

Stylo novo.	Temp. vero vest. eri.		Longitudo Martis.	Latitudo Martis.
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D. 9 Nov.	9. 34.	Observatio Manfredii.	♃ 13. 22. 20.	1. 1. 30. M.
		Ghislerii.	13. 22. —	1. 0. 30.
		Desplaces.	13. 11. —	1. 3. 30.
			13. 25. —	1. 2. 30.

VII. *A Collection of the Observations of the Remarkable Red Lights seen in the Air on Dec. 5. 1737. sent from different Places to the ROYAL SOCIETY.*

1. *An Account of the Red Lights, on Dec. $\frac{5}{16}$. 1737. as observed (at Naples) by the Prince of Cassano, F. R. S. and by him sent in a Letter to the President: Translated from the Italian by T. S. M. D. F. R. S.*

A *Phenomenon* of a fiery Meteor is my Motive for troubling you, Sir, with this other short Narrative; being persuaded that it will be as agreeable to you to peruse, as it was to me to draw it up with all the Circumstances of Truth, to which I was an Eye-witness.

Dec. 16. 1737. (N. S.) in the Evening, the Sun being about 25 Degrees below the Horizon, a Light was observed in the North, as if the Air was on Fire, and flashing; the Intenfeness of which gradually increasing, at the Third Hour of the Night it spread Westward in such a Manner, that if a Perpendicular was let fall from the Polar Star, and afterwards a
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Parallel to the Horizon supposed, and divided into Six equal Parts, which Parallel should pass through the whole Extent of the aforesaid Light, it is certain, that Five Parts of the Six would be towards the West, and only One toward the East.

The greatest Height of this Light was about 65 Degrees; for it occupied the whole Extent of both the *Bears*, and the *Polar Star*: Yet at the Sides it was not so high; for in some Places near the North it arose only to 50 Degrees; and gradually diminished, so as to become insensible at the true Horizon.

The above-mentioned Light at its Extremities was unequally jagged, and scattered, and followed the Course of the Westerly Wind; so that for a few Hours it spread considerably wider, yet without ever reaching the *Zenith*.

The greatest Redness and Inflammation appeared half Way, between the visible Pole and the Northern Point of the Horizon; and in the Middle of this inflamed Part there appeared some Streaks less inflamed, and mostly perpendicular to the Horizon; some of which flashed from time to time, while others successively vanished. About the Sixth Hour of the Night the Intensity of the Colour disappeared; some small Traces of the Inflammation still remaining towards the North-east and the West, which were all vanished at $7^{\text{h.}} \frac{1}{2}$ [of the Night.]

During the greatest Vigour of the Inflammation, some small dark Clouds often crossed the Light parallel to the Horizon: But the Sky was very clear, except in some Parts near the Horizon, where it was much overcast with Clouds.

The inflamed Matter, in the greatest Part of its Extent, gave a free Passage to the Rays of the Stars, even of the Third and Fourth Magnitude, situate behind it. About the Fourth Hour of the Night, a very regular Arch of a parabolic Figure was seen to rise gently, to Two Degrees of rectangular Elevation, and to Twenty Degrees of horizontal Amplitude.

This *Phænomenon* was seen all over *Italy*, as appears by several Accounts of it, though with some Disagreement between them.

But how bright soever and distinct it appeared, yet its Cause has been deemed by many to be very obscure: For some call it an *Aurora Borealis*, therein following the Opinion of *Gassendus*, and deducing all the Appearances from the Laws of simple Refraction of the solar Rays. Others think it an Irradiation of some luminous Comet, placed below our Horizon. Others more politely say, it was a new celestial Body descended from its upper Habitation down to us, and courteously received by the Earth's *Vertex*. Others, in Love with Authority, and *French* Names, have endeavoured to establish the Meteor as a Mixture of the Two Atmospheres of the Sun and Earth; therein tenaciously adhering to the new Opinion of Monsieur *de Mairan*, of the *Academy of Sciences* at *Paris*. In fine, others more accurately deduce the Whole from the simple Firing of a bituminous and sulphureous Matter, upon account of its very little specific Gravity, raised to the upper Parts of the Atmosphere, and there, by the Clashing of contrary Winds, broken, comminuted, and at last set on Fire. This Opinion has been defended with strong Arguments, in the *Petersburg Commentaries*,
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by *Mayerus*, upon Occasion of the Appearance of a similar *Phænomenon* in those Northern Countries.

And, indeed, the preceding Eruption of *Vesuvius*, the Contrariety of the moving Forces, the Readiness of the Matter to take Fire, the unequal Intenfeness of the Light, the Streaks, and all the other Circumstances, observed in this Meteor, are plain Arguments of a genuine and real Accension. And *Wolfius*, on the Appearance of a *Phænomenon* much like this, which was seen all over *Germany* on the 17th of *March* 1717. is of Opinion, that it should be called imperfect Lightning, as being produced by the inflammable Matter of Lightning: And possibly we shall see the subsequent Rains fall quietly, without Lightning or Thunder.

