



Sc Am 1977. 236.6 5115
 Poetic Responses BYARD, M.
 to the Copernican Revolution 1977

English poetry of the 17th century imaginatively reflected man's new awareness of a vaster universe. Yet the poetic imagination was rooted in the past and in the end lost its place as a bridge to new knowledge

by Margaret M. Byard

And new Philosophy calls all in doubt,
 The Element of fire is quite put out;
 The Sun is lost, and th'earth, and no
 mans wit
 Can well direct him, where to looke
 for it.

John Donne wrote those lines shortly after Galileo had trained his three-power telescope on Jupiter and found four bright moons circling the planet in a miniature model of the solar system, a discovery that lent credence to the Copernican hypothesis that the earth circled the sun and was therefore not the center of the universe. In 17th-century England, where men of rich imagination and language were equal to the occasion, the revolution begun by Copernicus and accelerated by Galileo inspired poetry in which the dismay expressed by Donne gradually gave way to exultation in the new universe of infinite space. The poets were not always precise about how the cosmos had been rearranged; they often invoked the old earth-centered Ptolemaic plan. Blended with such errors, however, was a new awareness of spaciousness, expressed in imagery that ranged across the cosmos, soaring into realms far beyond the celestial spheres in which the planets and the stars had hitherto been confined. The combination of the old and the new yielded poetry of a unique beauty pervaded by a sense of wonder and a singular freshness

of vision. Intensely religious as they were, these poets found that the new concepts of the universe fulfilled their ideas of a deity of infinite power and creativity.

To put oneself in the poet's place and to respond to his metaphors one must recall first the model of the universe he had inherited from the past and then the discoveries that burst open its boundaries and freed the tiny "punctual spot of earth" into a sea of stars. Until late in the 16th century the poet, like any other literate citizen, could think of himself as being the focus of a visible cosmos. Looking up at the heavens, he could see the moon circling the earth to illuminate it by night and the sun, that "busy old fool," rising and setting to illuminate it by day. The planets, set like jewels in their celestial spheres, also obediently circled the earth, and beyond them, set in their own sphere, revolved the "fixed" stars visible to the unaided eye, stars that were perfect, unchanging, divinely numbered, placed there by God. Each planet and star had a role in man's life and watched over his terrestrial affairs. Visible in the heavens but not included in the model was the Milky Way, explained by ancient myth as the copious output of Venus' breasts.

The regions below the moon were imperfect and subject to decay. Immediately below the moon was the region of fire, constantly aflame yet transparent. Below the region of fire were the regions of air, water and the solid earth.

Of primary importance was the interconnectedness of the plan. Man's body was made up of the four elements fire, air, water and earth and was regulated by the fixed stars. Since before the time of Plato it had been believed the world had a soul like man's own. Man's form and proportions were a pattern for all structure, including the structure of the universe.

Into this compact ancient model broke a brilliant new star in 1572 (Tycho's nova), a great comet in 1577 and another brilliant new star in 1604 (Kepler's nova). These events were a disaster to literal believers in the ancient cosmology but a liberation for those mathematician-astronomers who for centuries had been struggling to reconcile fantasy and observation. The evidence accumulated. Copernicus had published his finding of the sun's centrality in 1543, but there was no telescope to help prove his assertion. Working with ambitious but inadequate medieval instruments, Tycho Brahe calculated that the visible planets revolved around the sun. By determined ingenuity, however, he demonstrated that the sun, along with the planets, circled the earth. Johannes Kepler further ruined the comfortable old pattern of perfection by showing that the planets traveled around the sun in elliptical paths. He retained the ancient notion of the music of the spheres, but the complicated orbits meant that each planet contributed a full melody to the heavenly sound rather than a single tone. Galileo and his irrefutable observations doomed the old earth-centered cosmology. He announced that the sun is indeed central and the earth is its satellite, and not even the principal one. Moreover, through his "optic glass" the mysterious milk of Venus was seen to consist of faint stars in uncountable millions.

