THE RICE INSTITUTE

The Scientific Background

of

Henry Brooke's "Universal Beauty"

by

William Lee McAdams

A THESIS

SUBMITTED TO THE FACULTY

IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

Houston, Texas
April, 1960
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreword</td>
<td>1</td>
</tr>
<tr>
<td>CHAPTER I: Philosophic Content</td>
<td>1</td>
</tr>
<tr>
<td>CHAPTER II: Diction, Technique, and Sources</td>
<td>42</td>
</tr>
<tr>
<td>CHAPTER III: Aesthetic Concepts</td>
<td>64</td>
</tr>
<tr>
<td>CHAPTER IV: The Water Cycle</td>
<td>71</td>
</tr>
<tr>
<td>CHAPTER V: Light, Vision, and the Atmosphere</td>
<td>86</td>
</tr>
<tr>
<td>CHAPTER VI: Insects</td>
<td>99</td>
</tr>
<tr>
<td>NOTES</td>
<td>127</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>156</td>
</tr>
</tbody>
</table>
The following chapters constitute an essay in intellectual background, an essay that explores a minor poet's attitude in the 1730's toward science and nature. Although Brooke fails to make irresistible art out of scientific facts, one occasionally finds poetic sensibility made keen and perspicuous by the need to relate a scientific fact in Augustan terms.

The model for this study was Professor McKillop's *The Background of Thomson's "Seasons,"* especially his first two chapters on philosophy and science. There is also at least a generic resemblance to *The Road to Xanadu.* Professor McKillop, who oversaw the organization and choice of content of this essay, deserves to be thanked for patiently reading through multiple versions of some of the following chapters which evolved like the ammonite to their present complexity. I also appreciated Professor Lear's sympathetic interest in the sublime. Professor Williams' careful correction of many faults of diction has made this long essay much easier and more comprehensible reading.

Anyone who writes about science in Augustan literature should consider *Universal Beauty,* now regarded as the most scientific poem, and the most poetical science, of the age.
Although much of Brooke's science is still acceptable, most of it must be translated from Augustan poetic diction into clearer Newtonian terms. Explanations for scientific passages in the poem have been found in various handbooks of gardening, microscopy, and physico-theology.

The philosophical content of *Universal Beauty* was much harder to clarify than the scientific. After finding what is obvious—that Brooke elaborates Shaftesbury's idea of a harmonious and benevolent nature—one finds complicated scientific analogies that assert the value of sense impressions and the possibility of knowledge in Cartesian as well as Newtonian terms. Brooke presents a complete, but often unclear, rationalistic philosophy.

Scholars of a generation ago considered Brooke's philosophy deistic, and found implications of Darwinian evolution and mystical distrust of science. Brooke, however, did not consider himself a deist, and the passages that sound like evolution and mysticism are only elementary variations upon what Professor Lovejoy called the "principle of plenitude."

Brooke delights in scientific detail because it is interesting, and can be made to support his philosophy, but his final intention is to praise deity. Despite his intentions, however, we are interested in the uses the Augustan poet made of empirical technicality.

This essay shall therefore examine carefully the
scientific and intellectual background of what Brooke calls his chaster Song,
Adorn'd with Nature, and with Truth made strong:
No Debt to Fable, or to Fancy due,
And only wondrous Facts reveal'd to View.

*Universal Beauty* (V 196-199)
CHAPTER I
Philosophic Content

Universal Beauty is a long, 2302 line, deistic-moralistic-scientific poem in heroic couplet. Although the dates of composition are not clear, Brooke probably wrote the six parts between 1728 and 1735, while in Ireland, and during his second trip to London, where Pope is thought to have read and revised the poem. In a letter recorded in Brookiana, Brooke thanks the Wicked Wasp for a kindness:

I was much concerned that I had not an opportunity of taking leave of you when I came for Ireland. I earnestly wished to see you, because I feared it was for the last time, and I wanted to thank you once for all, for much good you have done me, and more particularly for revising and passing your friendly judgment upon some lines of mine, that, indeed, were scarcely worth your reading.

The Grub Street Journal, put out by Pope and some friends as a vocal organ opposed to the Whig writers of Grub Street, advertised, September 11, 1735, that the first five parts of Universal Beauty could be bought from L. Glliver, at Homer's Head in Fleet Street. A sixth and last part was promised speedily. Similar advertisements in the Grub Street Journal ran through February, March, and April of 1736, but in the Gentleman's Magazine of March, 1736, the sixteenth item in a new-book list read: "The Sixth Part of Universal Beauty, A
Poem, which completes the whole. Printed for J. Wilcox."
The Grub Street Journal had advertised that each separate Part of Universal Beauty could be had for the original asking price of one shilling, and further evidence of interest taken by the public in the poem appears in the printer’s note on the last page of Part I:

Whereas some Persons have complain’d of the Discouragement they are under, from buying a Work of this Nature in scatter’d Papers, where their Expectations may at length be disappointed, and the Whole never render’d Complete—-I am advis’d by the Author to advertise the Publick, That this, with the Two next ensuing Papers (speedily to be published) contain and finish the general Survey or Epitome of the Whole, promis’d in the Author’s first Proposal, being A Piece in itself distinct and compleated, were he never to proceed farther:——He then commences de novo, and proposes to answer every Doubt, and illustrate at full every Part of the foregoing Abridgment; and though he expects that the Whole, when finish’d, will be far from a Miscellaneous Work; yet, for the most Part, every single Paper will contain a Branch of distinct Learning, which the Reader may pitch upon at his Election.

John Wilcox

As a guide to the poem, however, Wilcox’s note is undependable. The "general Survey or Epitome of the Whole" occupies Part I, rather than, as the note implies, the first three Parts. In Part I, Brooks mentions the various topics that he will expound in greater detail further on, to show how infinite Wisdom has designed the universe harmoniously. He mentions planets, light, atmosphere, thought, vegetation, insects, and the water cycle; it is necessary for a poet who describes nature minutely, he says, to make his poem eclectic:
But whose unmeasur'd Praise, Memorial long!
Or Volubility of numerous Song?
Can Nature's infinite Productions range,
Or with her ever varying Species change?

(V 53-55)

Part I, although filled with minute detail which bears upon
the extended science of the other five Parts, is less a
table of contents than a hexameral preface. The "Eternal
Architect" built the universe, and Part I describes the
order of creation: to begin with,

Space immense, in its own Depth was drown'd
(I 26)

and then

Matter, and Spirit, Fire, Air, Ocean, Earth!
All Nature born!—nor conscious of its Birth.
(I 33, 34)

Swift roll'd the Spheres to their appointed Place.
(I 91)

Ten thousand, thousand Worlds profusely gay...
Plants, Woods, Waters, Glades,
Grotts, Arbours, Flow'rets, Downs, and Rural Shades.
(I 123, 139, 140)

From those array'd in Heav'n's resplendent Robes,
To the brute Essence on Terrestrial Globes,
Nor such inelegant, nor less demand
The curious Texture of Almighty Hand.
(I 211-214)

Without investigating Part I minutely at this point—without,
for example, comparing in detail the line 123 quoted above to
Henry More's **Infinity of Worlds** or to Fontenelle's **Plurality
of Worlds** and then to scientific optimism—it is possible to
summarize Brooke's Part I as God looked at what he had done
and pronounced it worthy. Man, endowed with reason, might
then look upon God's works and pronounce them beautiful
and just, with praises. Part I, ending with a contemplation
of the atmosphere, shows Brooke regarding the atmosphere with
wonder (as did Goldsmith in Animated Nature) as nature's
great server of a double and contradictory purpose:

here restorative—destructive here,
Here Nature's Grable—here her fun'ral Bier
(With keen Dispatch) on all Corruption preys,
And grateful, from car aching Sense conveys;
Returns the Bane into its Native Earth,
And there revives it to a secord Birth,
Renew'd and brighten'd like the Minted Ore,
To shoot again to Life, more gorgeous than before.
(I 384-391)

Part II describes the water cycle; Part III vegetation.
In Part IV Brooke essays the possibility of knowledge—the
relationship of nature, senses, science and true reality—and
the characteristic properties of thought and perception.
The last two Parts describe Arthropods and small mammals.
Nearly all the descriptions are interlaced with moral and
theistic reflection, and occasional long tributes to deity.
Always the point is that Providence made a well-ordered
world which man's senses have been designed to perceive,
at least in part, and that therefore nature, the intuitive
beauty of which is ratified by empirical science, ought to
be the subject of study, praise, and imitation by man—he
may learn political wisdom, for example, by observing the
conduct of a beehive.