1st, That it could be a Refraction, happens to be diametrically contrary to the Laws of Refraction; because the Sun was then in the opposite Tropic.

2^{dly}, The Light ought to have been most intense in the East, and weak in its Elevation; whereas quite the contrary was seen to happen. Thus the Whole is accounted for, not by Dioptrics, but by the sole Laws of direct or reflex Vision; and the Streaks, already taken notice of, were Spaces containing less of the inflammable Matter; whereby the luminous Rays of the neighbouring kindled Matter, being weakly reflected, made the Appearance of a fainter Colour.

3^{dly}, The uneven Appearance of the Light at its Extremities cannot be accounted for by Refraction, but perfectly well by Accension: Wherefore I think it rather deserves the Name of a *Northern Light* or *Fire*, than that of an *Aurora*: But I leave the further Consideration thereof to better Heads.

2. *An Account of an Aurora Borealis observed in the Night of the 16th of December 1737. (N. S.) at Padua, by [the Marquis] Poleni, F. R. S. Communicated in a Letter to Dr. Jurin: Translated from the Latin by T. S. M. D. F. R. S.*

THE Sky was intirely clear, not only in the Beginning, but during the whole Night. The Wind was at North; which was rather known by the Weather-cock, than sensibly felt, the Air being very still. The Quicksilver in the Barometer stood at 30 Dig. 24 Dec. (*English Measure*) an extraordinary Height; since in the Space of 14 Years, that I have applied with great Care to Meteorological Observations, I have but once observed the Quicksilver at 30. 48. which I have hitherto looked upon as the greatest Height.

In my Thermometer of Monsieur *Amonton's* Make, the Height of the Quicksilver was 48 Dig. 78 Dec. And in Monsieur *de l'Isle's* Thermometer, which he sent me from *Petersburg*, (in which the Heights are changed by the greater or lesser Density of the Mercury, and the Measure is taken behind the vacant Space at Top) I reckoned 142.

But before I treat of the Observation, it becomes necessary to remark Two Things, *viz.* that I suppose, that the Divisions of the Horizon into Degrees Eastward and Westward begin from that Point, where the Meridian intersects the Horizon in the North: And besides, when I mention the Degrees of the Horizon, or Degrees only, I mean those Distances

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which can be defined by the vertical Circles reaching to the Degrees mentioned.

In setting down my Observations, I made use of apparent Time (*p. m.*) Afternoon.

At 5^h. $\frac{1}{4}$, there appeared near the Horizon a blackish Zone, with its upper Limb of a Sky-colour, somewhat obscure. Above this Zone was another very luminous, resembling the Dawn pretty far advanced. The highest Zone was of a red fiery Colour. The Altitudes of the Zones seemed to bear such Proportion, that the Second was double the First, and the Third triple: And, at the same time, they in many Places rose somewhat above the 40th Degree of Altitude. Eastward they extended to the 55th Degree on the Horizon, and Westward to the 70th. They had Three perpendicular slender Divisions, like Slits; but they were parallel to the Horizon, excepting that the Third had some Parts of its upper Limb unequal in Height, with some Asperities upon it; and from the First to the Sixth Degree Westward, a sort of Beam wider than the rest was observed. The Stars of Part of the *Great Bear*, the *Dragon*, *Hercules*, and others, appeared more or less through the *Phænomenon* (and others afterwards, according as the Appearances varied). But through the lower Zone they appeared more obscurely, and in some Places not at all: Through the middle Zone, they shone bright; but through the highest, they were less distinct.

I cannot determine with Certainty the first Moment of the Appearance of this *Aurora*: Nor indeed does it seem feasible, to define the Rise of such *Phænomena* with sufficient Accuracy. But it is
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worthy of Remark, that after Sun-set on the preceding Days, as well as this, there appeared in the West a remarkable Redness expanded on each Side: And moreover, on the ensuing Evening, the same bright red Colour, appearing near the Horizon, deceived the common People into a Belief, that a new *Phænomenon*, like the foregoing, was breaking out of the Horizon. Wherefore I am of Opinion, that in this Case there is a considerable Difference between the *Aurora Borealis*, and the Redness occasioned by the Sun's setting.

About Three-quarters of an Hour after, the Length of the Zones was contracted, their Extremities having receded about Ten Degrees from the East and West. The white lucid Part was not now so distinguishable from the red, as before: And this last Colour grew fainter almost every-where else but at the Western Limit, where it was more vivid: But in that Western Space from which the *Aurora* was withdrawn, there remained a brighter Space of Three or Four Degrees, surrounded by a small black Cloud, so that it seemed to be a kind of *Hiatus*. Near our *Zenith* there appeared some thin lucid Clouds, partly of a Whitish-red, in such a manner, that they seemed as if occasioned by the burning of Houses at some Distance to the North. Others of this sort had happened before, and some were seen afterwards.

A little after Six, the upper Parts began to emit red Streamings, or Rays, in Plenty; but in these the Red was now-and-then intermixed with whitish and darkish Colours.

In a few Seconds after, there issued forth from the very *Æquinoctial West*, a red and very bright Co-

lumn, which ascended to the Third Part of the Heavens; and a little after, it became curved in the Shape of the Rainbow.

