

1665

An Astronomical Description of the Late Comet or Blazing Star; As it appeared in New-England in the 9th, 10th, 11th, and in the beginning of the 12th Moneth, 1664. Together with a Brief Theological Application thereof. (1665) An Online Electronic Text Edition.

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## ABSTRACT

Samuel Danforth's 1665 book on his observations of the great comet of 1664 (C/1664 W1) was one of the first works of astronomy printed in America. Danforth's explanations of the various phenomena show his currency with contemporary knowledge: that the comet was a celestial body more distant than the moon; that it was not on fire, but that its flaming tail represented the reflection of the sun's rays off exhalations from the head; that the tail always pointed away from the sun; that its motion in its path was uniform; and that it reached its perigee on December 18 (December 28, by the Gregorian calendar). He does suggest that its orbit was elliptical, although, in fact, it was observation of this comet that led Giovanni Alfonso Borelli to conclude that the path of non-periodic comets, such as this one, was parabolic. Halley's discovery that some comets had elliptical (and thus periodic) orbits was yet to come. Other famous observers of this comet included Isaac Newton, Giovanni Domenico Cassini, Robert Hooke, Samuel Pepys, Stanislaus Lubinetski, and Matasaburou. This is the comet thought to be referenced by John Milton in Book II of *Paradise Lost*.

Danforth (1626-1674) was a Puritan minister, as well as an astronomer and almanack-maker, so his description includes a brief recap of famous comets in history and the disastrous events that followed thereupon. He also uses the comet as an occasion to warn New England of its falling away from its divine mission and to promote a general reformation of morals.

This online electronic text edition includes the complete text of the first edition, explanatory notes, a skymap of the comet's path, orbital data on the comet, and a note on the text. The orbital data allows interested observers to re-create the observations at an online planetarium website. Includes links. The entire work can be printed out on 16 landscape-oriented pages.

## CONTENTS

<i>An Astronomical Description of the Late Comet or Blazing Star</i>	i
Notes	19
The Comet's Path	22
Orbital Data	24
Note on the Text	25

A N  
ASTRONOMICAL DESCRIPTION  
OF THE LATE  
COMET  
OR  
BLAZING STAR;

As it appeared in *New-England* in the  
9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, and in the beginning  
of the 12<sup>th</sup> Moneth, 1664.

TOGETHER  
*With a brief Theological Application  
thereof.*

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By S. D.

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*Psal.* 111. 2. The Works of the Lord are great: sought out  
of all them that have pleasure therein.

*Job.* 36. 24. Remember that thou magnifie his work, which  
men behold.

*Exod.* 7. 23. And Pharaoh turned and went into his House,  
neither did he set his heart to this also.

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C A M B R I D G E

Printed by *Samuel Green*, 1665.



A N

ASTRONOMICAL DESCRIPTION


OF THE LATE

COMET,

As it appeared in New-England.

DU BARTAS.

*There, with long bloody Hair, a Blazing Star  
Threatens the World with Famine, Plague & War:  
To Princes, death; to Kingdomes many crosses:  
To all Estates, Inevitable Losses:  
To Heardmen, Rott: to Plow-men hapless seasons:  
To Sailors, Storms: to Cities, civil Treasons.*

I.  *His Comet is no sublunary Meteor or sulphereous Exhalation, but a Celestial Luminary, moving in the starry Heavens.*

The Truth hereof may be demonstrated,  
1 *By the vast Dimensions of it's body.* Some Comets have been observed by Astronomers to be halfe as big as the *Moon*, some bigger then the *Moon*, yea some bigger then the *Earth*. The exact Dimensions of this Comet, I may not presume to determine, but it seemeth not to be of the smallest size. Now 'tis not easy to imagine how the *Earth* should afford matter for a *Meteor* of such a huge magnitude, except we grant the greater part of the lower World to be turned into an exhalation. 2. *By the smallness of it's Parallax.* The Parallax is the Distance between the *true* place of a *Planet* and the *apparent*. The lower and neerer any *Planet* is to the Earth, it

hath the greater *Parallax*. The Moon's *Parallax* in her *Perige*, is one degree and six minutes. I could not by my Observation discern that this Comet had any considerable *Parallax*. 3. *By it's large circular motion*. If it had moved in the upper Region of the *Aire*, it might have finished the whole visible *arch of it's Circle* in a few houres: but wee saw it perform it's proper motion with great constancy in a very large *Circle*, such as the *aire* is not capable of. 4. *By it's long auration and continuance*. Had it been a *Sulphereous Vapor* kindled in the *Aire*; it might have been consumed in a short time; as other *fiery Meteors* are: but this continued about three months. 5. *By it's Visibility to all Countries and Nations*. We already hear that this *Comet* was seen at *Virginea, Jamaica, St. Martha, Cartagena* and *Barbados* and no doubt but it was visible to the whole habitable World. But the highest region of the *Aire* is accounted not much above fifty English miles from the Earth, and had this *Comet* been no higher, it had been impossible that other *Countries* and *Nations* so far distant, should have beheld it. Whether this *Comet* was created in the beginning of the World together with the rest of the *Stars*, and hath been hidden in the height and profundity of the *Heavens*, and at a certain time descending toward the *Earth*, becomes Visible and Signal to the World, I leave free to after-disquisition.