At least half of Universal Beauty recounts precisely
various scientific facts and theories, as matter for
instruction, and as the certain evidence of design.
Bonamy Dobree, describing the prose efflorescence of
scientific verse in the first forty years of the
eighteenth century, writes, "The poet who most nearly
made a real poem out of science was, however, Henry Brooke."
Marjorie Hope Nicolson pays court similarly:

Henry Brooke was perhaps the most "scientific"
poet of the generation [among Blackmore, Reynolds,
Moses Browne, and Richard Jago, who tried to
"grasp the whole of things entire"]. Who now
reads Universal Beauty, except in extracts,
chosen apparently with a desire on the part of
the editors to avoid all that made Brooke's poem
popular in its generation? Brooke declared that
he had set himself a "daring example'd task;"
certainly no other poet of the period ventured
to crowd into his lines so many complexities, in
comparison with which Newton's own technicalities
in the Principia or the Opticks are as clear as
the light whose nature he analyzed. Yet Brooke's
treatment of the new scientific theories was an
able encyclopedia in verse; his notes are often
illuminating, and usually more intelligible than
his compressed text.

The present study will attempt no correction, either of
detail or emphasis, of the views of Dobree and Nicolson;
the science in the poem, apart from its intrinsic interest
to Brooke, gave the physical evidence for, and theoretically,
at least, preceded, the supposedly inductive conclusions,
regarding aesthetics and the nature of deity. From his
scientific survey of the planets, light, water, plants, and
insects, Brooke concludes:

The Sum of all (which has so long and copiously
employ'd the Pens of the Learned) is this,—
First, That there is a present Fitness or Beauty
sufficiently obvious in Things, to demonstrate an OVER-RULING WISDOM. Secondly, that this OVER-RULING WISDOM, or GOD, now does, and ever will conduct all Things for the best. But, Thirdly, since Things change, they can't be now in their State of Perfection. Therefore, Fourthly, there must be some other or Future State, to which all Things tend and are directed, for the final and unchangeable Perfection of all Things.

The footnote quoted above proceeds immediately from an attempt to explain the alteration of species, as in the metamorphosis of insects, yet the footnote applies to the whole poem. Brooke's conclusions are very similar to what Professor McIllop calls "empirical immortality" in the Seasons, the advancing to higher and higher stages of knowledge, in this world and the next. The concept of "empirical immortality" is drawn from science, but Thomson indicates in the "Hymn" that, contrary to Brooke's idea, no final state of perfection need be reached:

When even at last the solemn Hour shall come,
And wing my mystic Flight to Future Worlds,
I cheerful will obey, There, with new Powers,
Will rising Wonders sing; I cannot go
Where UNIVERSAL LOVE not smiles around,
Sustaining all yon Orbs and all their Sons,
From seeming Evil still educing Good,
And Better thence again, and Better still,
In infinite Progression.

The similarities between Brooke and Thomson are more important than their differences—their eschatological judgments come from science, and were acceptable to their readers; the relationship of science to Brooke's philosophical and aesthetic views will be developed and elucidated in the progress of this paper.
No one doubts that Brooke was a follower of Shaftesbury. The connection may be easily demonstrated. One of Brooke's most unfortunate mannerisms in Universal Beauty is the manufacturing of eccentric names for Providence; although most of these epithets describe God as a creator or a worker of some sort, many of them describe the nature of Providence—VOLUNTARY GOODNESS, BELOVED COMPLACENCE, PLACID, MILD, ALL BENIGN. This God of Wisdom and Benignity that Brooke infers from the works of nature is associated with deism and Shaftesbury, as opposed to the orthodox God of Wrath or Power. So far as the names are concerned, however, such combinations as PRIME ABYSS, ETERNAL HEIGHT, and ETERNAL DEPTH, suggest what Miss Nicolson calls Addison's "God of Vastness" from the "Pleasures of Imagination" papers. We shall see in a later chapter that Brooke does not seem to draw his aesthetic principles from Addison; his "beauty" or "fitness" appeals to reason, whereas Addison's beauty, or the "fair," is emotional and intuitive, although it can be apprehended intellectually. Cecil Moore pointed out that Brooke's "pseudo-science" resembled that of Thomson and Akenside, and all three received impetus from Shaftesbury to use scientific information to support their ethical, cosmological, or aesthetic views. It is Shaftesbury's statements on nature, however, that concern us here. In The Moralists, A Philosophical Rhapsody, Shaftesbury writes:
Fain would I have persuaded you to think with more equality of Nature, and to proportion her defects a little better. My notion was, that the grievance lay not altogether in one part, as you placed it, but that everything had its share of inconvenience; pleasure and pain, beauty and deformity, good and ill, seemed to me everywhere interwoven; and one with another made, I thought, a pretty mixture, agreeable enough in the main. 'Twas the same, I fancied, as in some of those rich stuffs where the flowers and ground were closely put together with such irregular work and contrary colors as looked ill in the pattern, but mighty natural and well in the place.

But you were still upon extremes. Nothing would serve to excuse the faults or blemishes of this part of the creation, mankind, even though all besides were fair, without a blemish. The very storms and tempests had their beauty in your account, those alone excepted which arose in human breasts. 'Twas only for this turbulent race of mortals you offered to excuse Nature.

Brooke, like the fellow in the quotation whom Shaftesbury is trying to improve, says that nature is perfect, and only man imperfect:

"Ah, Nature! thou hast escap'd thy only Blot, "Con'd Man but cease to be--or hitherto were not; "Ay, there's the Task, the Labour of our Song, "To prove that All is right--tho' Man be wrong."

Brooke makes a pun on "Labour" and "burden" in singing, while obviously echoing the *Essay on Man*. Shaftesbury says that the "aspiring soul" seeks the good and the beautiful, and tries to find order and harmony in man, his society, and the universe, and this were vain and idle if no universal mind presided; since without such a supreme intelligence and providential care the distracted universe must be condemned to suffer infinite calamities; 'tis here the generous mind
labours to discover that healing cause by which the interest of the whole is securely established, the beauty of things and the universal order happily sustained.\(^\text{13}\)

Francis Hutcheson says:

This is certain, that we have some of the most delightful instances of universal causes in the works of nature, and that the most studious men in these subjects are so delighted with the observations of them, that they always look upon them as evidences of wisdom in the administration of nature, from a sense of beauty.\(^\text{14}\)

As we have seen, Brooke accepts the notion of the controlling mind, and the poet then decrees to himself the task of surveying the works of that universal mind; addressing the writer of his own poem, he says:

elated in his theme,
A daring incalcul'd task he'd claim,
And wide unfold the universal frame;
In mortal Draught, immortal beauty snare,
And stamp this leaf, as nature's volume fair.

(II 17-21)

Brooke counsels against the implications of pantheism:

O Doting! dreamers! who cou'd once suppose
The passive mass its maker shou'd enclose,
And the form'd clay, its forming lord compose.

(II 306-308)

For deep, indeed, th' eternal founder lies,
And high above his work the maker flies.

(II 319, 320)

The specific suggestion for the writing of universal beauty came, as all commentators seem to agree, from a collected edition of the works of the poet Henry Needler.\(^\text{15}\)

In his essay, "On the Beauty of the Universe," Needler advances a program that asserts the Augustan concept of
gentle beauty and the Gothic sublime:

There is nothing that affords a more sensible proof both of the existence and goodness of God, than the beauty of the universe, those innumerable gay appearances and delightful spectacles, which are scatter'd thro' all the scenes of the visible creation. Thunder, lightning, earthquakes and such like astonishing phaenomena of nature, may perhaps terrify us into an apprehension of a superior power; but this [the beauty of the universe] is a proof which works upon us in the most sweet and agreeable, tho' at the same time forcible and convincing manner. This gives us the most lovely and amiable view of our maker, and whilst it persuades our understandings of his being, engages our affections to rejoice in, adore and love him...With how many charms and graces has he adorn'd every part of the universe?...The beauties of nature are too various and too exquisite, to be painted to the life by any pencil, or describ'd by any eloquence.16

Needler, surveying the heavens, the earth, and living things briefly, emphasizes the beauty of colors, of proportion, and of ornament given alike to the living and the non-living.