At Three-quarters after Six, the red Colour appeared fainter, and the Zones were not so distinct from one another; the *Phænomenon* reached only to the 20th Degree East, but to the West it retained its Length, as before.

At Seven, the *Phænomenon* appeared interrupted, and divided into Two Parts, the intermediate Space becoming almost invisible. The red Part of its Western Extremity was curved into an Arch terminating near the Horizon. Not far from the 84th Degree to the West, there appeared a sort of *Hiatus*, not unlike that in the East already described, and which had vanished by this time.

Seven Hours 20 Minutes, the whole *Aurora* was become paler, so that the red Colour was scarce discernible, except at the Western End, where it was of the Colour of Fire.

A little after Eight, the lowermost of the Zones, as they now stood, was blackish; and above this another whitish bright one was seen: And some Parts of these seemed to fluctuate, and be agitated (as it often happened before and after); and, if any of them disappeared, they were soon succeeded by others.

At half an Hour after Eight, almost in an Instant of Time, the bright Zone, from the 8th Degree West to the 50th East, became more vivid, and rose higher; and above this appeared a new large one, of a red fiery Colour, with several successive Streamings tending upward, and passing 60 Degrees of Altitude:

tude: The Western Part had assumed the Form of a thin Cloud.

A little before Nine, at 16 Degrees Eastward, a curved red Beam, (or Bow) though irregular in some of its Parts, rose up to the *Zenith*; and at the same time such another, commencing at the Horizon beyond the 80th Degree West, arose to the same Height, and joined the Eastern Arch in the *Zenith*.

At Nine, after these Beams had been up to the *Zenith* a very short time, they parted, and began to fall considerably lower: But in that Place where they were in Contact, there remained a certain reddish Cloud, which gradually changed in Magnitude and Figure: However, I never observed it to assume that Figure which might properly be called a *Corona*. In some time it vanished, as the other Appearances did from the *Zenith*: Nay, the whole *Phænomenon* grew less, and fainter; and was reduced to the irregular Form of bright Clouds and Beams, whose Light still diminished.

At Three-quarters after Nine, the Western Part was transformed into the Appearance of one Cloud, of a very red Colour, with very little Roughnesses on its Edges; but it was somewhat more contracted than before.

A little after Ten, the Heavens became brighter from the 84th Degree West, to the 18th Degree Eastward, and to 50 Degrees high, or better.

At 10^h. 36'. the *Phænomenon* was contracted, being now about Ten Degrees in Longitude shorter on each Side. But its upper Part was very red, as if on Fire, with several Rods, or narrow Beams, shooting from it. In a word, the Disposition and Brightness of its

its Parts came very near the Shape and Vigour the *Phænomenon* had at the Beginning.

At Eleven, the red Part did not afford the Sight of these Rods and Dartings; and the Colour being now fainter and pale, the whole *Aurora* was divided into Two Parts, and the Light was weaker.

In Ten Minutes after, the intermediate Sciffure was larger, being now near 20 Degrees; and the Part on the Right Hand ran somewhat East.

About 10^h. $\frac{1}{2}$, the Redness became stronger, but more so to the West than to the opposite Part.

In a Quarter of an Hour, both the Light and Redness diminished; so that the only Space that retained a vivid Light was that of Six Degrees to the West.

At Twelve, the Light of the *Aurora* was nearly extinct, there appearing only a very weak Light along the Tops of the Mountains.

Twenty Minutes after, there appeared a white brightish Beam, at 30 Degrees West, and 60 Degrees high; but it soon became invisible.

In half an Hour after, a very weak Light remained in the West, near the Horizon; which had not been observable, if the Brightness of the preceding *Phænomenon* had not invited me to continue the Observation.

At a Quarter after One, that weak Light was much contracted.

The Tranquillity of the Air continued the same, or nearly such, as in the Beginning; and yet there was not the least Report, or even hissing Noise, heard to issue from so much Matter.

At 1h. 30'. that Part of the Heavens where the *Aurora Borealis* had shone forth, was no ways different from the rest; and the only Light in the Sky proceeded from the Stars, and the Moon, which was now up.

I had at other times observed some luminous Appearances in the Heavens, which may be referred, in some measure, to the Class of the *Phænomenon* above described; but I was of Opinion, that the Memory of this ought to be preserved with the greater Diligence, as it far surpassed all that preceded it in Magnitude, Light, Figure, Colours, and Duration.