II. *This Comet is not an Opake Body, like the Moon and other of the Planets, but Transparent and Pellucid, the Sun Shining through it.*

The *Moon* is enlightened on that part onely which is next the Sun, and like a looking glasse she reflects the solar *Beames*, which are cast upon her: but the Sun *irradiates the Comet* and *shines through it* as through a *Transparent Gemme*, and illustrates a long tract in the *Heavens* beyond it. As the

*Moon*, being a thick and dark Body, casts a dark shadow from the *Sun*, so the *Comet* being a clear and *Diaphanous Body* transmits the light and casts a bright and shining stream from the *Sun*; which alters and varies according to the diverse aspect of the *Sun*.

III. *The Coma or Blazing Stream that issues from the Comet, is no real flame, but the Irradiation and Resplendence of the Sun through the Transparent and Pellucid Body of the Comet.*

A *Comet* is denominated from it's *Coma* or Bushy lock for the Stream hath some resemblance of a lock of hair. Now this Stream is not the *fragrancy of the Comet*, but the *Beames of the Sun* shining through the *Diaphanous* and *Translucid head of the Comet*; as may be argued and demonstrated, 1. *By it's site and position*, which is alwaies in opposition to the *Sun*. Had it been a natural flame, arising from it's *fragrant head*, it would have constantly moved upward, as the flame of a *Lamp* or *Torch*; unless it had broken forth by violence: but this streaming was sometimes *upward*, sometimes somewhat *downward*, sometimes *westward*, sometimes *northward*, sometimes *eastward*, according to the position of the Sun: neither can I imagine that any violence caused it so to move. 2. *By the diverse form and figure of the stream according to the diverse aspect of the Sun*. One while it was like a beard, another while like a taile. 3. *By the diverse dimensions of the Stream*. It was sometimes *longer*, sometimes *shorter*, sometimes *broader*, sometimes *narrower*, according as the *Comet* was neerer or further from the *Earth*. 4. *By the diverse quality and colour of the stream*. It was sometimes *bright* and *radiant*, at other times *obscure*, *dusky* and *faint*, according to the apparent radiation of the *Sun* and the *Comets* distance from us. 5. *By it's duration*. Had it been a real and natural flame, it is difficult to



understand how the head of the *Comet* could have supplied it with food and fuel for so many months together. Obj, *If the Stream be an irradiation of the Sun, how comes it to be conspicuous and visible to us?* The Sun-beames passing through the ethereal Heavens are not in themselves visible, neither do they terminate our sight. *Answ.* The only reason thereof (that I can yet learn) is the Refraction and Reverberation of the Sun-beames, as they pass through the *Comet's condensed body*, whereby they are so congregated and so neerly united, as that they terminate the sight and become conspicuous in the Heavens.

“I have read of a certain semi-transparent Gemme, called the *Heliotrope*, that if it be put into faire water, opposed to the beames of the Sun, it doth change it's beames, and by the repercussion of the Aire, seems to shadow the clearness of it's rayes, and so induce a sanguineous colour in the Aire, as if the Sun by the interposition of the body of the Moon, did suffer an ecliptick darkness.”

IV. *This Comet is not a new fixed Star, but a Planetick or Erratick Body, wandring up & down in the ethereal firmament under the fixed stars.*

Some learned Astronomers distinguish these more noble and celestial *Phænomena* or *Appearances* into *Fixed* and *Erratick*. Several new Stars have appeared which are fixed, *i. e.* they keep the same place in the *Heavens*, and the same distance from the *fixed Stars*. One in *Cassiopeia* Anno 1572. which continued a year and four months. Another in *Antinous*: another in the *Girdle of Andromeda*, another in the *Whale*, another in the *Brest of the Swan*, which continued many years. But this *Comet* was *Αζηρ πλανήτης* (as *Jude* speaks) a *wandring*

*Star*, which kept not the same place in the Heavens, nor the same distance from the fixed Stars.

V. *This Comet appeared first in the Constellation of the Raven, from whence it descended and crossing the Tropick of Capricorn and some part of Hydra, it went southward until it arrived at the main topsaile of the ship: then it began to return, and going through the belly of Canis major, it again crossed the Tropick of Capricorn, and passing through the middle of the Hare, it crossed the river Eridanus and the Equinoctial, and entred into the mouth of the Whale, and going through his head, it crossed the Ecliptick and so passed up between Aries and Linum septentrionale.*

Some took notice of this *Comet* in the beginning of *November*, and indeed it had passed through the middle of the *Asterism of Corvus*, (as I gather from it's following motions) before I saw it. *Dec. 5.* early in the morning it seemed to me to be very neer the *Southern Tropick*, about 3. degrees southward of the *Ravens bill* having longit. *Libra 4. Dec. 8* early in the morning I saw it in some part of *Hydra*; in *Virgo 28. lat. S. 30 gr.* The stream overshadowing a small star in *Hydra*, that was neer. *Dec. 16.* some observed it among the stars that are in the mainmast of *Argo Navis*: where it had longit. *Leo 23. Lat. S. 45. Dec. 17.* It was seen amongst the *stellæ informes*, which are behinde *Canis major*: where it was apprehended to have longit. *Leo. 2. lat. S. 50. Dec. 18.* The *Comet* came to *Sirius*, *i. e.* the *great Dog*, and passed through his belly. That night I saw it in *Cancer 13. lat. S. 48. Dec. 19.* It ascended from *Canis major* and crossing the *southern Tropick* it arrived at *Lepus*, *i. e.* the *Hare*. That night I saw it pass over the more *northern Star* in the *Hare's hinder legs*: being in *Gemini 24. lat. S. 44. Dec. 23.* I saw it as I supposed in *Taur. 14. lat. S. 19. Dec. 24.* I apprehended it to be in the *Equinoctial* which it crossed in the *44th*