Gradually the new ideas diffused throughout Europe. They arrived in England at a time—the time of Shake-

BATTLE IN HEAVEN in Milton's *Paradise Lost* is conducted on several planes. Here the battle between Satan and God, as reenacted before Adam and Eve in Book VI, is portrayed in the first illustrated edition of the work published in 1688. According to the argument at the beginning of Book VI, "God on the third day sends *Messiah* his Son, for whom he had reserv'd the glory of . . . Victory; He in the Power of his Father coming to the place [of battle], and causing all his Legions to stand still on either side, with his Chariot and Thunder driving into the midst of his Enemies, pursues them unable to resist towards the wall of Heaven; which opening, they leap down with horror and confusion into the place of punishment prepar'd for them in the Deep." Although Milton's message in *Paradise Lost* was theological and political, the awareness of space that was brought about by the revolutionary cosmology of Copernicus, Kepler and Galileo gave him a vast arena for his account of struggle between good and evil.

spere—when poetic expression in the English language was at a peak, never attained before or since. The poetic tradition was also strong: as one of a long line descended from David and Orpheus the poet could still write as an interpreter of the truths of nature. The *Poly-Ol-bion* (1612) of Michael Drayton is a gazetteer of England in verse form. *The Purple Island* (1633) of Phineas Fletcher is an anatomy of the body in archaic terms. *Democritus Platonissimus* (1646) of Henry More is a faithful description of the Copernican solar system embedded in a "Platonic" poem. It was almost as if the writers had to veil their knowledge in a cloud of poetry.

Where the Latin letters and treatises of Kepler, Galileo and their successors were addressed to astronomers and mathematicians, the poets spoke in common English to the wider circle of the literate. One can see in their work a

growing awareness of a larger universe of space and of infinity. Yet at the same time they retained the outlook of the old cosmology: man was still the center of things bound in a close relation with the planets and the stars.

The canon of space poetry defined 40

years ago by the literary historian Marjorie Hope Nicolson, begins with Donne. In his "worst voluptuousness, an hydroptic, immoderate desire of human learning and languages," he was associated with the learned university men of his day. Thomas Harriot, the English astronomer who was one of the first to use the telescope, can be connected with Donne through mutual friends and associates. Evidence of Donne's scientific sophistication comes from *Ignatius his Candore*, a satire that describes an imaginary descent to hell, where "innovations" such as Galileo and Kepler are dis-

posed of. Galileo, Donne says, "of late hath summoned the other worlds, the Stars, to come neerer to him, and give him an account of themselves.... Kepler... ever since Tycho Brahe's death hath received it into his care, that no new thing should be done in heaven without his knowledge."

Even Donne's love poems are alive with imagery of suns, moons and stars. It cannot be said of these poems that Donne was entering the mysteries of a newly discovered cosmos; his imagery is almost always Ptolemaic. He is unique, however, in complimenting the women he celebrates with cosmic references. They must have been puzzled ("perplexed," said Dryden) by some of his mind-stretching comparisons. In "Elegie: Going to Bed" the lady's belt, as he removes it in exploring "my America! my new-found-land," is the zone of Orion. In "A Valediction of Weeping" each

of his lover's tears as she weeps at their parting is like a globe or a new world. "O more than Moore," he calls her in the next stanza, the moon can only influence the tides but she creates tides in which he drowns.

In the poems Donne wrote for the great ladies who were his patronesses there is no mistaking cosmic hyperbole. The Countess of Bedford changes the entire celestial order; her brightness is such that she creates a new day, a new night, a new cosmos:

Out from your chariot, morning breaks at night,
And falsifies both computations so:
Since a new world doth rise here from your light,
We your new creatures, by new reckonings goe.

The Countess of Huntingdon, who shines great titles, has been taught modesty by the constellations themselves, the greatest of which have taken modest names such as the Crab (Cancer) or the Bull (Taurus). How very different it is from the conventional compliments to which the dedicatees were accustomed: the beamy eyes, the sweet, swelling, sugared lips, the brows like Cupid's bows that Philip Sidney gave his Stella.

Later, Donne's attitudes were to shift away from the easy commandering of stars and moons as ornaments for his mistresses and patronesses. In his religious poetry, written as he was on his way to another life as the greatest preacher of his age, he spans aeons and immeasurable distances. In the most famous of his *Holy Sonnets* Donne equates himself and the world: "I am a little world made cunningly / of Elements, and an Angelike spirit." Less noticed are the next lines, in which he says that Christ is a discoverer who "beyond that heaven which was most high" has "found new spheres, and of new lands can write." Those are remarkable lines. In them Donne was admitting that heaven was most high and yet that there might be new spheres beyond the closed traditional world. Could he have been thinking of the infinity of worlds that had become a stronger possibility because of Galileo?

Donne's "The First Anniversary" (1611) and "Of the Progress of the Soule" (1612) are laments for a dying world and a dying cosmology. In them one finds the dismay that was generally being experienced over what Nicolson called "the breaking of the circle," the demise of the Ptolemaic system.