3. *Description of an Aurora Borealis observed at the Observatory of the Institute of Bononia, the Night of the $\frac{5}{16}$ of December 1737. By Dr. Eustachio Zanotti, Deputy Professor of Astronomy. Translated from the Italian by T. S. M. D. F. R. S.*

THE *Aurora Borealis*, which was formerly a rare *Phænomenon*, and almost unknown in this our Climate, is now become very frequent. In *Bononia* a great Number have been observed for some Years past, as appears by the Register of the Observations made in this *Institute*. This time it was so very remarkable, that I do not think any one remembers to have ever seen the like. As to its Extent, it spread so as to occupy about 140 Degrees of the Heavens: And, as to its Light, it was so vivid, as by it to distinguish Houses at a great Distance; which seemed of a red Colour, and made some People
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attribute this Light to a Fire in the Neighbourhood. But when they were assured what it was, they remained no less frightened, superstitiously believing it impossible, that such an uncommon Light, and of a red Colour too, like Blood, should appear in the Sky without presaging some unhappy Accident. While the whole City was intent upon viewing this new Appearance, I and some young Gentlemen were employed in calculating the *Ephemerides*; and, being apprised thereof, we jointly began to take Observations of it. This uncommon Light drew to the Observatory several others, that were used to come at other times. But I shall only relate what is entered upon the Register of Astronomical Observations, leaving to those who are fond of philosophical Hypotheses, to investigate its Cause according to their Fancy.

7^h. 9'. *p. m.* When we first perceived the *Aurora Borealis*, its Centre was near the North Pole. The Brightness extended along the Horizon about 70 Degrees, and its Height was judged 20 Degrees. The Sky was almost totally overcast with Clouds, but the Light was visible in several Parts, where the Sky was clear. The Two Stars, ζ and ϵ , of the *Great Bear*, shone bright in the midst of the reddish Light of the *Aurora*.

7^h. 34'. No Change having happened for some time, the Light now appeared somewhat weaker, and removed from its Place; for its Centre was no longer in the North, but passed Westward [N. W.]. The Stars, ζ and ϵ , were still visible, but more Eastward, with respect to that Part where the Light was brightest.

7^h. 39'. The Light continued diminishing. To the West, the Sky was quite overspread with Clouds; so that it was not possible to distinguish its Limits.

7^h. 42'. The *Phænomenon* on a sudden reassumed new Strength, and became more vivid, and of a Colour as red as Fire.

7^h. 44'. It again became languid, but was spreading at the same time. To the East, it was not possible to determine its Limits, by reason of the Weakness of the Light, which disappeared by degrees. About the Pole, and to the West, it was lost behind the Clouds.

7^h. 49'. It continued to spread wider, and had already taken in the Two Stars, β and γ , of the *Dragon's-Head*, and *Lucida Lyræ*.

7^h. 52'. The Expansion of the Light still increased, which took in a great Part of the *Swan*, surrounded by a Mist. At this time the Height of the *Aurora* was 40 Degrees, and its brightest Part was a little under *Lucida Lyræ*.

7^h. 54'. On the other Side towards the North, the Two Stars, δ and γ , of the *Great Bear*, were immersed in the Light.

7^h. 59'. The *Aurora* formed itself into a concave Arch towards the Horizon. The Polar Star was near the Top of its Convexity, and some Stars shone bright in the midst of the Light; and, among these, δ and γ , of *Ursa major*. The concave Part was terminated by a Basis somewhat dark; which separated the red Light of the Arch from a white and very bright Light, that remained within it. The Arch, which was 15 Degrees broad, was of a deeper Colour towards the Horizon than towards the Pole. The

Western Limit, which was interrupted by Clouds, was wider and more irregular than the Eastern Limit. TAB. Fig. 1. exhibits the *Phænomenon* conformable to the Description now given.

8^h. 9'. To the West, the Limit of the Arch remained confused, though of a red Colour, somewhat vivid: But to the East it became more faint, and changed rather into a whitish Colour.

8^h. 19'. The red Light spread to the Constellation of the *Dolphin*.

8^h. 22'. The Arch, which was still distinct, grew bigger, passing Eastward by the Two Stars, α and ι , of *Ursa major*, and Westward by the Stars of the *Swan's Tail*.

8^h. 29'. *Lucida Lyrae* remained clear of the red Light, which moved higher, and was immerfed in the bright Light.

8^h. 30'. At the Eastern Limit of the *Aurora*, that is, at 54 Degrees from the North Pole, there was suddenly seen to rise vertically up, a Beam of Fire, at first of a very bright Light; but, in Process of Time becoming more resplendent, it changed into a red Colour, like that of the Moon in the Horizon.

8^h. 31'. The Light still increased in Vigour, and was now intirely like the red Rays, which are separated by the Prism. Its Figure was changed; for it resembled a Pyramid, with its Basis on the Horizon, 4 Degrees wide, and its Height was about 20 Degrees. Near the Top of the Pyramid, the Redness was less than at the Basis, and its Limits were not very distinct.

