards, was not our *Vertex*, but evidently 15 or 20 Degrees distant towards the South; and that the Wind was in *Rutland* North, as I observed myself; at the *Bath* West, as Mr. *Molyneux* observed; and, as I am inform'd by Sir *Robert Clarke*, in *Northamptonshire*

*amptonsbire* South ; all at the same Time, which deserves particular Reflection. But then, if any Reader expects here the *Solution* of all these *Phænomena*, he is to know, that as to these *Northern Lights*, Dr. *Halley* has communicated his Thoughts to the Publick in the *Philosophical Transactions* soon after the first Appearance ; and I communicated mine about the same Time in a small Pamphlet. And as to the *Halo's*, *Mock-Suns*, *Inverted Arcs of Rainbows*, and other *Phænomena* of the like Nature, *Monf. Huygens* has most accurately explained them in his *Posthumous Works*, from p. 293 to p. 366. and *Sir Isaac Newton* himself has touched upon them in his *Opticks*, 1st *Edit.* p. 134. to which the *Inquisitive Reader* may have Recourse for his Satisfaction. Only if any enquire farther, Why the *Northern Lights* have of late been so unusually frequent, I must declare, I am far from having satisfied myself, and so shall not pretend to offer any Thing for the Reader's Satisfaction.

London, Nov. 6. 1721,

Will. Whiston.

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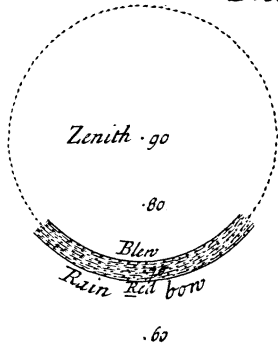


Fig. 1.

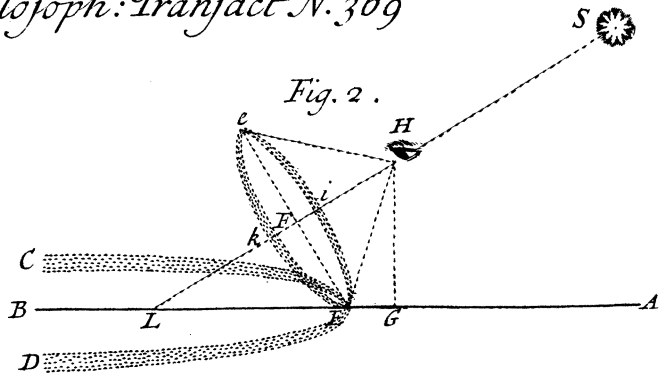


Fig. 2.

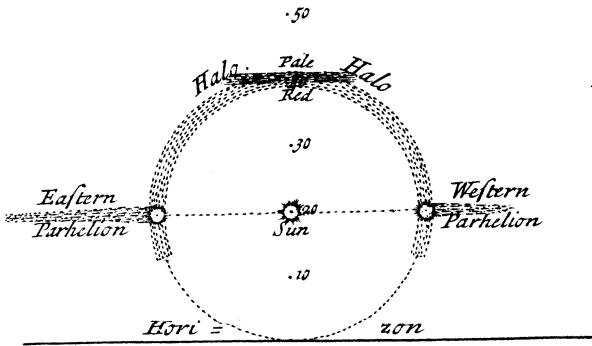


Fig. 3.

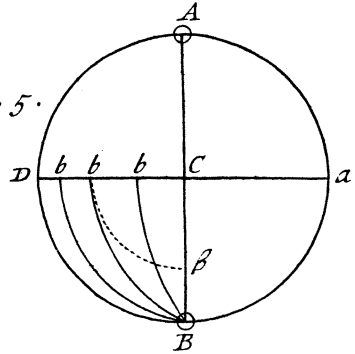


Fig. 4.

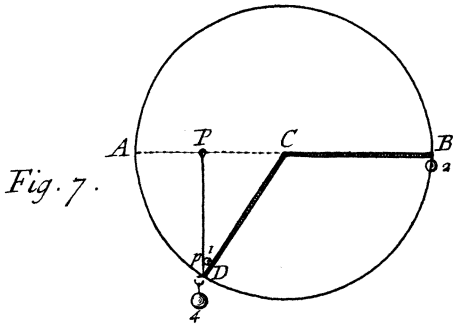


Fig. 5.

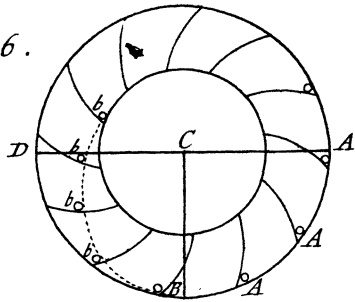


Fig. 6.

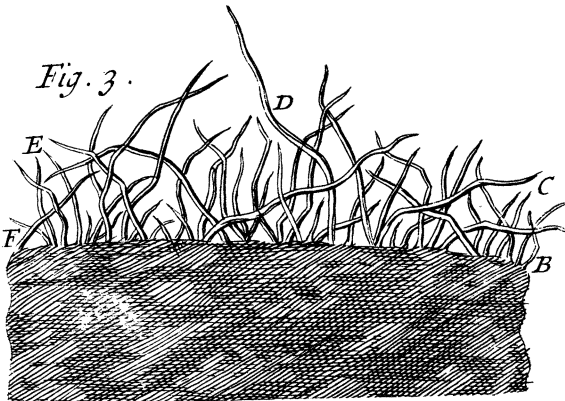


Fig. 7.

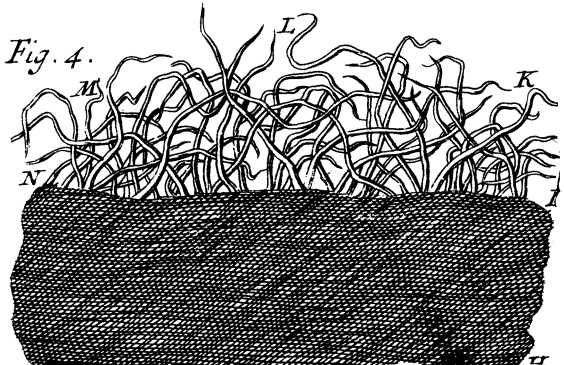


Fig. 8.