He ends his essay with an anti-Lucretian flourish:

It would be a difficult matter to convince a reasonable peasant, that even a common cottage, which only serves to shelter its inhabitants from the winds and weather, was the mere effect of chance; but such a one would certainly think the man distracted who should seriously endeavour to persuade him, that a fair and magnificent palace, exactly regular and symmetrical in its design, adorn'd with elegant painting and sculpture, and furnish'd with every thing which pleasure and ornament as well as necessity and use require, had no other original than the lucky concourse of atoms.17

Anti-Lucretian passages were evidently popular means of distracting attention from the heterodoxy of natural religion.

Dobree mentions the continual appearance, in English popular
philosophical writing of the years of the Restoration and early eighteenth century, of attacks on Descartes and Lucretius, or Epicurus. Blackmore's Creation, which supported Christian revelation noisily enough, also attacked atomism-without-deity viciously. The obvious reason was that while scientists might elect atomic theories of physics, no one should draw atheistic implications from such theories. Orthodoxy could be supported to a certain extent by scientific evidence which was fitted into the argument from design.

Queen Anne, however, tried to silence writers who defended design at the expense of revelation. Anthony Collins was exiled in 1715 for his A Discourse of Free-Thinking, and the usually decorous Addison, whom Moore believed to be afraid to agree in print with Shaftesbury, claimed that Collins "deserved to be denied the common benefits of air and water." Moore describes the support that Anne gave to the Anglican Church, and the repressive measures taken against persons who complained or expressed untoward opinions. By the 1720's, however, certain ideas of the deists became acceptable because George I was uninterested in supporting religion, and the Anglican Church fell lax in its benevolent duties.

The second quarter of the eighteenth century produced much harmonizing of science and religion and nature enthusiasm, but little scientific progress. Professor McKillop notes that Newton thought of God not as an abstract Perfection or Infinity,
but as a spiritual being that held dominion. Gravitation, then, was not a purely mechanistic principle, but an instinct or an impulse, suitable for application to morality. Englishmen accepted attraction, and its implications, while Leibniz and the Continental scientists criticized it as a form of magic without physical content—bodies could not act on each other at a distance. Marjorie Hope Nicolson says that Newton's theory actually stultified scientific progress until the 1750's.

Shaftesbury's theories of benevolence prevailed over orthodox religious notions of sin and guilt because the Anglican Church was receiving less royal encouragement to engage in benevolent activities; Hutcheson defended Shaftesbury from Mandeville; and Pope wrote that Shaftesbury's castigation of the "rod and sweetmeat" system of Christian obedience, in favor of natural virtue, benevolence, and the study of nature rather than the Bible, did greater harm to revealed religion than the writings of all the Epicureans and atheists.

The popularity of "sentiments" fitted the theory of benevolence—Christian sentiment was, of course, merely moral encouragement or reproof, not positive admission of spontaneous goodness. Brooke himself is best known for his sentimental novels The Fool of Quality and Juliet Grenville, but one may also find in the early-written Universal Beauty a direct appeal to readers to express sentiments; the poet expects all
persons to be grateful for the divine gift of perception and sense experience:

Come then, thou Gratitude! endearing Guest!
In all thy feeling, soft Suggestions dress’d,
And heave the Swell of each exulting Breast!
Thou Sentiments of Friendship’s cordial Tye;
Thou Thanks! expressive from the moist’ning Eye,
Thou Pledge assur’d! of firm Dependence, dear,
Repos’d on Omnipresence, ever near—
Thro’ All that breathe, waft, waft, thy ballow’d Gale,

And let the universal Bish exhalé!
In Symphony of vocal Transport raise,
And mount to Heaven the tributary Praise.

(EV 97-107)

Brooke’s orthodoxy has been questioned by Helen Margaret Scurr, his principal biographer. Brooke, however, was apparently not accused by his contemporaries of heterodoxy. Miss Scurr notes the implication of orthodoxy in Brookiana:

It [Universal Beauty] was very much read, and admired for the truly religious and philosophical sentiments which it contained....There are many passages in this poem, which, in point of view of sublimity, and harmony of numbers, vie with any in the Anti-Lucretius of Cardinal Polignac.24

("Sublimity" in that statement meant probably that Brooke’s thoughts were noble and that his poem discussed deity seriously, not that his poetic technique made dramatic use of vague images or Gothic descriptions.) Miss Scurr found Brooke’s philosophy much more interesting than his science. She misleads us, in fact, by saying, “There is little of concrete, accurately observed detail in Universal Beauty;25 she then quotes passages that demonstrate that, by eighteenth
century standards, Brooke wrote a deistical poem. In the poem, Brooke says that nature reveals a benevolent deity, that deity and the universe are perfect, or at least the latter is nearly so, and that evil and inconvenience either reside only in the human frame, or appear in human misinterpretations of nature; Brooke mentions neither revelation nor Christ. Eexile Fairchild admits that Miss Scurr is undoubtedly correct, but warns against emphasizing Brooke's heterodoxy; Universal Beauty, after all, deals with nature and rational explanations thereof, not with matters of faith. Brooke came from an Anglican family and was himself known for a lively but pious good temper.

In the letter wherein Pope was thanked for reading his verses, Brooke challenged the greater poet concerning Crousaz' attack on the orthodoxy of the Essay on Man; Brooke says:

I should not have presumed to express myself thus far [in praise of Pope's poetry] if it had not come in my way, as I was going to speak to you upon a matter that is much nearer and dearer to me than even your fame. I have often heard it insinuated, that you had too much wit to be a man of religion, and too refined a taste to be that trifling thing called a Christian; those who spoke thus, perhaps, intended it to your praise, but to me it was a cloud that intercepted the brightness of your character; I am amazed whence this could proceed, and I now feel that they little knew you. I had not read your Messiah, your Ode of the dying Christian to his Soul, and your letters to that great and good man the Bishop of Rochester, till very lately, and that at a time when sickness indisposing me for light thoughts, gave me a true and affecting relish for them, and I am sure it is as impossible for any other than a Christian to write them, as it is for the best Christian to read and not be made better by them.
Brooke's conscious religious views should be plain enough from that letter to Pope, whose famous reply was accompanied by a copy of Warburton's defense of the *Essay on Man*; Pope states:

I sincerely worship God, believe in his revelations, resign to his dispensations, love all his creatures, am in charity with all denominations of Christians, however violently they treat each other, and detest none so much as that profligate race who would loosen the bonds of morality, either under the pretense of religion or free-thinking.

Professor Fairchild says that Brooke would have thought his own heterodoxy the unluckiest of accidents.

Professor Fairchild outlines the poet's general philosophical background at the time he wrote *Universal Beauty*. Later in his life, Brooke wrote poems and novels partly under the influence of religious mystics, especially Boehme and Law. Lionel Stevenson believes that there was a great deal of intriguing mysticism in *Universal Beauty*, but his point, so far as the historical background of the poem is concerned, is doubtful; reference can be made from time to time to Stevenson's article in order to show how Augustan concepts of the Chain of Being and the Principle of Plenitude might be read by a modern reader as mystical utterance or Darwinian evolution. Henry Brooke, Fairchild writes, did not think of himself as a deist, nor did his contemporaries so regard him. "Nothing in the poem is inconsistent with a very broad, soft, hazy, type of
Christian Rationalism. The Newtonian element would have been accepted as impeccably orthodox.* Brooke is a Platonist whose god creates matter and exists beyond the veil of the material world; Platonism could be used against deism, in the sense that matter could not reveal the form behind it. (Brooke is careful, as we have noted, to disavow pantheism.) The personal regard for his deity that the poet expresses in enthusiastic passages, which Stevenson thought mystical or pantheistic in their exuberance, Fairchild more appropriately terms evangelism;* with his later interest in mysticism grew also an interest in the Methodist movement. Here, for example, is the "main theme of the poem"—

The ONE grows sundry by creative Pow'r;
Th' ETERNAL'S found in each revolving Hour;
Th' IMMENSE appears in ev'ry Point of Space;
Th' UNCHANGABLE in Nature's varying Face;
The INVISIBLE conspicuous to our Mind;
And DEITY in ev'ry Atom shrin'd.