8^h. 34'. The red Light continued spreading, and made, as it were, a Basis of a weaker Redness, for the

the aforefaid Pyramid. At this time the *Aurora* appeared unfettled and curious, as in Fig. 2. TAB. V. At its Eastern Limit, the Pyramid continued vifible, but of a more intenfè Colour towards the North, and from its Middle there fhot up vertically a Streak of Light, between a white and a yellow Colour. A very dark narrow Cloud crossed the whole *Phænomenon*, and went to terminate in the Pyramid. At the upper Part, a confiderable Tract of the Heavens was enlightened with a very vivid red Light, which was interrupted by feveral Streaks or Columns of a bright yellowifh Light. The faid Streamings fhot up vertically, and parallel to each other; and the narrow Cloud feemed to ferve them for a Bafis. Under the Cloud there iffued forth Two Tails of a whitifh Light, hanging downward on a Bafis of a weak Red, and it feemed as if they kindled and darted the Light downward. There was likewise feen a white Streak, which paffed acrofs thefe Two Tails, and extended from one End of the *Phænomenon* to the other, in a Position almoft parallel to the above-mentioned Cloud. Weftward, the Sky was all cloudy, fo as to fuffer nothing to be obferved. At this time fome of the Company perceived other little Shootings, like thofe which are frequently feen in Summer, and are commonly called *falling Stars*. More than one of thefe were obferved in that Part of the Heavens that was free from the *Phænomenon*, at about 45 Degrees of Altitude, not far from the Eaft.

8^h. 36'. There reappeared a Portion of the Arch, which was feen at firft. The Pyramid was fpreading, and lofing its Figure.

8^h. 38'. The very bright red Light, which first formed the Pyramid, spread Northward on the Tracks of the Arch; which nevertheless contained within it a bright Light extending to the Horizon, excepting that it was covered here-and-there by Clouds.

8^h. 39'. The Stars, ζ , ϵ , of *Ursa major*, shone through the red Light, which contained several white luminous Streaks.

8^h. 44'. The red Light, now very vivid, was all interspersed with white luminous Streams, which darted out of the Basis or lower Extremity of the Arch. To the West, the Northern Light terminated exactly in a white Streak, and Eastward it spread as far as the Horizon. The North Pole began again to become red, yet there still remained somewhat of the usual bright Light between the Red of the Pole, and that of the Arch.

8^h. 51'. The red Arch began also to appear to the West, and reached to the Stars of the *Swan*, which at first were hid by the Clouds.

8^h. 54'. The red Light began to spread on every Side, but still contained within it somewhat of the Brightness. The *Zenith* was now all red, and with it that Part of the Sky which takes in 70 Degrees on each Side. Fig. 3. TAB. V. exhibits the *Phenomenon* as it was observed at that Time. The Circle described by the Figure denotes a Parallel to the Horizon at the Altitude of 45 Degrees; on which is a Portion of the Arch, so often made mention of.

8^h. 56'. There appeared several white Streaks to the East, where the Light of the *Aurora* was strongest; which Light was rising higher, and seemed to have in-

intirely quitted that Part of the Sky near the Horizon.

9^h. 4'. There now remained but a little reddish Light at the North Pole; all the rest was collected near the *Zenith*, not extending lower than the Star α of *Ursa major*. In the South, where the Sky was clear, there were seen some of those Stars which we have called *falling Stars*.

9^h. 6'. About the *Zenith* the Light continued red and vivid, but descended lower. The *Aurora* abandoned the East, and took Possession of the North-west. It appeared as if the Coruscations had almost constantly taken their Rise from the Eastern Quarter, and afterwards extended to the West.

9^h. 9'. A considerable Streak, or Tract of red Light, more vivid than the rest, crossed the Stars of the *Swan* almost horizontally.

9^h. 12'. In the East, where the *Aurora* seemed to have intirely disappeared, it began again to make its Appearance; but to this Time the Light was but faint, in comparison of that which was seen in the Beginning.

9^h. 19'. The Light was become pretty faint, and confined within a small Space, at the Height of about 40 Degrees, above the North-west. Many little Changes, that occurred, are not set down, it being impossible to keep an Account of them all, inasmuch as they succeeded one another very quick.

9^h. 34'. The *Aurora* seemed intirely extinguished. In some Minutes after, it began to revive; but the Clouds, which were in great Numbers, and spread round on every Side, left but a few little Spaces free. The greatest Brightness was in the *Zenith*,
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which appeared like a red Veil, declining to the North, where it lost itself behind the Clouds.

11^h. 6'. The Light gathered new Strength, and was all at North, up to 20 Degrees of Altitude, the *Zenith* being quite clear of it. The Brightness was greatest about the Pole, and grew weaker as it receded from it, taking in, upon the Whole, 90 Degrees of the Horizon. The Clouds continued to increase, and prevented seeing the *Phænomenon* but now-and-then; and in this manner the Light lasted to the 13th [15th] Hour. Some say they have seen Foot-steps of it at the 16th [4th] Hour; but our Company parted long before from the Observatory, thinking it intirely at an End; and the rather, because the Clouds had deprived us of all Hopes of being able to pursue the Observation.

I shall add some things which have been courteously communicated to me by the celebrated Dr. *Beccari*, and are of his own Observation.

The Day of the *Aurora*, the Barometer was very high, *viz.* at 28 Degrees $5 \frac{1}{2}$ Lines. The preceding Day, the Winds were different, in different Regions of the Air. Near us [the Earth], the Wind was West-north-west, and pretty cold. Higher up, the Clouds came from the East, and moved Westward; which Clouds were globular Collections of Mists. Above that Region the Wind blew at South-west by South, as appeared by some small Fleaks of Clouds coming from that Quarter. The 16th Day, the Wind that reigned in the Region of the Clouds was *Greco-tramontana*, and was in the Second Degree of Strength.