*gr.* entering into the mouth of *Balæna*: having longit. *Taur.* 12. 30. lat. *S.* 17. *Dec.* 25. In *Taur.* 11. 30. lat. *S.* 14. *Dec.* 28, I saw it in a right line between two Stars in the *head of the Whale*, almost in the middle between them: in *Taur.* 4. 15. Lat. *S.* 7. 15. *Dec.* 29 I saw it very neer to another Star in the *head of the Whale*: in *Taur.* 3. lat. *S.* 6. *Jan.* 3 It crossed the *Ecliptick* in *Aries* 28. 30. *Jan.* 16. it came to *Aries* 26. lat. *N.* 3. *Jan.* 24. *Aries* 25. lat. *N.* 4. *Jan.* 31. *Aries* 25. lat. *N.* 5. 30. *Feb.* 4. *Aries* 25. lat. *N.* 6. 15. Since that I saw it not, nor any man else, that I hear of. If in these observations I have not attained that *ac-curateness* which the Reader desires, my want of *Astronomical Instruments* may bespeak his indulgence therein.

VI. *This Comet at it's first appearance was Oriental and Matutine, afterward it became Occidental and Vespertine.*

At first it appeared early in the morning before the rising of the Sun, and then every day rose sooner then other, (withall changing it's *Azimuth* or point of the Compass in it's rising) until it appeared in the evening, as soon as daylight was ended.

VII. *This Comet at first moved slowly, then more swiftly, till it came to it's Perige; since which time it hath gradually decreased in it's motion: toward the latter end of its apparition, it hath moved most slowly.*

From *Dec.* 5<sup>th</sup>. to the 8<sup>th</sup> (which was the time between my first and second observation) the *Comets* apparent motion in it's proper line upon the *celestial Sphere*, was about 2 degrees & a half in a day, one day with another. *Dec.* 17. it was observed by some to move about 13. *degrees.* *Dec.* 18 it moved 15, or 16 *degrees.* *Dec.* 19 it moved about 13 *degrees.* [I cannot precisely determine it's *diurnal motion*, especially when it was so exceeding swift, because I know not certainly the hour of

the night, when these observations were made.] From *Dec.* 25, to 29 it moved 2 *degrees* & half in a day, one day with another. *Dec.* 29. 2 *degr.* *Dec.* 30. 1 *degr.* & half. *Dec.* 31. 1 *degr.* In the beginning of *Ian.* it moved neer 1 *degr.* in a day: but toward the latter end, not one *degr.* in several dayes. From *Ian.* 5<sup>th</sup> to *Feb.* 4<sup>th</sup> according to my observation it gained scarce 7 *degr.*

VIII *This Comet was continually Retrograde in it's motion, onely toward the latter end of it's apparition, it became Stationary.*

This *Comet* from the first time, it was taken notice of, until the latter end of *Ian.* in it's proper motion went contrary to the *series* and *order of the signes*, *viz.* from *Libra* to *Virgo* and so backward to *Aries*: But in the latter end of *January* and in the beginning of *February* it kept in the same *degree of longitude*, onely it altered it's *latitude*.

IX *This Comet hath moved constantly almost in a right line, or in a great Circle, equal to the greatest circle of the celestial Sphere: but towards it's disappearing, it hath deflected a little and become ellipticall.*

This may be demonstrated by the *Celestial Globe*. Depress the Southern Pole 61 *degr.* (which is the complement of the *Comet's* greatest declination,) and you may finde almost all the forementioned observations concerning the *Comets* place to fall just upon the *Horizon of the Globe*: but toward the latter end, you shall finde the *Cometicall line* to recede a little from a *true circle*.

X. *The proper Circle of the Comets motion is Eccentricall, i.e. it hath a center diverse from the center of the world.*

This is evident 1 By the *diversion of it's Latitude*, which was sometimes *southern*, and sometimes *northern*. 2 By the inequality of it's *apparent motion*, which was sometimes *swift*

and sometimes *slow*. 3 By the diversity of it's *distance* from the earth, which was sometimes *greater*, and sometimes *less*.

XI. *This Comet hath ascended in Meridian Altitude above 44 degr. For it's lowest meridian altitude with us, was 18 degr. and 40 minutes, and it's highest, 63 degr. and 15 min.*

XII. *The Cometical line descended to 29 degr. of Southern declination.*

XIII. *The Comet's Southern Limit of Latitude was 50 degr.*

XIV. *The apparent motion of the Comet was anomalous and unequal, but it's motion in it's proper Orb or Circle, was very neer equal and uniform.*

That it's apparent motion was *unequal* and *irregular* is manifest by it's *Velocity* or *swiftness* one while, it's *mediocrity* another while, and it's *tardity* or *slowness* toward the latter end. The cause of which *anomaly* and *inequality*, was the *Comet's Eccentricity*. That the *Comet's* motion in it's proper orb or circle was very neer equal and uniform, may be demonstrated by the equality of it's *diurnal motion* in equal distances from it's *perige*. For instance, I finde on the 5<sup>th</sup> of December and on the 25<sup>th</sup>, the *Comet* was equally distant from it's *Perige*, and that then it's apparent motion was equal, *viz.* 2 degrees and a halfe in a day: and therefore it's true motion in reference to it's own proper center was very neer equal and regular.