(III 5-8)

Actually the "main theme" should be nature, but Fairchild's point concerning evangelism seems more pertinent to the general appearance of the poem than implications of pantheism or mystical utterance; Stevenson compared the quotation to Blake, but the parallel suits the diction perhaps better than the intellectual content. Pious teleology throughout the poem insists upon a god of wisdom and Plenitude.

Fairchild agrees with Scurr's attribution of Brooke's ideas to Shaftesbury,* he also notes that the works of Needler and
the first three Seasons were available to Brooke in 1728. In Universal Beauty, two lines of thought are put together to support the argument from design: the numerically proportioned universe of Pythagoras and Plato, the delineation of which was founded upon rational cogitations (Copernicus, Galileo, and Kepler) combines with Baconian empiricism, which demonstrates design from point to point; The factual background of the empiricism was Newtonian and scientific. Fairchild says that Universal Beauty is more technical than Cooper's The Power of Harmony, and more Platonic than Thomson's Seasons. Fairchild summarizes the intellectual background of Universal Beauty thus:

By the time this complex of ideas [Platonism, Newtonianism] reaches Shaftesbury the Platonic-Pythagorean conception of a universe based on mathematical proportionateness has broadened and softened into a more general notion of aesthetic harmony, and in this form it is ready to be used by Brooke.

Fairchild implies, with perfect justice, that Universal Beauty was accepted as orthodox and ordinary. Professor McKillop's The Background of Thomson's "Seasons" notes that eighteenth century readers did not question the appropriateness of a long philosophical poem that spoke of the wonders of nature or the designs of deity. It was recognized by the 1730's that the study of nature certainly ought to give some idea of a creator, rather than, say, some idea of random assortments of atoms. Scientific information had been harmonized with religion for a quarter of a century; and
people believed that science could learn all about the
details of nature (having already been given the general
principles by Newton) in two or three generations. Brooke
says that nature is too vast in detail for human minds to
compass:

Yet infinite that work, beyond our Scar;
Beyond what Clarkes can prove, or Newtons can
explore.

(II 321, 322)

In the same vein, we see only "superficial Scenes"—Platonic
"matter:"

These but the Sketch, the Carve, the Veil of Things,
Whence all our Depth of shallow Science springs.

(V 152, 153)

On the other hand, sense and science both come from God:

THEE! the SOLE SOURCE, whence Sense, and Science
flow.

(V 30)

And the human mind has been designed specifically to complement
nature:

Anull'd, and blank this grand illustrious Scene,
All, all its Grace, and lifeless Glories, vain;
Till from th' ETERNAL sprung this effluent Soul,
Bless'd to inspect, and comprehend the Whole!

(IV 329-332)

Brooke, as the scientific age expected, interprets nature
optimistically; mankind, he says, is nature's only blot.

Universal Beauty, then, is optimistic, while the Essay on
Man must be guarded and must not speak of man, a creature
with a certain place in the Chain of Being, as having
untoward merits or faults. In other words, if man may not
know true reality, he has still been given the means to perceive a phenomenal world that should satisfy all curiosity:

All is Phoenenon, and Type on Earth,
Replete with sacred and mysterious Birth,
Deep from our Search, exalted from our Sear,
And Reason's Task is, only to adore.

(V 162-165)

Miss Scarr objected to the assertion that because Brooke depreciated reason, he was a mystic. Reason is, in fact, mentioned in *Universal Beauty* to its detriment, if it is human reason:

If stubborn, in your little Reason's Spight,
Ye will judge wrong, because ye won't judge right.

(II 311, 312)

Ye self-sufficient Sons of reasoning Pride,
Too wise to take CONSCIENCE for your Guide;

(V 330, 331)

Arthur Lovejoy found Brooke's attitude toward reason to be typical of English neo-classicism; Lovejoy terms the attitude "rationalistic anti-intellectualism"—animus against hair-splitting argument. If God made nature according to simple and regular principles, then valuable knowledge of nature should be available to everyone, and make it useless to split hairs in theological controversy. It was generally thought that God must have made necessary truths known to man, not always through revelation. Human reason, then, should not try to humiliate itself, but should rather try to observe what is obvious, and share as much as possible in the divine reason, for, as Brooke says of deity:
Of Reason Thou the Coeternal Cause,
Thyself all Reason, and thy Will all Laws;
All-reas'ning Will with powerful Wisdom fraught,
Thy Wisdom, one unchanging endless Thought.

(VI 409-412)

Science reinforced the idea of ordered nature, and theological subtleties fell to odium in the progress of the "rationalistic anti-intellectualism."

Brooke spends much tedious effort trying to define the relationship of mind to matter and to external phenomena—the possibility of knowledge. Thought, to begin with, is not a part of matter:

Mysterious Thought! swift Angel of the Mind!
By Space unbounded, tho' to Space confin'd,
How dost thou glow with just disdain? how Scorn?
That Thought could ever think Thee Earthly Born?
Thou who canst Distance Motion in thy Flight,
Wing with aspiring Plume the wondrous Height,
Swifter than Light, outspeed the Flame of Day,
Fierce thro' the dark Profound, and shame the darting Ray.

(I 57-64)

Here! Matter's fix'd, eternal Barriers stand,
Thou wrought beneath TH' ALMIGHTY'S FORMING HAND,
Thou'st abilitiz'd beyond the kindling Ray,
Or sacred Flame of Heaven's empyreal Day;
No pleasur'd Mode, no Aptitude refin'd,
Can yield one Glimpse of all-informing Mind;
The Parts distinct in firm Cohesion lie,
Distinct as those that range the distant Sky;
Time's fleeting Points th' unreal Self devour,
Wary'd and lost thro' ev'ry changling Hour;
Whence, the precarious System, tho' compact,
Can no'er arrive to individual Act.

(IV 51-62)

Thought and life, "the vital Flame" (a phrase from the Essay on Man), are divine gifts:

Whate'er the Spark, the Light, the Lamp, the Ray,
Essence! or Influence of ESSENTIAL DAY,
"Perception" implies mind, of course, but requires matter organized into a body constructed to receive stimuli; Brooke describes the purely mechanical operation of the nerves and eyes, and in the last couplet of the following passage compares the body to a musical instrument:

The passage continues with the complicated statement that external sense stimuli have nothing to do with mind, and that nerves could operate without mind, unconsciously:

Effects [external sense stimuli] like Acts inevitable rise,
(Procoordinate in the DESIGN ALLUDE)
Yet still their earthly Origine retain,
Reductive to the Principle terrene,
The′ curios to deceive with mimic Skill,
And feint the Dictate of interior Will.
(IV 45-50)
Nature, in other words, is very close to true reality. Matter, at any rate, cannot perceive, nor can it inform of mind:

No plexur'd Mode, no Aptitude refin'd,
Can yield one Glimpse of all-informing Mind.

(IV 55, 56)

In a series of footnotes, Brooke proves that mind cannot be a part of matter because mind cannot be said to be a property either of single atoms or of atoms combined into an organism, nor can mind be destroyed, as could matter—mind is "a pure essential Unit, incompound."

What Miss Bourr calls "immortal deism" comes forth at the point where Brooke claims that the indivisible mind, unsubject to change or decay, must endure forever:

The One indissoluble, must exist,
And deathless thro' Eternity subsist.

(IV 73, 74)

Having proved to himself what Descartes and Locke had asserted, that mind and body were entirely separate, Brooke was left to tell how the two entities could affect each other. Brooke has already compared the human body to a musical instrument properly responsive to stimulus. The mind, or "Soul," the "Being of a Nature distinct from Matter," the presence of which bestows life, "the vital Flame," assumes control over the body, and by means of nerve impulses ("attendant Spirits") directs bodily activity.