Several Persons have positively assured us, that, in the Evening of the 16th Day, they perceived a certain Stench in the Air, like that which is sometimes occasioned by a Fog. The same has been taken notice of at other times, when such *Phænomena* have appeared.

There was a very thin Fog in the Air not only on the 16th Day, but also on the preceding and ensuing Days. The Mornings of the 17th and 18th, before and a little after Sun-rise, the Air appeared of an uncommon fiery Colour. The Evening of the 17th, the Crepusculum was of an extraordinary Height. Between the North and West, there was seen a very thin red Vapour, which lasted almost till Night.

The various Appearances of the *Aurora*, observed by that Gentleman, are here omitted, because they very well agree with those above described.

4. *Splendidissimum lumen Boreale Romæ visum die 16. Decembri 1737. Observante Didaco de Revillas, Abbate Hieronym. pub. Math. Prof. & Reg. Societ. Londinensis, necnon Acad. Scient. Inst. Bonon. Socio.*

ETSI hora dumtaxat p. m. VII. cum semisse de splendidissimo cœlum illustrante lumine monitus ejus observationi vacare cœperim; abs oculatis tamen, & fide dignis testibus hæc accepimus: nimirum, 10. Crepusculo vix finito humiliorem cœli borealem plagam rubro colore infectam, ignitamque conspici cœpisse; nonnullis postmodum albicantibus striis inde
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affurgentibus. 2°. A boreali versus occiduam plagam paullo post incensionem declinâsse; striis modo evanescentibus, modo iterum conspicuis, quæ duobus albicantibus arcubus concentricis, & horizonti proximis, ad aliquod tempus insiscebant. 3°. Prope horum fimbrias vividius lumen ex horizonte ejaculari. 4°. Demum boream versus hora circiter VII. conflagrationem denuo migrâsse; arcubus jam tunc evanescentibus. Hæc ab aliis: en a nobis observata.

H. VII. 30'. Igneum rubrumque lumen, cœlo sereno ac quieto, borealem plagam illustrabat, quod ad altitudinem graduum circiter 8 protendebatur, amplitudine in ortum gr. 10, in occasum gr. 35. fixis trans lumen emicantibus. Prope horizontem insueto candore veram auroram æmulante cœlum splendebat.

40'. Nigricans stria versus Polarem stellam affurgebat; atque interea temporis sanguineus color sensim propagabatur.

H. VII. 45'. Inter gr. 26 & 30 a borea occasum versus major conflagratio colligebatur; ibique duæ leviter albicantes striæ nonnihil inferius convergentes in sublime levabantur. Paullo post ad altitudinem gr. 40 conflagratio conscendebat: boreali plaga vix ad sensum rubescente.

H. VIII. Ubi paullo ante vividior inflammatio, minuebatur. Ad boream tamen, & ad ONO. ulterius ad altiora cœli progrediens, iterum accendebatur.

15'. Horizontalis candida lux sub elevationis angulo gr. ferme 7. apparebat in tota boreali plaga. At quæ superiores occupabat partes, nonnihil ad horizontem prope NO. conflagratio pertingebat. Forte arcus figuram candor hicce nanciscebatur; sed interjecta
ædi-

ædificia ejus conspectum prohibebant. Paulo post ad gr. occid. 32. a borea ruber color ferme evanescebat. Ad boream, & ad NO. intendebatur. Interea temporis circa Lucidam Lyræ area propemodum elliptica, vivido colore rubra, majori axe ad horizontem normali apparebat; ex qua candicantes striæ versus cœli summitatem emittebantur. Alia vero pariter candicans ab ellipsis imo ad Ursæ majoris caput extendebatur. Areæ major axis gr. circiter 10 occupabat.

20'. Nova hæc elliptica conflagratio sensim elevabatur; & nonnihil ad occasum declinans a Lucida Lyræ recedebat, trilateram, seu potius circuli sectoris figuram, converso ad horizontem arcu, assumendo. Sectoris hujusce centrum obtinebat stella in Cygni pectore emicans. Sub idem fere tempus a boreali conflagrante plaga resplendens stria versus sectoris centrum inclinata figuram trapetiam intermediam ferme obtenebratam terminabat.

45'. Lucidus circuli sector evanescebat. Nubes nigricans intra gr. 28 & 34 a borea in occasum. Conflagratio pene tota extinguebatur præterquam circa Polarem stellam.

50'. Iterum inter Polarem, & Ursæ majoris caput colore sanguineo perfusum lumen vel maxime accendebatur ultra graduum 60 altitudinem protensum. Atque interim occasum versus alia cœli portio conflagrabat a priore sejuncta. Paulo post interjectum quoque spatium superius inflammabatur, relicto prope horizontem ad NNO. albicante lucidoque intervallo.

H. IX. Conflagratio major circa Ursæ majoris caput. Rubra lux ferme usque ad *Zenith*; iterumque versus occiduum plagam diffundebatur. Plures nigricantes striæ nonnihil inferius convergentes intra

conflagrationem attollebantur, quarum amplior Polarem attingebat.