XV. *The Comet seemed to be in it's Perige, or neerest to the Earth, when it was in the belly of Canis major, which was sometime on the 18<sup>th</sup> of December.*

The *Perige* is that point of the *Cometical circle* which is neerest to the earth. The *Apoge* is the point farthest distant from the earth. That the *Comet* was in it's *Perige* at the time and in the place forementioned may be argued, 1 From the *swift-*

*ness of it's apparent motion* on that day. All the Planets are slow in their *Apoge* and swift in their *Perige*. This *Comet* was apprehended to move the most swiftly on that day. 2. from the *Equality of it's apparent motion* in equal distances from thence: An instance wherof I gave before. 3. From the *distance of the place assigned*, (*viz.* the middle of the belly of *Sirius*) to the place of the *Comet's* disappearing: In the *Cometical line* the distance is about 90 degrees: Now according to the Theory and doctrine of *Comets*, it was never observed that any *Comet* from the point of it's swiftest motion, ever ran beyond the fourth part of a circle, which is 90 degrees. *N. B.* On the selfe same day (*viz.* the 18<sup>th</sup> of *December*) the Sun was also in his *Perige*.

XVI. *Since December 5<sup>th</sup>, the Comet hath proceeded in it's proper curricule upon the celestial Sphere, 153. degrees: and I suppose in all, since it's first apparition, 180. degrees.*

XVII. *The cometical circle seemeth to include and encompass the Earth.*

This may be Argued, 1. From the *length* and *greatness* of the visible and apparent *Arch* of the *Cometical circle*, which was very neer to if not a true *semicircle*. 2. From the *Duration* and long *continuance* of it's *Apparition*, which was about three months.

XVIII. *The true and real magnitude of the Comet was constantly one and the same, but it's apparent magnitude was Various and Diverse.*

At it's first appearance it seemed but *small*, at length it appeared far *greater*, sometime it seemed to be very neer halfe as big as the *Moon*: after that it decreased successively, till at last it appeared like a cloudy star. The Reason wherof is evident; at it's first appearance it was very high in the Heav-



ens, and therefore it's *diameter* seemed less: afterward it descended lower and neerer to the earth, and then it's *diameter* increased; at length it went up higher & was removed further from our sight, and then it's *basis* together with the *angle of the optick Cone* was diminished, until at last it disappeared and vanished out of sight.

XIX *The true colour and splendor of the Comet was alwayes one and the same, but it's apparent colour was various and diverse.*

At first appearance it's colour was *pale and obscure*: afterward *bright and radiant*, at length it grew very *obscure and faint* like a cloudy star. In the West Indies it appeared *fiery, red and dreadfull*.

XX *The Coma or Stream that came from the head of the Comet, was alwayes cast into that part, which was diametrically opposite to the sun.*

When the *Comet's irradiation* was from the *southeast*, it's streaming was toward the *northwest*, when it's *irradiation* was from S.S.E. it's streaming was toward *N.N.W.* when it's *irradiation* was from the *South*, it's streaming was toward the *north*, when it's *irradiation* was from S.S.W. it's streaming was toward *N.N.E.* when it's *irradiation* was from the *S.W.* it's streaming was toward *N.E.*

XXI. *The Comet in respect of it's stream, hath been of a diverse figure according to the diverse aspect of the Sun.*

*Comets* in respect of their figure are distinguished into *Barbate*, *Caudate*, and *Crinite*. A *Comet* is *barbate*, when the stream like a beard, goes before the body of the *Comet*. *Caudate*, when the stream like a tail follows the body of the *Comet*. *Crinite* when the stream goes right up into the Heavens and seems like a hairy-lock to be wound up around the *Comet's* head. This *Comet*, while it was *Oriental*, was *Barbate*, the

stream going before its body like a beard. When the *Comet* became *Occidental*, it was *Caudate*, the stream following the *Comet's* body like a tail. But it could not be properly *Crinite*, in regard of the greatness of the *Comet's* southern latitude at the time of it's opposition with the Sun.

XXII. *The stream hath appeared of a diverse height, breadth and extent, according to the diverse position of the Sun, and the Comet's distance from us.*

The stream was not alwaies of the same height in the Heavens with the head of the *Comet*, but sometimes *higher*, and sometimes *lower*. Neither was the *dilatation* of the stream alwaies one and the same, but it was sometimes *broader*, and sometimes *narrower*. The *length* and *extent* of the stream was also *diverse*: Dec. 8. It was apprehended to be 38 *degr.* long. Dec. 17. 20 *degr.* Dec. 30. 15 *degr.* Jan. 6. 14 *degr.* Jan. 25. 7 *degr.* Jan. 31. 3 *degr.*

XXIII. *This Comet hath been vertical to all countries, that lye between 29 degrees of Southern Latitude and 15 degrees of Northern Latitude.*

The *Comet* is said to be *Vertical* to any people, when the Body of the *Comet* passeth over their heads. This *Comet* was vertical to the chief *Islands* of the *East Indies*, as also to *Guinea* and to the most of the Southern part of *Africa*: likewise to *Peru*, *Brasilia*, *Guiana*, *Castilia del oro*, *nova Andaluizia*, and to several of the *Islands* of the *West Indies*, as *Trinidada*, *Granada*, *Barbados*, *Matalino*, *Dominica* and many other.

XXIV. *The stream which came from the Comet hath turned about and pointed toward most countries and Kingdomes in the habitable World.*

XXV. *This Comet is not evaporated nor dissolved, but it is ascended higher toward it's Apoge and so departed out of our sight.*

If the Comet be no vapour but a *celestial planetick luminary*, moving constantly in it's *Eccentric orb*, and if the stream thereof be no real flame, but the *irradiation* of the *Sun* through the Comet's *head*, it will necessarily follow that the Comet is not *consumed, dissipated* or *extinguished*, but rather *ascended* toward it's *Apoge, i.e.* the farthest point distant from the Earth, and so being buried in the *deep abyss* of the Heavens, becomes inconspicuous to us.