And freely men confesse, that this world's spent,
When in the Planets, and the Firmament
They seeke so many new; they see that this

is crumbled out againe to his Atomis.
Tis all in pieces, all coherence gone....
Donne felt that the new science tears the Firmament in eight and forty shewes,
And in those constellations there arise New starrs, and old do vanish from our eyes:
As though heav'n suffered earth-quake, peace or war,
When new Townes rise, and olde demolish'd are.

Astronomers have "tempayd within a Zodiacke / The free-borne Sunne." Everything in the arrangement of the heavens is uncertain. No longer can one know when sun or stars will rise.

...nor can the Sunne
Perfit a Circle, or maintaine his way
One inch direct; but where he rose to day
He comes no more, but with a countensing line,
Steales by that point, and so is
Serpentine:
And seeming weary with his reeling
thus,
He meane to sleepe, being now faine
neerer us,
So, of the Starrs which boast that they do tume
In Circle still, none ends where he
begunne.
All their proportion's lame, it sinks, it
swells.

The two poems are an interweaving of the old and the new. At the same time that they lament the old model of the universe, they carry the reader out toward the uncertain boundaries of space. However regretful Donne may be, his imagination has been loosed from the "little world." Yet he strongly retains the old close relation of man with the sun and the stars, writing of the celestial bodies as fellow sufferers in disintegration. Anthropomorphism, animism and the pathetic fallacy have here their most convincing and most moving expression:

For of Meridians, and Parallels,
Man hath weav'd out a net, and this net
throwe
Upon the Heavens, and now they are
his owne.

George Herbert, a younger contemporary of Donne and perhaps the greatest of English religious poets, also laments and dreads the vast universe. In the few short lines of "The Tempest" (1633) he soars from the greatest heights above the earth to the limitless depths below, down into the unknown region of hell. It is notable that in the following lines heaven is not only receding but also multiplied, a change in con-

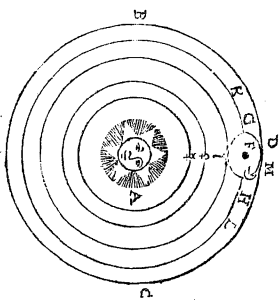


DIAGRAM OF A VORTEX, by which Descartes and others explained the orbital motion of the planets around the sun, is found in the notes of the poet Henry More for his *Philosophical Poems*, published in 1647. In older theories of the universe, the vortex was a hypothetical rotary movement of cosmic matter around a center or an axis; a movement that both allowed the solar system to form and continued to keep the planets moving in their orbits. More describes the illustration: "CDBE is that great Vortex, in which, and by which the Planets are carried from West to East according to the order of CDBE. Let A be the Sun, the Center of this great Vortex." Point F marks the earth, which is carried by the moon. More's poem "Democritus Platonissimus" praises the glories of Copernican astronomy and has many astronomical references.

ception that might not have occurred without new views of the structure of the universe:

Although there were some fourtie
heav'ns, or more,
Sometimes I peete above them all;
Sometimes I hardly reach a score,
Sometimes to hell I fall.
O rack me not to such a vast extent;
Those distances belong to thee:
The world's too little for thy rent,
A grave too big for me.

Yet unlike Donne, Herbert exults in the spacious universe he portrays, even as he retains the old sense of man's position in it and kinship with it. In his poem "Man" he writes: "The starrs have us to bed; / Night draws the curtain, which the sunne withdraws." There are cupboards and cabinets in his outer space as there are in the library or study where the 17th-century collector kept his treasures:

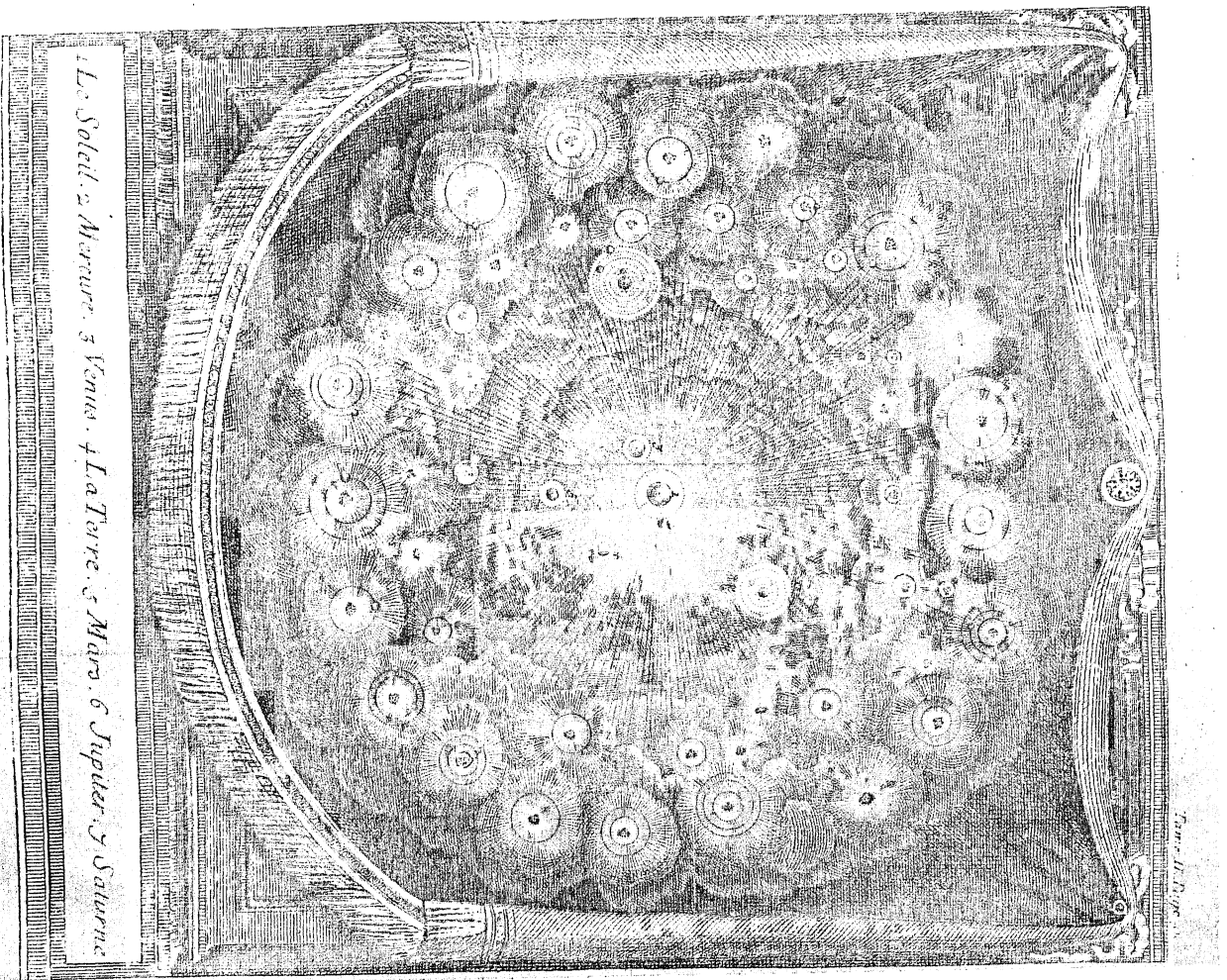
Nothing hath got so farr,
But Man hath caught and kept it, as his prey,
His eyes dismount the highest starr:
He is in little all the sphere,
Herbs gladly cure our flesh; because
that they
Finde their acquaintance there,
For us the windes do blow,



"THE ORIGIN OF THE MILKY WAY," painted in the 16th century by Titian, also (1518-94), portrays a pre-Galilean "common

sense" explanation of the nature of the Milky Way based on ancient Greek myth: the luminous track seen across the sky was Venus' milk.





SOLAR SYSTEM portrayed in the frontispiece of the 1762 edition of Bernard Le Bouvier de Fontenelle's *Entretien sur la Pluralité des Mondes* (the first edition of which was published in 1686). A soft, radi-
ant version of the solar system is correctly drawn, to the extent that it was then known, on a draped theatrical curtain. The solar system is surrounded by stars, each of which is accompanied by its own system of planets; each star, however, is represented by the face of an angel.

The earth doth rest, heav'n move, and
fountains flow,
Nothing we see, but means our good,
As our delight, or as our treasure;
The whole is, either our cupboard of
food,
Or cabinet of pleasure.

Herbert also brings the new cosmos
and man together in an almost cozy rela-
tionship, in keeping with his sense of the
unity of all things. We are made to walk
(or fly) with him as he imagines the work
of the astronomer:

The fleet Astronomer can bore,
And tired the spheres with his
quick-piercing mind:
He views their stations, walks from
door to door,
To make a purchase there: he sees their
dances,
And knoweth long before
Both their full-cy'd aspects, and secret
glances.

In "The Agonic," Herbert sees the
power of the scientist to stride through
the heavens:

Philosophers have measur'd
mountains,
Fathom'd the depths of seas, of states,
and kings,
Walk'd with a staffe to heav'n, and
traced fountains....