H. IX. 10'. Striæ evanescebant, vegetiore conflagratione supra Ursæ majoris caput perseverante; & ad horizontem usque paullo ante albicantem sese extendente.

15'. Major conflagratio circa Polarem. Totum tamen boreale hemisphærium plurimum rubebat.

20'. Ad gr. 32 a borea in occasum, ampla candidans stria assurgebat; & circa Ursam majorem minuebatur accensio. Intra gr. 30 & 34 perseverabat; ubi adhuc rubro colore horizon, occasum versus albescens, inficiebatur.

30'. Plurimum languescbat accensio: iterumque juxta boream intendebatur.

40'. Evanescebat iterum, tenui occasum versus perseverante fulgore, qui tardius, sed pedetentim extinguebatur.

H. X. Iterum ad boream inflammatio, quæ nonnihil orientem versus protendebatur; inter utramque tamen accensionem spatium gr. circiter 15 interjacente; in quo, utrinque evanescens conflagratio, satis tamen diminuta, mox colligebatur.

15'. Occasum versus coelum nubilum. Solus horizon sudus. Conflagratio jam extincta, vix tenui ad boream rubicundo colore superstite.

H. XI. Iterum ad NNE. reviviscens ad medium usque noctis perseverabat. Sensim deinde minuebatur. At quæ supererat dubia lux aërisque rubor, vix post duas horas evanescebat.

Die 16h. 9'. a. m.

Barom. 28. 1.

h. 9. p. m.

28. 1 $\frac{1}{10}$.

D. 17h. 7. a. m.

28. 1.

5. Ex-

s. *Extract of a Letter from Mr. James Short to Mr. George Graham, F. R. S. dated at Edinburgh, Dec. 6. 1737. concerning the same Lights.*

— **Y**esternight we were surpris'd upon looking out at the Windows, about Six o'Clock, to find the Sky, as it were, all in a Flame; but upon further Inquiry, it was nothing but the *Aurora Borealis*, compos'd of red Light. There was an Arch of this red Light reach'd from the West, over the *Zenith*, to the East; the Northern Border of this Light was tinged with somewhat of a blue Colour. This *Aurora*, as far as I saw, did not first form in the North, and after forming an Arch there, rise towards the *Zenith*, as they commonly use to do; neither did the Light shiver, and by sudden Jirks spread itself over the Hemisphere, as is common, but gradually and gently stole along the Face of the Sky, till it had cover'd the whole Hemisphere; which alarm'd the Vulgar, and was indeed a strange Sight: In some Places we saw the Clouds pass betwixt us and it. During the whole Time, which was from Five o'Clock till Eight, there was a most violent Wind from the South-west. I look'd at *Jupiter* with 15 $\frac{1}{2}$ Inch Telescope, but the Air was in such an Agitation I could not see him distinctly. *Lucida Lyra* appear'd through the red Light very dim to the naked Eye. About Eight o'Clock this red Light form'd a *Corona*, a little to the South of the *Zenith*; and instead of a dark Fund in the Middle, as usual in such Occasions, it was of a deep Red. There was always