XXVI. *This Comet hath followed upon a notable Conjunction of the Superiour Planets, Saturn and Jupiter.*

*Astronomers* observe, that *Comets* do many times follow a Conjunction of the *Superior Planets*. The last Year, *October 10th*, was a great Conjunction of *Saturn* and *Jupiter* in the *13th degr. of Sagittarius*.

A Brief *Theological Application* of this strange and notable *Appearance* in the *Heavens*.

I. **T**HE *Holy Scriptures, which are the Authentick and unerring Canon of truth, teach us to look at Comets, as Portentous and Signal of great and notable Changes.*

*Joel 2. 30, 31.* I will shew wonders in the Heavens and in the Earth, Blood and Fire, and Pillars of Smoak. The Sun shall be turned into Darkness, and the Moon into Blood before the great and terrible day of the Lord come.

*Luke 21. 25.* There shall be signes in the Sun, and in the Moon, and in the Stars.

*Acts 2. 19, 20.* I will shew wonders in Heaven above, and signes in the Earth beneath: Blood, and Fire, and Vapor of Smoak. The Sun shall be turned into Darkness and the Moon into Blood before the great and notable day of the Lord come.

II. *The Histories of former Ages, do abundantly testifie that Comets have been many times Heralds of wrath to a secure and impenitent World.*

*Take a few Instances.*

A little before the *Achaick Warr* (as *Seneca* reports) there appeared a Comet fiery and ruddy, which cast a clear light, whereby the night was enlightened.

*Anno Christi 56.* There appeared a Comet. The same year *Claudius* died, and bloody *Nero* succeeded, who slew his *Mother*, his *Wife* and his *Master Seneca*, and exercised a great deal of cruelty and wickedness.

*Anno 323.* There were diverse Comets which preceeded the *Pestilent Heresie* of *Arius*.

*Anno. 337.* A Comet appeared before the death of *Constantine* the great, and innumerable evils followed.

*Anno 602.* A great Comet appeared, which preceded, if not presaged the slaughter of *Mauritius* the *Emperor*, and the *Supremacy* of the *Bishop of Rome*.

*Anno 675, & 676.* There appeared a Comet 3 moneths, at which time the *Saracens* greatly afflicted the *Roman Empire*.

*Anno. 729* Two Comets appeared, and the same year a great *Plague* invaded the World.

*Anno 814.* A terrible Comet appeared before the death of *Charles the great*.

*Anno 1066.* A Comet appeared a long time to the whole World: the same year *England* was many waies afflicted by *William Duke of Normandy*, and at length subdued.

*Anno 1618.* There appeared a great Comet: the same year brake forth the *Bloody Wars* in *Germany*.

Anno 1652. There appeared a Comet at the beginning of Mr. *Cottons* sickness, and disappeared a few daies after his death. The next year strange and notable changes of state happened in *England*.

'Tis true, some Comets have been thought to presage good to the World, as that in the dayes of *Augustus* before the birth of Christ. [*I intend not that miraculous Star, which appeared to the Magi.*] Another before the death of *Nero*: Another before the reformation by *Wickliffe*: Another before the reformation by *Luther*: but most commonly they are observed to precede, if not portend great Calamities.

Anno 79 Upon a Comet followed horrible *Winds*, and *Earth-quake* and *Pestilence*. When some shewed *Vespasian* this Comet, fearing it might portend his death, he answered merrily that this Prodigie noted not him, but the King of *Parthia*. For saith he, *he nourisheth his hair*, but I am bald. But not long after, *Vespasian* died.

III. *The Commination of wrath according to Scripture, is to be understood after a conditional manner, i.e. with an implicate reservation for Gods altering and revoking his threatned dispensation upon repentance intervening.*

*Jer.* 18. 7, 8. At what Instant I shall speak concerning a nation and concerning a Kingdome, to pluck up and to pull down and to destroy it: if that nation against whom I have pronounced, turn from their Evil, I will repent of the evil that I thought to do unto them.

*Jer.* 36. 3, 7. It may be the house of *Judah* will hear all the evil, which I purpose to do unto them, that they may return every man from his evil way, that I may forgive their Iniquity and their Sin. It may be they will present their supplication before the Lord, and will returne every one from his evil way: for great is the Anger and the Fury, which the Lord hath pronounced against his People.

*Jonah* 3. 10. And God saw their works that they turned from their evil way, and God repented of the Evil, that he had said that he would do unto them, and he did it not.

IV. *This Blazing Star being in conjunction with diverse other awful Providences and Tokens of Wrath, calls upon us to awake out of security, and to bring forth fruits meet for Repentance.*

*A Few Instances of some late awful Providences.*

1. *Earth-quakes*. About two years ago *viz. Jan.* 26, & 28. 1662, 63. The foundations of the Earth trembled, and some of our houses rock't like a cradle, 6, or 7 times did the Earth shake under us in the space of 2 or 3 dayes. It was then thought and said, that these *Earth-quakes* might portend the Lords shaking the foundations of our Churches and of our civil state.

2. The late *removal by Death* of some of our eminent *Prophets* and *seers*, who were as eyes unto us in the Wilderness, and the *Charets* of *Israel* and the *Horse-men* thereof. *April.* 5th, 1663, That burning and shining Light, who shone in the Church of *Boston*, and gave light to the whole Colony and Country, Mr. *John Norton*, a man eminently accomplished, was taken from us, and translated to an higher Orb. Of whom *New-England* was not worthy.