In a precise and animated passage, Brooke describes the motion of nerve impulses to and from the mind, regarding
all of the senses as functions of touch:

The Mind thus speeds her Ministry [nerve impulses] abroad,
And rules obedient Matter with a nod;
The obsequious Mass beneath her Influence yields,
And e’en her Will the unwieldy Fabric yields.
Thro’ winding Paths her sprightly Envoys fly,
Or watchful in the frontier Senses ly;
Brisk on the Tongue the grateful Gusto greets,
And thro’ the Nerves return th’ ideal Sweet;
Or incense from the Nostrils Gate exhale,
And to their Goddess waft the ov’rous Gale;
Or musical to charm the list’ning Soul,
Attentive round the tortuous hair matrode,
There each sonorous Undulation wait,
And thrill in Rapture to the mental Seat;
Or wondrous to the organick Vision pass,
And to the Mind inflect the magick Glass.

The “magick Glass” is the lens of the eye. It is interesting
to note that so far as nerves and stimuli are concerned,
Brooke discusses fearlessly, for the sake of completeness,
a topic which Thomson essayed, and then gave up. Dobree
quotes a passage omitted from Winter in 1744; Thomson, like
Brooke, did not doubt that mind and nature, although unlike,
were, to use the musical metaphor again, somehow “tuned” to
each other:

’Tis Harmony, that World-attuning Power
By which all Beings are adjusted, each
To all around, impelling and impell’d
In endless Circulation, that inspires
This universal Smile. Thus the glad Skies,
The wide-rejoycing Earth, the Wood, the Seas
With every Life they hold, down to the Flower
That paints the lowly Vale, or Insect-Wing
Sw’ld o’er the Shepherds’ Slumber and the Mind
To Nature tun’d, with a light-flying Hand;
Invisible; quick-urging, thro’ the Nerves,
The glittering Spirits, in a Flood of Day.”
Brooke does not give a clear answer to the question as to how mind rules body, or at least makes body activities conscious. He separates mind from body, and insists that animals have no minds, although of course matter could form sense organs. Since man knows not "the manner in which the Union between such Substance [mind] and Matter is made," then, says Brooke, man must assume that somehow God supports the scheme of mind and body; as we have seen, God is given credit for having made bodies exactly so as to operate under a mind or soul. Brooke's notions at this point imply the doctrine of occasionalism suggested by Geulincx and Malebranche—God forces connections of mind and body at the best times and places. Brooke, however, says only that Providence made bodies, and that mind exists, the connection remaining unclear.

Most important for Brooke is his conclusion that Providence created everything that was necessary in the universe; the poet lists in order the separate creations of deity that make perception possible—eyeballs, objects to look at, light, air, and mind:

Yet useless was this textur'd Wonder [the eyeball]

Wore Nature, beauteous Object! undisplay'd:
Those, both as vain, the Object, and the Sight,
WraPt from the Radiance of revealing Light;
As vain the bright illuminating Beam,
UnwafTed by the Medium's airy Stream;
Yet vain the textur'd Eye, and Object fair,
The sunny Lustre, and continuous Air;
Annul'd, and blank this grand illustrious Scene,
All, all its Grace, and lifeless Glories, vain;
We may see that science, as Brooke understood it, ratified his view of nature, demonstrating fitness and order; science demonstrated a machine, after all, but as Whitehead exclaims, somehow the poets praised a god instead of the machine, and a god instead of their own sense organs which could perceive colors and shapes in the dead world of moving atoms.42

"Sense and Science," Brooke has stated, come from God, and he implies that sense and science are much alike. Science empowers sense, the microscope allows man to investigate minutiae closely, and, theoretically at least, the more science knows of nature, the closer it should come to divine or Platonic reality. Science for Brooks is closer observation rather than abstract theorizing. Brooke is "anti-intellectual" in Lovejoy's sense, and he does not regard the theorist Newton nearly so high as did his contemporaries—in several places, Brooke equates Newton and Descartes, accepting theories from both, an unlikely practice for an Englishman in the 1730's:

Each [planet] to his native Vortex is assign'd,
And magic Circles ev'ry System bind;
A deeper Charm ["attraction"] each Individual binds,
And firm within its Atmosphere enfolds;
The secret smell, thro' ev'ry Part, and Whole,
Distinct, intime, invades it like a Soul;
Its Atoms at the am'rous Touch cohere,
And knit, in universal Wedlock share.
(I 115-120)

Of course, Brooke was Irish rather than English, and he seems
to have come across Continental ideas, and perhaps read Pluche's *Spectacle de la Nature*. Brooke states plainly that we see as much of true reality as we can tolerate. The obvious implication, then, is that science is not expected to overthrow the evidences of unaided sense.

Of the sense of sight, he says:

Here [in the eyeball] borne elate upon ethereal Tides,
The blithe illuminated Glory [the sense impression] Glides,
And on the Beam the painted Image rides;
Those Images that still continuous flow,
Effluentied Around, Above, Below,
True to the Colour, Distance, Shape, and Size.
That from essential Things perpetual rises,
And obvious, gratulate our wand'ring Eyes.

(IV 339-356)

Brooke thus assures his readers that in their admiration of the beauty of nature, they are not chasing after phantoms. Perhaps it would have been sufficient to say, after Addison, that God made the soul to delight in colors and apparitions, purely as a gift of pleasure to man, but Brooke adds the assurance already specified, that what we see is true to "essential Things"—that is, to Platonic Form or Kantian noumena. Marjorie Hope Nicolson, in *Newton Demands the Muse*, speaks of the writers who were affected by the question of sense and reality: in the mechanistic world of Descartes and Locke, Edward Young retreated from the false world of light and colors, while Pope and Akenside warned scientists not to expect to exceed the limits of human grasp; on the other hand, Richard Jago,
in the age of Hume, delighted in sense experience. Brooke, like Thomson, thought beauty really existed in nature—with the proviso, however, that Brooke's beauty is a kind of perceptible fitness which appeals to reason, as well as a kind of intuitively delightful perception.

Having seen that Brooke regards nature as not only close to true reality, but also made for man, as necessary to perception, one may describe what Brooke thinks he actually sees in nature. Professor Fairchild seems to hit the mark when he says that Brooke reconciles "uniformitarian and diversitarian trends"—he means simply that the unity of deity lies behind the variety of nature.

Pre-romantic and mystical notions were read into Universal Beauty by scholars of a generation ago, before the intellectual background of the poem was taken into account. George Williams, whose emphasis appears correct, writes of the Augustan attitude toward the country as opposed to the city. Augustans in general sought the peace and quiet of the country, despite its scorned rusticity, in order to rest and contemplate the learning and culture for which they originally had to go to the noisy, dirty city and engage in coffee-house squabbles. The neo-classic age desired to live quietly, rationally, and intellectually, and a life close to nature was thought to offer the leisure and tranquillity necessary for study. Newton and Addison re-focussed attention upon vision,
imagination, colors, and nature. Some of the poets whom Professor Williams quotes are: Steele and Needler (rural leisure), Gay, Swift, and Pope (unpleasantness of the cities), Winchelsea, Hill, Broome, Thomson, Dyer, Somerville, Hughes, and Elizabeth Rowe (quietness of the country), Pomfret and Pope (healing power of the country upon the soul), and, of course, Blackmore, Hughes, Young, Baker, Ralph, Thomson, Mallet, Savage, Cooper, Pope, Brooke, Boyse, and Akenside, among others, who saw perfect nature as a manifestation of God's creative wisdom. One may find in Universal Beauty passages scourging man ("This King o'er Reason, but this Slave to Sense") praising the pastoral life, and sneering at beaus and governors—all quite unoriginal, and not at all forward-looking.

Ernest Bernbaum, prefacing an early anthology which included Brooke, says:

In 1785 a far more important poet of sentimentalism [than Samuel Johnson] arose in Henry Brooke, an undeservedly neglected pioneer, who, likewise drawing his inspiration from Shaftesbury, developed his theories with unusual consistency and fullness. His Universal Beauty voiced his sense of the divine immanence in every part of the cosmos, and emphasized the doctrine that animals, because they unhesitatingly follow the promptings of Nature, are more lovely, happy, and moral than Men, who should learn from them the individual and social virtues, abandon artificial civilization, and follow instinct.