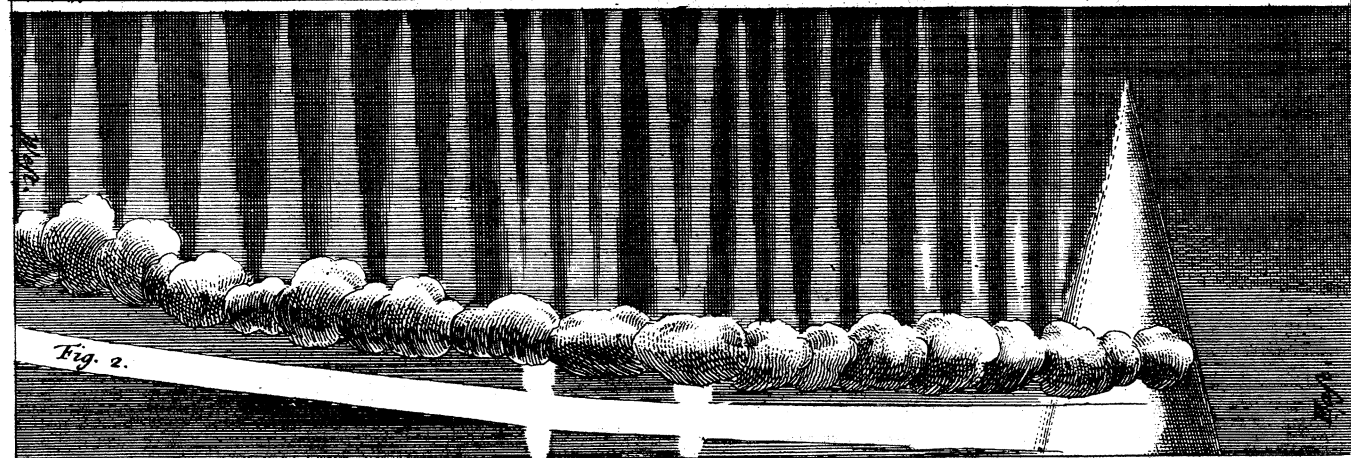
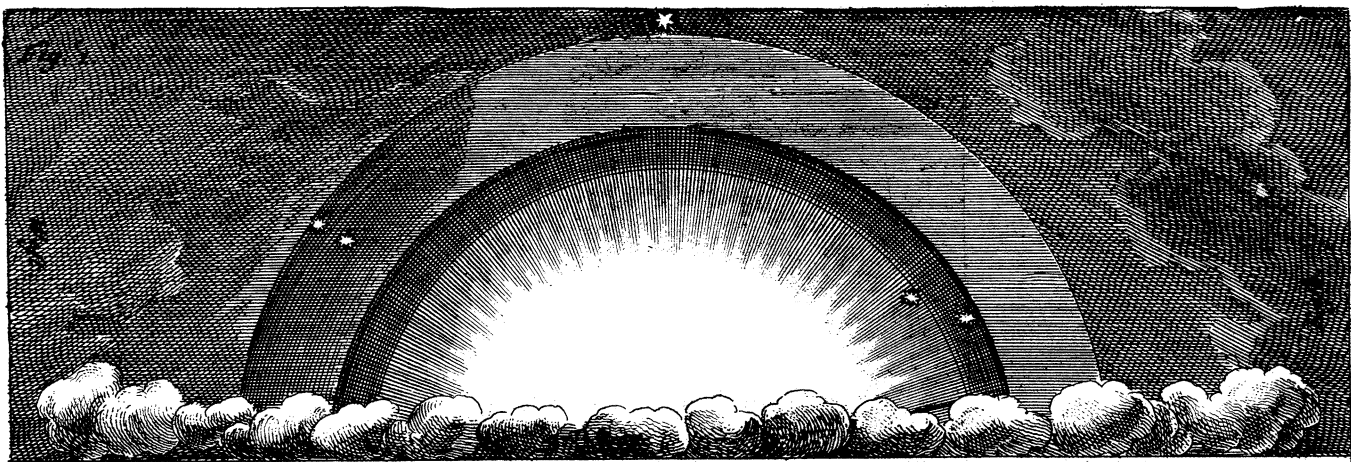
a great Circle of this Light came from the West to the *Zenith*, which seemed to be the Magazine whence all the rest were supplied. It is but about a Year since I first observed this red Light in the *Aurora Borealis*, and only then in very small Quantities. I shall be glad to know if there is any such Alteration in the Light at *London*.

6. *An Abstract of a Letter from John Fuller, Esq; jun. F. R. S. to the President, concerning the Red Lights seen Dec. 5. 1737.*

* * * **I**T was a strong and very steady Light, as near as can be of the Colour of red *Okre*; it did not seem to dart or flash at all, but continued going on in a steady Course against the Wind, which blew fresh from the South-west. It began about North North-west, in Form of a Pillar of Light, at about 6^h. 15'. in the Evening; in about 10 Minutes, a Fourth Part of it divided from the rest, and never joined again; in 10 Minutes more it described an Arch, but did not join at Top; exactly at Seven, it formed a Bow, and soon after quite disappeared; it was all the while lightest and reddest at the Horizon: It gave as much Light as a Full Moon.

At 8^h. it began again exactly North: It was very light then, but not near so light as before; in half an Hour it made an Arch from East to West, and went quite away to the South, when it ended much with the same Appearance as it began in the North, but not quite so red.

Rosehill, [Sussex] Dec. 20. 1737.

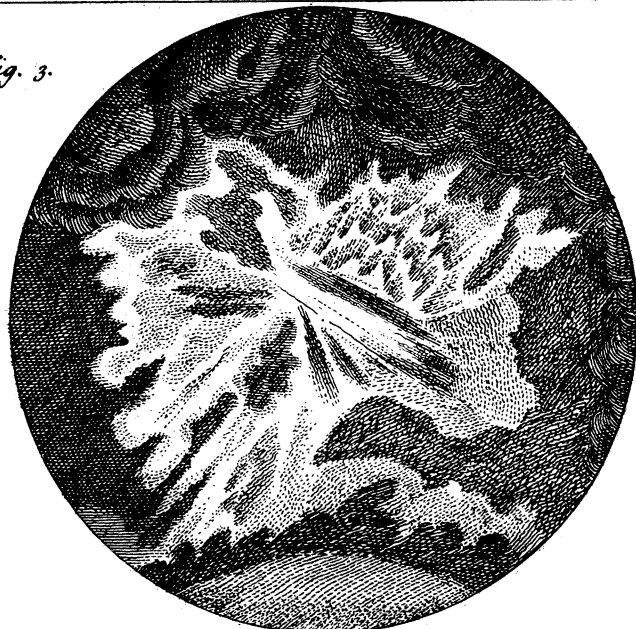


Philos. Trans. N^o 459.

TAB. V

Fig. 3.

West



East

North

J. Mynde Jr.