*July* 20 1663. That bright and radiant Star, a Star of the first magnitude, Mr. *Samuel Stone*, the strength and glory of *Connecticut*, rested from his labours and sorrows, and fell a sleep sweetly and placidly in the Lord. A little before Him, Mr. *Iohn Miller* and Mr. *Samuel Newman*, faithful, painful and affectionate Preachers of the Gospel, were also taken from us by death. Thus our Pillars are cut down, our strongest Stakes pluck't up, and our breaches not repaired. Is it

a small thing in our eyes, † our principal Congregations & Head-townes, should be so badly bereaved, as they are at this day?

3. The sad *Mildew* and *Blasting*, whereby we have been greatly afflicted the last Summer, and some of us the Summer before: our principal grain being turned into an husk & rottenness.

4. Severe *Drought* this last Summer, which burnt up the Pastures and the latter growth.

5. Early *Frosts*, which smote our *Indian Corn*, and greatly impoverished our latter harvest.

Unto these and some other no less threatenng Visitations, is superadded this strange and fearful Appearance in the Heavens, which is now seconded by a new Appearance this Spring, concomitant to the translation of our Honoured and Aged Governour, Mr. *John Endicot*, from hence to a better World: By all which doubtless the Lord calls upon *New-England* to awake and to repent.

*To this End Consider.*

1. What a jealous eye the Lord hath upon us, observing how we carry and behave our selves at such a time as this. *Ier.* 3. 8. And I saw, when for all the causes, whereby backsliding Israel committed Adultery, I had put her away, and given her a bill of Divorce: yet her Treacherous Sister Judah feared not, but went and played the Harlot also.

2. What the Lord expects and looks for from a people so highly favoured and priviledged, and so awfully warned and threatned. *Zeph.* 3. 7. I said surely thou wilt fear mee; thou wilt receive Instruction: so their dwelling place should not be cut off; howsoever I punished them.

3. How sadly will the Lord Jesus expostulate with us, if we fall asleep in the hour of the Passion and Agony of the Gospel. *Mat.* 26. 40. He cometh unto the Disciples and findeth them a sleep, and saith unto Peter, what could ye not watch with me one hour? each word is very Emphatical.

4. The danger of being surprized by temptation before we are aware. *Lam.* 1. 9. She Remembred not her last end, therefore she came down wonderfully: she had no comforter. *Rev.* 16. 15. Behold I come as a thief. Blessed is he that watcheth and keepeth his garments, lest he walk naked, and they see his shame.

5. The singular blessing reserved for the vigilant and penitent. *Hab.* 3. 16. When I heard my belly trembled; my lips quivered at the voice: rottenness entred into my bones: and I trembled in my selfe, that I might rest in the day of trouble. *Luke* 21. 36. Watch ye therefore and pray alwaies, that ye may be accounted worthy to escape all these things that shall come to pass, and to stand before the Son of Man.

*To Conclude:* God forbid that any of us, should be *Ασέρες πλανήτας* wandring Stars, Eccentrick and Erratick in our motions, as all Seducers and Impostors are: for whom is reserved the blackness of darkness for ever. *Jude*, v. 13. but the Lord grant that we may all become fixed Stars in the new *Jerusalem*, which cometh down from God, observing the Heavenly order prescribed in his holy word, and shining as lights in the midst of a crooked and perverse generation, clearly reflecting that pure and precious light, wherewith we are irradiated by the Sun of Righteousness: and then we may assure ourselves, Christ will still hold us in his right hand, and not suffer us to be cast down from Heaven, but enable us to finish our course with joy, & at length translate



us into the Kingdome of the Father, where we shall shine forth as the Sun, and as the brightness of the firmament, and as the Stars forever and ever. *Amen.*

F I N I S.