Brooke, however, is not anti-social, even in a Rousseauistic sense, and his passages on the beehive and the wasp-nest indicate that society may be completely natural, even for
humanity. Here, at any rate, is the interesting passage which Bernbaum headed, "Moral Lessons from Animal Life;"

Ye self-sufficient Sons of reasoning Pride,
Too wise to take CONSCIENCE for your Guide!
Those Rules from Insects, Birds, and Brutes discern,
Which from the MAKAR You disdain to learn.
The social Friendship, and the firm Ally,
The filial Sanctitude, and nuptial Tie,
Patience in want, and Faith to persevere,
Th' endearing Sentiment, and tender Care,
Courage o'er private Interest to prevail,
And die all Decii for the Publick Seal.
(V 330-333)

Shaftesbury says much the same thing:

It has already been shown, that in the passions and affections of particular creatures there is a constant relation to the interest of a species or common nature. This has been demonstrated in the case of natural affection, parental kindness, zeal for posterity, concern for the propagation and nurture of the young, love of fellowship and company, compassion, mutual succour, and the rest of this kind.48

Brooke discusses the familiar notion, from Pliny, that man has been inadequately furnished for his struggles with nature, lacking, for example, the "Tortoise's impervious Mail," "The Lynx's Eye," "the Bark of Trees." Man, says Brooke, complains that he has only "interior Reason," which, says the poet, man boasts about absurdly. Perhaps Brooke offers a correction to Shaftesbury, who also noted man's physical weakness, but said that "reason and discourse" more than made up the lack.49 Bernbaum heads another "pre-romantic" passage, "Promptings of Divine Instinct," which is a flamboyant paraphrase of Shaftesbury:
30

Dispers'd thro' ev'ry Copse, or marshy Plain,
where haunts the Woodcock, or the annual Crane,
where else encamp'd the feather'd Legions spread,
or bathe incumbent on their cozy bed,
The swelling lake THY SMILING PRESENCE fills,
And wave's the Banners of a thousand Hills,
THOU speed'st the summons of THY WARNING VOICE;
Wing'd at THY WORD, the distant Troops rejoice,
From ev'ry Quarter scour the Fields of Air,
And to the general Rendezvous repair:
Each from the mingled Rout dispersing burns,
And with the Love of kindred Plumage burns;
THY POTENT WILL instinctive Bosoms feel,
And here arranging semilunar, wheel,
Or marshall'd here the painted Rhomb display,
Or point the Wedge that cleaves th' aerial Way;
Uplifted on THY WATTING BREATH they rise,
Thou pav'st the Regions of the pathless Skies,
Two' boundless Tracts, support' st the journey'd Host,

And point' st the Voyage to the certain Coast,
THOU the sure COMPASS, and the SEA, they sail,
The CHART, the PORT, the STEERAGE, and GALE.
(VI 361-394)

Thomson's Autumn describes a stork-assembly which is less abstract than Brooke's legions of birds. Thomson describes stork migration realistically, but with an autumnal tone of melancholy—he implies that the storks do not have divine protection. Thomson is a good deal more geography-minded than Brooke.

WHERE the Rhine loses his majestic Force
In Belgian Plains, won from the raging Deep,
By Diligence amazing, and the strong
Unconquerable Hand of Liberty,
The Stork-Assembly meets; for many a Day,
Consulting deep, and various, ere they take
Their arduous Voyage thro' the liquid Sky.
And now their Rout design'd, their Leaders chose,
Their Tribes adjusted, cleasn'd their vigorous Wings;
And many a Circle, many a short Essay,
Wheel'd round and round, in Congregation full,
The figur'd Flight ascends; and, riding high
Th' aerial Billows, mixes with the Clouds.
OR where the Northern Ocean, in vast whirls,
Boils round the naked melancholy Isles
Of farthest Thule, and th' Atlantic Surge
Pours in among the stormy Hebrides;
Who can recount what Transmigrations there
Are annual made? What Nations come and go?
And how the living Clouds on Clouds arise?
Infinite Wings! till all the Plume-dark Air
And rude resounding Shore are one wild Cry.

Brooke's passage on the birds will be discussed in
detail in the chapter on diction and technique, but here
we note that Shaftesbury says much the same thing as
Brooke, about animals in general:

Their females, newly pregnant, and before they
have bore young, gave a clear prospect or pre-
sension of their state which is to follow;
know what to provide, and how, in what manner,
and at what time. How many things do they prepon-
derate? How many at once comprehend? The seasons
of the year, the country, climate, place, aspect,
situation, the basis of their building, the
materials, architecture; the diet and treatment
of their offspring, in short, the whole economy
of their nursery; and all this as perfectly at
first, and when inexperienced, as at any time of
their life afterwards.

So far as imputations of pre-romanticism are concerned,
Brooke exhibits an enthusiasm for nature that distinguishes
him from his contemporaries only slightly; there is no
special doctrine that he upholds which would be thought
advanced, either in his day, or later.

The general result of this discussion of Brooke's
attitude toward nature should be the demonstration of the
poet's nearly complete orthodoxy as regards the common
opinions of his time. Brooke actually does little but
talk of the beauty of nature and the harmony that reinforces
the argument from design; his conscious heterodoxy appears mostly in his admission of Cartesian ideas to his cosmology. It should be no secret that Brooke is writing of the Great Chain of Being and of Plenitude, and that what appears to be confusing mystical utterance or formulations of biological evolution are in fact usually tributes to harmonious Plenitude. Miss Nicolson believed that Brooke's contemporaries must have read Universal Beauty for its science; one must add that they read for the science that was incorporated into familiar patterns of thought, not as, say, we might read Jeans or Eddington to see how remote or esoteric physics is getting to be. Brooke draws no odd conclusions from his science, which was, as it has been stated here, little more than close observation.

Lionel Stevenson said that Universal Beauty expressed contradictions throughout; the scientific argument from design supposedly conflicts with the poet's "subconscious tendency" to make God a spiritual principle manifest in all phenomena. Stevenson's evidence is slender; he quotes the lines against pantheism:

who could once suppose
The passive Mass its Maker should enclose,
And the form'd Clay, its forming Lord compose.

(II 306-308)

For deep, indeed, the ETERNAL FOUNDER lies,
And high above his Work the MAKER flies.

(II 319, 520)

Stevenson then quotes a passage suggesting pantheism:
The ONE grows sundry by creative Pow'r;
Th' ETERNAL'S found in each revolving Hour;
Th' DIMENSE appears in ev'ry Point of Space;
Th' UNCHANGEABLE in Nature's varying Face;
Th' INVISIBLE conspicuous to our Mind;
And NUTY in ev'ry Atom shrin'd;
From whence exults the animated God,
And smiling Features speak the PARENT GOD;
Who here, and there, and ev'ry where abounds.

(III 3-11)

Both Scurr and Fairchild insist that the latter passage, in view of the two previous passages, is not pantheistic. The passage, in context, expresses the universal beauty of all created things. Thomson expressed the same idea in his "Hymn:"

These, as they change, Almighty Father, these Are but the varied God. The rolling year Is full of Thee.

Cecil Rowe, using those lines for evidence, said that Thomson equated nature with God, but Professor McKillop disagrees. Part of the nature of God, according to the principle of Plenitude, was the tendency to create all possible phenomena; the diversity of nature, then, reflected an aspect of providence. Nature reflects, but does not contain, its creator:

Hence from the Seraph's intellectual Ray,
To Reason's Spark, that gilds our sensual Clay;
To life (scarce conscious) in th' instinctive Brute;
To Reptile; Plant, and vegetating Root;
The Features, in conspicuous Semblance shine,
And speak thro' all, ONE PARENT ALL DIVINE.