The same kind of imagination and ex-
ultation can be found in the religious
poetry of Richard Crashaw, probably
written in the 1640's. Crashaw, the most
baroque of the English poets, seems as
much at home in an outer world of stars
and planets as Herbert is:

Drest in the glorious madness of a
Muse
Whose feet can walk the milky way....
Crashaw conveys a sense of space by
describing the flight of the soul into a
cloudy realm of the skies to meet the
greatest of symbols, the name of Jesus:

Goe, Sou, out of thy Self, and seek
for More,
Goe and request
Great NATURE for the Key of her
huge Chest:
Of Heavens, the self involving Set of
Spheres
(Which dull mortality more Feeles
then heares)
Then rouse the nest
Of nimble ART, and traverse round
The Aery Shop of soul-appeasing
Sound....

Crashaw establishes a world in his
heavens that he imagines even as to the

feel of the clouds and the sounds that he
hears: music is omnipresent:

Come, nere to part,
NATURE and ART:
Come, and come strong,
To the conspiracy of our Spacious song,
Bring All the Powers of Praise
Your Provinces of well-united
Words can raise:
Bring All your LUTES and HARPS of
Heav'n and Earth:
What e're cooperates To The common
mirth
Vessels of vocal Joyes,
Or You, more noble Architects of
Intellectual Noise,
Cymballs of Heav'n, or Humane
spheres,
Solicitors of SOULES or EARES....

Is Crashaw intimating here that sound
is involved in the sensation of space and
that we lose our spatial orientation when
sound is absent? The discomfort of a
soundproof room bears out Crashaw's
intuition and Milton's more complex
use of sound and imitations of it in *Para-
dise Lost*.

In "The Weeper" Crashaw celebrates
Mary Magdalene, repentant sinner of
the Gospels, whose tears become stars:

Heavens thy fair eyes be:
Heavens of ever-falling starres,
Tis seed-time still with thee
And starres thou sow'st, whose
harvest darest
Promise the earth to counter shine
Whatever makes heav'n's forehead ine.
In the fourth stanza her tears not only
drop down but also fly up:

Upwards thou dost weep,
Heav'n's bosome drinks the
gentle stream,
Where th milky rivers creep,
Thine fountes above; and is the cream,
Waters above in Heav'n, what they be
We are taught best by thy TEARES
and thee.

And in the heavens, that indefinable
stellar region, the tears become the wine
for the souls of the dead who live there:

When some new bright Guest
Takes up among the starres a room,
And Heav'n will make a feast,
Angels with crystal violis come
And draw from these full eyes of thine
Their master's Wine: their own Wine.
Even as Crashaw was in nature's "aery
shop," Henry More, philosopher and
poet of Cambridge, wrote that Cupid
could hug the universe in his arms:

My mightie wings high stretch'd then
clipping light

I brush the starres and make them
shine more bright.

Then all the works of God with close
embrace
I deently hug in my enlarged arms....

Cupid, here the god of Platonic love,
is given powers that strain the imagina-
tion. Elsewhere More endowed spirits
and angels, in which he earnestly be-
lieved, with similar attributes, including
extension in space and "essential spi-
ritude" (which can be defined as vis-
costly).

In a quite different vein More's *De-
monstratio Platonisana* accurately de-
scribes the Copernican solar system
with copious notes and diagrams to clar-
ify his lines. The most informed and sch-
olastic of all the poets, More was unfor-
tunately the least inspired; tedious and
long-winded, he is often insuperably
hard to read. One difficulty is that he
wrote many of his poems in the ornate
Spenserian stanza and employed archaic
language that was outmoded even in
the time of Spenser himself. Yet More
must have realized that in order to be
widely read by the literate public it was
best to write in the respected medium of
poetry, and that Copernicanism was
more easily accepted in stanzas such as
these:

The Centre of our world's the lively
light
Of the warm sunne, the visible Deity
Of this externall Temple, *Mercure*
Next plac'd and warm'd more thor-
oughly by his rayes,
Right nimbly 'bout his golden head
doth fly:
Then *Venus* nothing slow about him
strayes
And next our *Earth* though seeming sad
full sprightly plays.

... so our worlds sunne
Becomes a starre elsewhere, and doth
derive
Joynt light with others, cheereth all
that won
In those dim diskish Orbs round other
suns that run.

How tantalizingly close the poet
comes to the concept of gravity before
Isaac Newton's discovery of it in 1682! He
intuitively senses a force called then
by many names: God, angels, voices,
the "primum mobile." More seems to
have in mind a propulsion generated
within the planets themselves; he com-
bines, or rather bends, his knowledge of
the way planets actually move to suit
his mythology: Mercury nimbly flies as he
always flew as the messenger of the
gods; Venus strays about the warm sun
as she strayed in her amour, even
though her orbit as a planet is one of the

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most circular. In the last two lines More specifically recognizes that man may not be alone in space. (The word "won" is to be read as "live" or "dwell.")