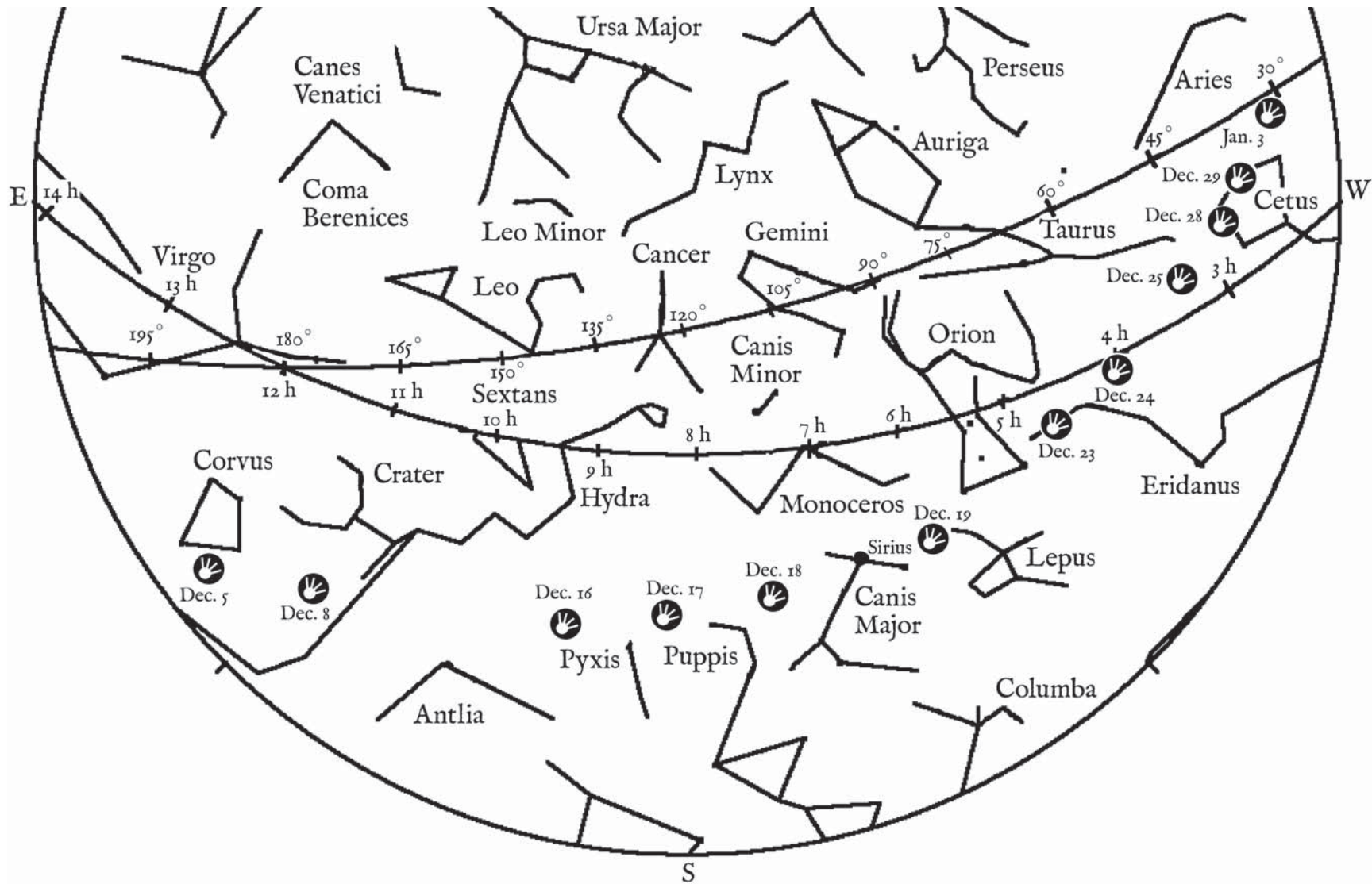
## Notes

- i.4 COMET ] Known as C/1664 W<sub>1</sub> or simply “the comet of 1664,” it was observed by many, including Isaac Newton (then a student at Cambridge), Robert Hooke, Richard Holland, John Gadbury, and Samuel Pepys in England, Giovanni Domenico Cassini and Giovanni Alfonso Borelli in Italy, Stanislaus Lubinetski in Poland, and Matasaburou (Katsurai Soan) in Japan. It passed within 0.1699 AU (25.4 million kilometers, or 15.8 million miles) of the Earth on 29 December 1664 (new style), or 19 December 1664 in the contemporary English calendar system. It is believed to have attained a brightness of magnitude -1, roughly equivalent to the brightest stars ([http://ssd.jpl.nasa.gov/?great\\_comets](http://ssd.jpl.nasa.gov/?great_comets)).
- i.8-9 9<sup>th</sup> ... 12<sup>th</sup> *Moneth* ] *I.e.*, November 1664-February 1665, by the modern calendar. Note also that the Julian calendar then in use in England was 10 days behind the modern (Gregorian) calendar; *i.e.* the winter solstice occurred on December 11, rather than December 21.
- i. 21 *Samuel Green* ] Printer and proprietor of the Press in Cambridge since 1648-92; the third such printer—after Stephen Daye (1638-45) and Matthew Day (1646-48). This is the 59th work he is known to have printed. From 1660-1671, he was occasionally assisted by Marmaduke Johnson.
- ii. 1 DU BARTAS. ] Guillaume de Salluste Du Bartas (1544-1590), Huguenot French poet. The lines are from *Du Bartas his deuine weekes and workes translated . . . by Iosuah Syluester* (London, 1611), p. 42 (from “The Second Day of the First Week”); which is a translation of *La Sepmaine; ou, Creation du monde* (1578).



- 4.12-18 *semi-transparent Gemme, ... ecliptick darkness.* ] In Pliny, *Natural History*, book 37. The translation is probably Danforth's, and it differs significantly from the published English translation by Philemon Holland (London, 1601 & 1634). The original reads: "Heliotropium nascitur in Aethiopia, Africa, Cypro, porraceo colore, sanguineis venis distincta. causa nominis, quoniam deiecta in vas aquae, fulgore solis accidente, repercussu sanguineo mutat eum, maxime Aethiopica. eadem extra aquam speculi modo solem accipit deprenditque defectus, subeuntem lunam ostendens."
- 4.30 *Jude* ] Verse 13: "wandering stars, to whom is reserved the blackness of darkness for ever."
- 12.13 Conjunction of *Saturn* and *Iupiter* ] By coincidence, the point of this conjunction was on the comet's path, although it was not yet visible. (See "Your Sky" for Julian date 2,328,750, using comet's orbital data, *infra*.)
- 13.5 *Seneca* ] In *Quaestiones naturales*, Book 1, ch. 15.4.
- 13.17 *Mauritius the Emperor* ] Flavius Mauricius Tiberius Augustus, or Maurice (539-602), was emperor of the Eastern Roman Empire 582-602, when he was deposed by Phocas and beheaded. In 607 Phocas decreed the Bishop of Rome, Boniface III, the "universal bishop" or "pope."
- 14.2-3 Mr. *Cottons* sickness ... death ] John Cotton died December 23, 1652.
- 14.13 *Vespasian* ] The story is related by Cassius Dio, *Roman History*, Book 66, and Suetonius, *Life of Vespasian*.
- 14.16 *Parthia* ] Both copies of the Cambridge first edition (1665) have broken type following the third and before the last letter of this word. The London edition (1666) reads "*Parma*" – suggesting that its copy-text was also deficient at this point. Dio, Suetonius, and all other sources agree that the kingdom referred to is Parthia (in western Asia); Parma did not have a king in 79 A.D.