(III 222-227)

Plenitude was modified, as Lovejoy points out, to account for apparently changing species; Brooke says:
The world became, in other words, a *plenum formarum*, wherein all possible beings are realized over periods of time, but some die out, and all possibles will not be present at any one time. Brocke’s conclusion that the world was progressing toward perfection fits the *plenum formarum*, which allowed optimism and hope easier than the flat statement that this was the best of all possible material worlds. The doctrine of Plenitude is given voice in the following lines:

A World from Nought—all Empty, now all Full!  
(I 46)

Repletion! never to be more—not less!  
(I 86)

THOU VOLUNTARY GOODNESS! thus immense  
To pour the largess of perceptive Sense,  
Sense to perceive, to feel, to find, to know,  
That we enjoy, and YOU ALONE bestow.  
Could Increation crave THY VITAL SKILL,  
The VIRTUAL FIAT of CREATIVE WILL?  
Less can THY FLOW of PLENTITUDE receive  
Reversion, from the Goods ITS BOUNTY gave.  
(iv 89-96)

The notion of spirit beings above man yet below angels, a corollary to the theory of the Chain, is expressed in this passage:

Nor want the lucid Spheres  
(Of Blest Inheritance) the blissful Heirs;  
Angelick Shapes, that wing th’ Ethereal Space,  
And scarce inferior to the Heav’ny Race;  
An uncompounded radiant Form they claim,  
Nor Spirit all—nor yet Corporeal Frame.  
(I 195-202)
In his hexaemeral passage, Brooke spoke of "Ten thousand, thousand Worlds profusely gay," and later he speaks of the infinity of worlds, a concept popularized by Derham's Astro-Theology, each world is boundless to the creatures on it:

One House, one World, one Universe divine,
Where countless Orbs, through countless Systems shine;
Systems! which view'd throughout the Circuit wide,
Or lost—or scarce the pointed Sight abide,
(Thro' Space immense, with Diminution seen)
Yet boundless, to those Worlds that roll within;
Each World as boundless, to its native Race,
That range, and waken thro' its ample Space,
Frequent, thro' Fields, thro' Clouds of Fragrance stray,
Or skim the watry or otherial Way.
(I 225-234)

Brooke accepts the notion of immutable species (in the plenum formanum species could come and go, but could not evolve):

Th' eternal Species in an Instant mould.
(III 100)

Distinct, each Species of peculiar Frame,
Distinct, peculiar Love and Fondness claim;
Indul'g'd by Nature's kind Parental Care,
As each alone were her appointed Heir.
(III 267-270)

Amid the profusion of nature, the poet must be eclectic:

But those unmeasur'd Praise, Memorial long!
Or Volubility of numerous Song?
Can Nature's infinite Productions range,
Or with Her ever varying Species change?
(V 53-56)

Yet the poet has nearly a free choice of what to describe, for, as Brooke says in a note to Part V, line 27, "Deity is
necessarily inferred from the contemplation of every object."

Since ev'n the Smallest from the Great One springs
Great and Conspicuous, in minutest Things.
(V 71, 72)

Brooke does not discuss the Chain of Being specifically.
The **plenum formarum** is more appropriate to accounts of animals,
while the Chain, as in the Essay on Man, served a moral
purpose in warning man not to try to exceed his appointed
gap. Pride, associated with the idea of the Chain,
designated a man who put himself not above his fellows, but
above the human station. Evil, according to Brooke, becomes
the impressionistic interpretation that mankind gives to
certain of his own activities; good and evil are likely to
be close together, evil being the misuse of what ought to be
good:

*Bless'd are the blameless Means, the Curse is the Desire—
Hence Comfort kindles in the cheerful Blaze,
The' Fire upon th' expiring Martyr preys;
The Peasant hence manures th' exhausted Soil,
The' Lordlings share the Product of his Toil;
Hence Artists in the Princely Dome survive,
The' Drones may occupy its ample Hive;
Hence Medicines yield the salutif'rous Pill,
But gently qualify'd can learn to kill.
Hence Medals may reveal the Patriot's Face,
Altho' a Tyrant gild the nether Space:
Once more, return great Socrates to Light,
Or with an Alexander, blast the Night,
(Who here approves the Infamy of Fame,
Shares Alexander's Guilt, and Alexander's Shame)
Nor less, the Plough-share needs the Lydian Blade,
The' Steel, and Pride the neigh'ring Realm invade:
The Tools to Life subservient we allege,
The' deadly Cruelty can whet their Edge;
Such we approve the Trade supporting Ore,
The' Avarice purloin' the shining Store:
In Mars's Hand the precious Treasure view,
It spreads all bounteous as the heav'nly Dew.
Shall Nature check the Purple col'ring Globe,
Lest Magistrates shou'd trail the splendid Robe?
Nor beauteous, her adorning Brillants wear,
Lest Gems shou'd deck the Follies of the Fair?
"Ah, Nature! thou hadst scap'd thy only Blot,
"Could Man but cease to be—or hitherto were not;
"Ay, there's the Task, the Labour of our Song,
"To prove that All is right—the Man be wrong."

Technically, Universal Beauty is melioristic rather than optimistic. There is, in other words, room for improvement.

(Improvement, that is, in human thinking and society. Lovejoy, in Chapter IX of The Great Chain of Being, says that Universal Beauty emphasizes the immutability of species and of the world. His point seems to conflict with Brooke's conclusion of progress toward perfection in this world and the next. Lovejoy then admits a reaction to Plenitude expressed by Young and Akenside in favor of progress.)

The poet specifies that a better state is being approached, and much of the poem describes the society of animals, which humanity would do well to imitate. The plenum formarum allows for change in the number of species at any one time. Lovejoy distinguished between the perfect nature that the optimist saw, and the improving nature that appeared to the meliorist, and he listed Akenside with the meliorists—optimists were complacent, but meliorists were hopeful.

With the interpretation of nature according to the coherence of the Chain and the plenum, Brooke takes care of what Fairchild called "diversitarian trends" of his century. Since Plato, God had been so good as to disarm envy by
creating all possible phenomenal creatures. Brooke, while he speaks of nature, is at the same moment inferring deity "from the contemplation of every object." Yet the diversity of nature is backed by the unity of deity:

that Order, which the SUPREME SELF-EXISTENCE, to manifest his own Power, and Goodness, has caus'd to flow through an infinite Variety of Creatures; and yet has founded that infinite Variety, on the Union of a few Principles; which few Principles are further, and ultimately resolvable, and united in HIM, the only ORIGINAL, and SELF ETERNAL PRINCIPLE.

(note to II 255)

Since HE, on whom, the mighty Fabric leans, Th' ETERNAL, from Eternity ordains Variety, which Union must produce; And Order knit consummate, into Use; That DEITY, throughout the World may shine, And Nature's Birth, confess her SIRE DIVINE. (II 255-260)

Hutcheson defines beauty as Uniformity amidst Variety. 59

God's nature, because of natural revelation, need not be expressed in metaphors, but can be stated rationalistically:

Of Reason Thou the Coeternal Cause, Thyself all Reason, and thy Will all Laws; All-reas'ning Will with pow'rful Wisdom fraught, Thy Wisdom, one unchanging endless Thought, Where all potential Natures were survey'd, And ev'n in Pre-existence lay display'd, All, all—Things past—now present—yet to Be, Great Intellect! were present all to Thee; While Thou sole Infinite Essential reign'd, And of Finites th' Infinity contain'd, Ideal Entities in One Supreme, Distinguish'd endless, yet with Thee the same, Thy Pow'r their Essence, and thy Will their Claim. (VI 409-422)

Science, then, explains and exhibits nature, to make all the more obvious the wisdom and planning that harmonized such a
diversity of material creation together. Stevenson, attempting to modernize *Universal Beauty*, cast out the science as "childish," and pictured Brooke as torn between Genesis supported by design and the poet's own intuitive sense of deity behind phenomena. There is little justification for Professor Stevenson's view: Brooke's audience expected to be taught something about natural philosophy, and the diversity of phenomena, plus Brooke's intuitions about God, combine in *Universal Beauty* to express familiar ideas taken from Shaftesbury.