Less extravagant than Crashaw and less scientific than More were two modest clergyman-poets, Henry Vaughan and Thomas Traherne. In the course of their religious meditations they wrote verses that ranged far into the "Eternity" that Vaughan saw "the other night".

Like a great *Ring* of pure and endless light.

All calm, as it was bright,
And round beneath it, Time in hours,
Days, years

Driven by the spheres

Like a vast shadow mov'd, In which the world
And all her train were hur'd.

Both Vaughan and Traherne were Oxford men and therefore part of the small coterie of intellectuals of their day. Traherne specifically wrote that while he was at Oxford he studied "the secrets of nature with Albertus Magnus, the motions of the Heavens with Galileo, or the cosmography of the moon with Hevelius."

Almost every poem of Vaughan's *Sillex Scintillans* (*Sparks from a Flint*), published in 1650 and 1655, is lighted by imagery of stars, those "fair, order'd lights" that "wind, and curl, and wink and smile," and by "the new worlds new, quickning Sun." (In the 17th century "world" meant an entire system, Ptolemaic or Copernican; "earth" meant only our planet.)

Traherne ranged further still. He imagined that the "Earth, the Seas, the Light, the Day, the Skies, / The Sun and Stars" were his as he speculated "never-endingly about eternity and infinity." He claims "new Worlds" as part of the realm of the God he is praising:

"Tis mean Ambition to desire
A single World:
To many I aspire.
Tho one upon another hurld:
Nor will they all, if they be all
confind.

Delight my Mind.

This busy, vast, enquiring Soul
Brooks no Control:

"Tis very curious too.
Each one of all those Worlds must be
Enrich'd with infinit Variety
And Worth: or 'twill not do.

Traherne's "Consummation" is an awkward but adventurous projection of infinity:

The Thoughts of Men appear
Freely to move within a Sphere
Of endless Reach: and run.

Tho in the Soul, beyond the Sun,
The Ground on which they acted be
Is unobserv'd Infinity.

Traversing throu the Sky,
Tho here, beyond it far they fly:

Abiding in the Mind

An endless Liberty they find:
Throu-out all Spaces can extend.
Nor ever meet or know an End.

Crashaw, Vaughan and Traherne were all lyric singers of space. John Milton was the epic voice. With *Paradise Lost* there comes into existence another—and perhaps the greatest—cosmic vision of the age. Later critics have worried because Milton was a "reluctant Copernican" and did not leave the old cosmology behind. The biblical Ptolemaic scheme is his framework. One can see why. Milton needed the old system to assert his moral. Man had to be central in a central earth so that he could be the focus of the scheme of things. Moreover, because of his God-given freedom of choice, he was responsible for the good and the evil on earth. Nevertheless, Milton's vision of the cosmos is unconfined in space and time. He projects the universe of his epic through violent contrasts of light and dark, in crescendos and decrescendos of sound, through

action, through flight backward in time as well as forward. The entire epic represented by *Paradise Lost* can be outlined in a succession of flights across a three-sphere universe consisting of heaven, earth and hell.

Satan is the first to experience the vastness of the universe. As he looks out from the gates of hell before beginning his flight to earth, even he is terrified by what he sees. Accompanied by Sin, his paramour, and by Death, his child, he gazes out into chaos:

Before thir eyes in sudden view appear
The secrets of the hoarie deep, a dark
Unluminable Ocean without bound.
Without dimension, where length,
breadth, and height,
And time and place are lost. . . .

With angels' weightlessness, he resumes his flight. But even he is subject to air pockets:

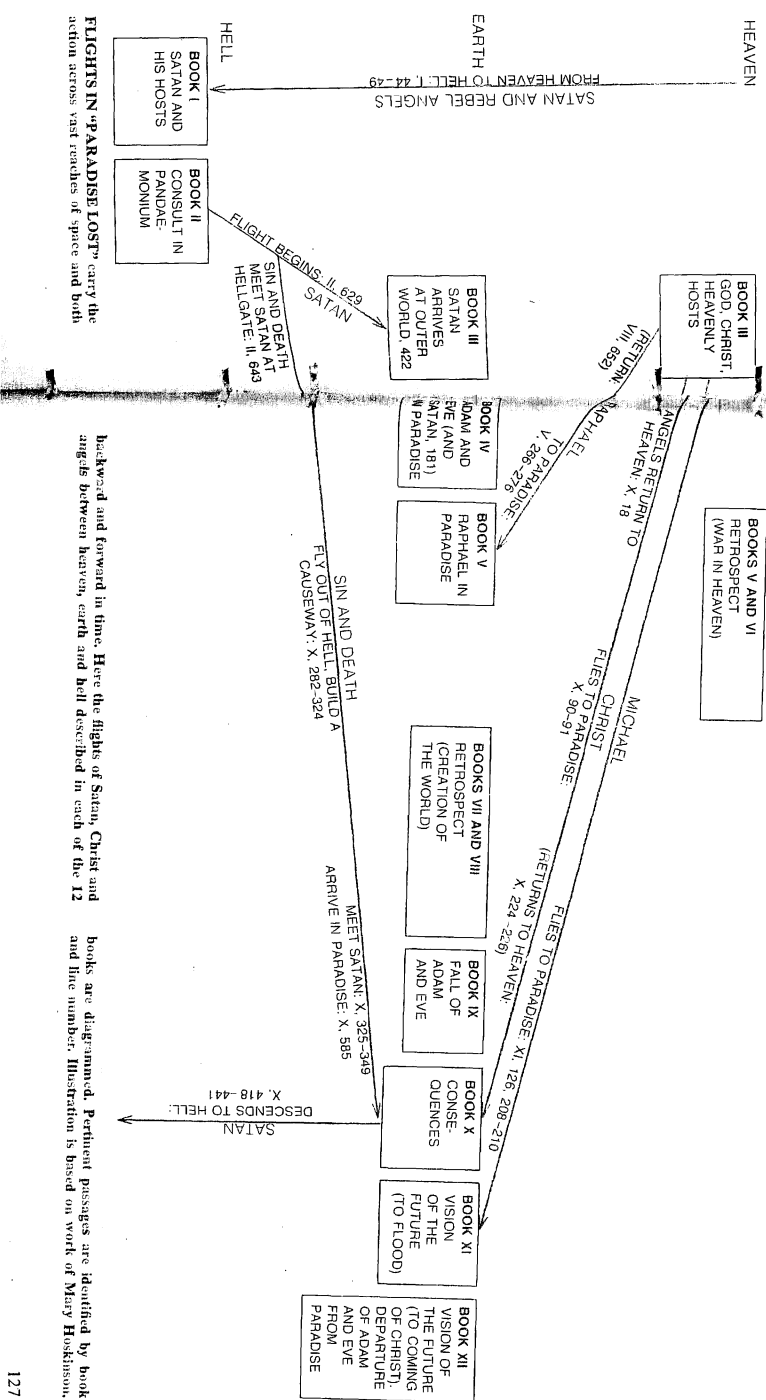
At last his Sail-broad Vans
He spreads for flight, and in the surging
smoke
Uplifted spurns the ground, thence
many a League
As in a cloudy Chair ascending rides
Audacious, but that sent soon falling,
meets

Then he "springs upward like a Pyramid of fire," and finally, with "shrouds and Tackle torn," lands on earth. Satan as a launching rocket and a floating astronaut, and the earth as we have recent-

ly seen it from the moon, are all imaginable from Milton's lines.

As a counteraction to Satan's flight Raphael, the sociable angel, flies from heaven to earth to warn Adam and Eve with the sequence of time Raphael takes Adam and Eve through the history of the universe before their own creation. The battle in heaven is projected before them: Satan and his Olympians align themselves against God and the angels and archangels. Mountains are hurled against mountains: heaven seems to return to the chaos below it. But Satan and his rebellious angels are defeated and are hurled out into space down to hell. To replace Satan and his followers the earth is created. From the distance of the star, through the vast sweep and action of Milton's lines, we watch with Adam and Eve as the universe is created. The earth was formed on the third day and the sun, the moon and the stars on the fourth:

For of Celestial Bodies first the Sun
A mighty Spherer be fram'd,
unlightless first,
Though of Ethereal Mould: then
form'd the Moon
Globose, and every magnitude of
Stars.



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THE SEARCH FOR THE EDGE OF THE UNIVERSE
BY THOMAS SPATZ
Illustrations by Carl Sagan

"Provides a twofold revelation—about the beauty and grandeur of the universe, and about the brilliance and tenacity of the human minds that occupy an obscure corner of that universe."—From the Introduction by Carl Sagan

Illustrated with photographs

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WILLIAM MORROW

And sowed with Stars the Heav'n thick as a field....

There is a rising crescendo of action and sound up to the seventh day, when the completion of the universe is celebrated. The music of the spheres—of the stars, of the planets, of the angels—rings, resounds and echoes throughout the new creation.