- 15.23 *Samuel Stone* ] With Thomas Hooker, one of the founders of Hartford, Connecticut, in 1636.
- 15.26 *John Miller* ] Rev. John Miller (1604-1663) of Groton, Massachusetts, died June 12, 1663.
- 15.26 *Samuel Newman* ] (1602-1663) Pastor at Dorchester, Weymouth, and Rehobeth, and author of *A Large and Compleat Concordance to the Bible in English* (London, 1643); he died July 5, 1663.
- 16.16 *John Endicott* ] He died March 15, 1665.



**THE COMET'S PATH:** The base map shows the southern sky at Boston, on Danforth's Dec. 4, 1664, at about 2 a.m. (12/14/1664 07:00 GMT; Julian Day 2329171.8). The comet has been placed where and when Danforth says he observed it, which does not always agree with the projected orbital data.

The modern constellations Antlia, Pyxis, and Puppis are parts of the larger classical constellation *Argo Navis*. The constellation Cetus (the Whale) is called *Balena* by Danforth. (Base map from <http://www.fourmilab.ch/yoursky/#Skymap>).

## *Orbital Data*

The following data can be used to trace the comet's path at "Your Sky," an interactive web planetarium, online at <http://www.fourmilab.ch/yoursky/#Skymap> :

Lat.: 42° 21' 24" N		
Long.: 71° 3' 24" W (or select Boston)		
<i>Danforth's calendar</i>	<i>Modern calendar</i>	<i>Julian Day no.</i>
Dec. 5, 1664	Dec. 15, 1664	2,329,172
Dec. 8	Dec. 18	2,329,175
Dec. 16	Dec. 26	2,329,183
Dec. 17	Dec. 27	2,329,184
Dec. 18	Dec. 28	2,329,185
Dec. 19	Dec. 29	2,329,186
Dec. 23	Jan. 2, 1665	2,329,190
Dec. 24	Jan. 3	2,329,191
Dec. 25	Jan. 4	2,329,192
Dec. 28	Jan. 7	2,329,195
Dec. 29	Jan. 8	2,329,196
Jan. 3	Jan. 13	2,329,201
Jan. 16	Jan. 26	2,329,214
Jan. 24	Feb. 3	2,329,222
Jan. 31	Feb. 10	2,329,229
Feb. 4	Feb. 14	2,329,233

Note that New England local time would be UT (or GMT) minus 5 hours, and that the Julian day runs from noon to noon.

Orbital elements for the comet:

C/1664 W1	
T = 1664 Dec. 4.98343 TT	Peri. = 310.6748
	Node = 86.0525 2000.0
q = 1.025531 AU	Incl. = 158.6965

## *Note on the Text*

This online electronic text edition of *An Astronomical Description of the Late Comet or Blazing Star* is based on the first edition, published in Cambridge, Massachusetts, in 1665. Text was transcribed from microfilm images of a copy held by the Massachusetts Historical Society (Evans Early American Imprints, Series 1, no. 99) and collated against digital images of a copy held by the Bodleian Library and accessed in the Early English Books Online series. The spelling, punctuation, italics, and orthography of the original have not been altered, except for the correction of obvious typographical errors, and a list of these emendations is given below.

The work was republished in London the following year (1666), but a comparison of the texts does not suggest that Danforth made corrections or alterations.

The typeface used in this edition is IM Fell English, digitized and furnished by Iginio Marini (<http://iginomarini.com>), based on seventeenth-century originals probably cut by Christoffel van Dijck (roman) and Robert Granjon (italic). In deference to modern readers the long s has not been used; and, for the sake of more accurate searching and excerpting, the ligatures for sh, st, ct, fi, fl, ff, ffi, and ffl have not been employed. Paragraph-length quotations have been rendered in the modern style, rather than beginning each line with quotation marks. The ornaments are reproductions or reconstructions of those used in the original edition.

Following is a list of typographical errors corrected; line numbers do not include include running heads or hairlines:

<i>Page.line</i>	<i>1664 edition</i>	<i>emended to</i>
2.8	4 <i>By</i>	4. <i>By</i>
2.11	5 <i>By</i>	5. <i>By</i>
2.13	<i>Jamaica</i>	<i>Jamaica,</i>
3.27	4 <i>By</i>	4 <i>By</i>
6.27	another	another.
7.3	halfe	halfe.

<i>Page. line</i>	<i>1664 edition</i>	<i>emended to</i>
11. 14	<i>Dec: 8.</i>	<i>Dec. 8.</i>
11. 15	<i>15 degr.</i>	<i>15 degr.</i>
11. 15	<i>7 degr</i>	<i>7 degr.</i>
14. 1	<i>Anno 1652.</i>	<i>[¶] Anno 1652.</i>
14. 19	<i>i e.</i>	<i>i. e.</i>
14. 22	<i>Fer 18</i>	<i>Fer. 18</i>
14. 26	<i>Fer 36</i>	<i>Fer. 36</i>

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 July 13, 2006