After the vision we are returned to Adam and Eve's present. Inevitably they are corrupted. As a result of their symbolic act of eating the apple from the tree of knowledge the entire universe changes convulsively. In a rearrangement of the cosmos the action is speeded up in a chaotic series of fights between heaven, hell and earth. The last scenes of the epic are earth-centered. Adam and Eve, now mere human beings, are expelled from the Garden of Eden. The choice of good or evil is up to them and their descendants. The end of the epic is overwhelming. The visions of space and time, the cosmic flights are over. We are landed squarely on earth.

The intoxication with space that appears in England's poetry set painters of the baroque period on equally ambitious voyages beyond the sky. Guercino (1591–1666) and others show action in space and time that could only have occurred to them after the confines of the old model of the cosmos had been split open. In the painting "Aurora" Guercino has gods, chariots and horses thundering across the sky in an immense ceiling painting that lifts the viewer out of his dimensions and compels him to join the flight of the gods above him. In "Divine Wisdom," painted by Andrea Sacchi at the Barberini Palace in Rome between 1629 and 1633, the earth floats in space. In "Adoration of the Name of Jesus," painted by Giovanni Battista Gaulli ("Il Baciccio") in a church in Rome between 1672 and 1685 angels and sacred personages fly upward in an explosion of wings and draperies.

It is remarkable how many artists in the three centuries since Milton's death have been inspired by *Paradise Lost*—more, perhaps, than by any other work except for Dante's *Divine Comedy*. Almost all of them, including the 19th-century illustrators Gustave Doré and John Martin, try to give their impression of the vastness of the poem. In our own day Milton's descriptions have even been translated into film: Sergei Eisenstein modeled the battle scenes of *Alexander Nevsky* on Milton's war in heaven. John Collier has attempted to present the action of the poem in *Milton's Paradise Lost: Screenplay for the Cinema of the Mind*.

After 1660, with the founding of the Royal Society of London as an arbiter of both science and literature, there came a change in attitude toward poets and poetry. Thomas Sprat, the historian

of the Royal Society, proclaimed that all writing leaning heavily on metaphorical language—the language of "fancy" and imagination—could be a barrier to truth. He advocated a "close, naked, natural way of speaking; positive expressions, clear senses; a native easiness; bringing all things...near Mathematical plainness." He placed "the language of Artizans, Countrymen, and Merchants, before that of Wits, or Scholars." By "wits" Sprat particularly meant poets, with their delight in analogy as a way of describing relations between man and the cosmos. His attack suggests he was afraid of the poet's influence over men's minds—"bewitching," he called it. His diatribe carries all the fervor of an attack on the communications media today. By the end of the 17th century the poet could no longer write with quite the same belief in himself as a prophet and a seer into the nature of things; intuition had increasingly to give way to the revolution in scientific knowledge that was to follow.

These old poets, to use the words of Sir Thomas Browne, were "true amphibians" that lived in "divided and distinguished worlds." What is always renewing in their poems is their sense of the marvelous. There is a freshness in Andrew Marvell's wonder at "Stars [that] shew lovely in the Night, / But as they seem the Tears of Light"; we find it also in Traherne's "On Leaping over the Moon," where he sees new worlds mirrored in a pool of water. To Traherne the entire universe was a world of treasure and man was its temple of infinity.

To find such poetry, which transcends time and knowledge, one has to go back to before the 1660's. Yet the relatedness of all things that the poet celebrated was no mere projection of his "fancy." Today the ancient elements—fire, air, water and earth—have yielded to the *u* and *d* quarks, the electron and the electron neutrino as the components of all matter. "These four particles," writes Sheldon Lee Glashow, "are the only ones needed to construct the world; they are sufficient to build all atoms and molecules, and even to keep the sun and other stars shining" [see "Quarks with Color and Flavor", *SCIENTIFIC AMERICAN*, October, 1975]. In principle the poet's intuition was right.

Even more important, to understand the universe opened up beyond the reach of our senses and of our common sense, and to make that universe our own, we still rely on the poet's devices of the analogy, the simile, the hyperbole. The animistic, anthropomorphic world invoked by poetic imagery helps to bridge the gap between scientific discovery and the layman's comprehension. We continue to learn about the rest of the world through reference to ourselves and our common everyday experience.

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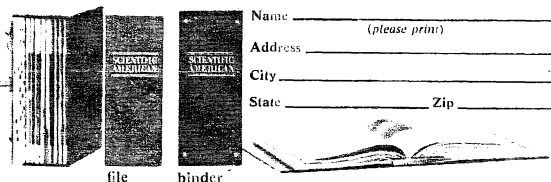
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