Addison said that God gave man consciousness, sense perception, and intuitive aesthetic judgments in order that man could enjoy nature. From that point, the distance is short to the notion that nature was made for man. Certainly Brooks adopts that position; nature is instructed:

*The Paths of Beauty and of Truth pursue,*
*And teach proud Man those Lectures which ensue.*

(IV 351, 352)

Man is told throughout the poem that he is to adore nature and the creatures on the Chain, and to express gratitude for having perceptions of each. Edward Young took the same view. Expressing the limitless scope of reason and the Christian value of the individual soul, he felt that man could actually rise higher on the Chain because of his faculty of reason. In other words, both Brooks and Young, whom we now term deist and Christian apologist, accepted the Chain and had similar views of nature.
This chapter has attempted to make clear the metaphysical and epistemological content of Universal Beauty. One must look, as Whitehead instructs, for beliefs so common that they were rarely given explicit statement. We rarely speak of ourselves as made of molecules, nor did Brooke speak much of the Chain of Being. It has seemed worthwhile to try to strip away New Critical interpretations of Universal Beauty, and even the studies of deism, in order to demonstrate that the poem was orthodox in its day, and original only in presentation or phrasing; such a point, once made, can be assumed when parallels are drawn between Universal Beauty and the various specific sources from which the materials of the poem could have been taken. Universal Beauty fitted well into its cultural context, if we infer correctly from the lack of stir it caused, and that context must be as important, since the poem is not great, as the poem itself. Miss Scurr is correct in calling the poem deistic, but it apparently was not called deistic in its own day; Professor Stevenson, by quoting out of context, read evolution and mysticism into Universal Beauty, but probably attracted no new reader to the poem. Miss Nicolson appropriately emphasizes science, but since she has had no occasion to outline the general philosophy of Universal Beauty, such an outline has been made here, in accord with the suggestions of Fairchild, who delineated
the religious content of the poem according to the expectations of the 1730's. Whether one regards *Universal Beauty* as a bonepile, or as a Christmas tree, one may find in its mobile couplets an almost endless variety of once important, but now long discarded, notions.
CHAPTER II

Diction, Technique, and Sources

After accusing Brooke of committing several common sins against poetry—abstraction, monotony, technicality, heroic couplet—Miss Scurr dismisses style as the least important part of the poem. She credits Brooke with no stylistic virtue, and although Cosse called the couplets musical and Dobréé admits that they have "a certain variety of movement," her judgment has been allowed to stand. Brooke, she admits, writes with "labourious, mechanical perfection"—his lines are smooth and his rhymes are perfect and unforced, but the result, she insists, is monotony. The devices that Pope used to avoid monotony—alexandrines, shifting accents, and pauses—are used to no advantage in Universal Beauty. Typical eighteenth century habits are censured by Scurr: poetic periphrase, personification of abstract qualities, mythological reference. Miss Scurr quotes a few of Brooke's "musty" adjectives—terrene, pellucid, steeny, beamy, ineffable, ambient, circumfluous, umbelliferous—and then betrays her own preference by commenting upon the adjectives: "Which of them is absent from the poetry of the neoclassicist? or present in the poetry of the romanticist?" Miss Scurr
unfortunately condemns typical eighteenth century devices without explaining their purposes, and without admitting any sort of theory to be behind them.

A defense of Brooke's style should probably limit itself to elucidation. If the poem were great, after all, someone would have said so, and a reader's favorable impressions might not seem unique or eccentric. Let us simply agree, however, with Dobree in calling most of the poem "pleasant reading," and then try to analyze some of the bolder, and seemingly most unaccountable, elements of the verse.

We might start with the assertion that heroic couplets "are out of harmony with the contemplation of infinity," and that Brooke therefore should have taken Shaftesbury's advice to write in blank verse. Without detouring into the rather precious question whether verse-form should be closer to the subject matter than to the tone of the writing or to the mood created, one should note that Thomson was criticized for continually revising the Seasons, supposedly because he had not accepted the yoke of the couplet. No doubt, in the hands of a competent versifier such as Brooke happens to be, the heroic couplet, with its demands of rhyme and meter, oftener coerces a better turn of expression or thought than otherwise.

Brooke's poetic periphrasis may be no better than it should be—"finny Tribes, wat'ry People, feather'd Legions—but it does no good to lose patience and speak of Augustan
poets wagering to replace all straightforward speech with circumlocutions. C. V. Deane suggests three types of circuitous phrase that can be valuable. There are, first, periphrases which "evoke a sense of friendly companionship between man and nature," a sort of pathetic fallacy that generally depends upon the context for effect; examples are from Universal Beauty:

- smiling liquors (flowing streams)
- fervid exhalations (water vapor)
- airy wantons (insects)
- sylvan leach (roe which selects medicinal bark to heal its wounds)
- little virtuoses (bees)
- exiled crowds (bees which seek a new nesting place)
- subterranean tribes (wasps)
- innoxious cottagers (mice)

Deane calls his second group "accurate circumlocutions" which describe with veracity a feature, or the disposition, of the object:

- glinting swarms (insects)
- limbeck (mountain upon which water vapor condenses)
- humid mirrors (still waters)
- struggling fountain (stream blocked by snow)
- sinister cavern (left ventricle of the heart)
- visionary net (retina)
- plumy sail (bird wings)

The third group consists of visually suggestive periphrases:

- gilded squadrons (insects)
- azure concave (sky)
- azure tribes (blue microbes on plums)
- sleepy surface (still waters)

An Augustan poet who described familiar objects could use the poetic periphrase to humanize, visualize, or elucidate the object; he tried to bring the object to the viewer, with
perhaps an explanation why the viewer should take interest. A consciously romantic poet would express his personal reactions, perhaps, but would reject the familiar periphrase for the very reason of not wanting to explain the object in any familiar way. The neo-classicist believed in some objective standard—"nature" might be an aesthetic norm as well as be the outside world. The romantic knows that the nature he sees is his alone, but the classicist is likely to think that the nature he sees ought to be seen in like manner by any reasonable man. Poetic diction, at any rate, could introduce familiar topics easily, and could contribute intellectually, visually, and aurally to the description in which it appeared. In the following lines, for example, a neat, well-conceived and fully realized image of a bee building its hive is made possible by the poetic comparison which is too exact to be a conceit:

How first appears the rough proportion'd Frame,
Rough in the Draught, but perfect in the Scheme;
Then lo! each little Archimedes nigh,
Mote's ev'ry Angle with judicious Eye,
Adjusts the centring Cones, with Skill profound,
And forms the curious Hexagon around.

(VI 201-206)

In a universe where everything is fit and all things imply deity, any object deserves the best poetic treatment; Brooke's poetic periphrases may be notable for being frequently employed upon inanimate objects.

Miss Scurry insists that poetic periphrase makes Brooke prefer the general to the specific, and she noted that
Thomson lists eleven species of birds, while Brooke refers only to the warblers of the wood. Yet Brooke does not mean to take any full inventory, and the virtues of his method—certainly not differing from Thomson by its use of poetic diction—might be illustrated by the passage quoted in the first chapter of this study, the passage that Bernbaum headed, "Promptings of Divine Instinct:"

```
Dispers'd thro' ev'ry Copse, or marshy Plain,
Where haunts the Woodcock, or the annual Crane,
Where also encamp'd the feather'd Legions spread,
Or bathe incumbent on their oozy Bed.
```

"Annual" gives an exact, yet graceful, description of the Crane in a word; the second line quoted would charm the verse of any age. The third line quoted moves in typical Augustan fashion from the specific to the general. Only in the general could the objective standards be manifest, and eccentricities be avoided. Woodcocks and cranes are familiar enough, and the annually returning crane certainly would catch the reader's eye, ear, and sense of recognition. Yet Brooke, immediately after securing attention with the striking line, moves from woodcocks and cranes to the feather'd Legions, meaning that he has something to say about all birds in every copse or marshy plain. The anthropomorphic comparison of birds to legions which move together, concertedly, implies the kinship of humanity to other living things. Brooke then spells out the birds' willingness to receive the promptings of divine instinct; again a poetic periphrase has carried the
verse in a new direction—from the specific to the general, and then to the peculiar action of the passage. Perhaps the last line quoted, in which birds are playing in the mud, strikes one as ludicrous, but that is, after all, what birds do. This long paragraph sounds, of course, like the New Criticism which was criticized in the first chapter of this study for being irrelevant; here, however, we try to understand the poet's technique and subject, not try to read modern ideas into the intellectual content of an Augustan poem.

When the periphrase has put the reader in mind, not of individual woodcocks or cranes, but of a mass of birds that could be thought of as typical of genera in their reception of divine impulses, or as more appropriate to the theme than individuals. The birds act together instinctively:

The brimming Lake THE SMILING PRESENCE fills,
And wave's the Banners of a thousand hills,
THOU speed' st the Summons of THY WARNING VOICE;
Wing'd at THY WORD, the distant Troops rejoice,
From ev'ry Quarter scour the Fields of Air,
And to the general Rendezvous repair;
Each from the mingled Rout dispersing turns,
And with the Love of kindred Plumage burns.
(VI 365-372)

Addison mentioned the intuitive beauty of opposite sexes, and Brooke states accurately that birds are attracted to certain shapes and colors of plumage—the bodies and sense organs of the birds act in a quite mechanical manner, under the divine impulse. For what it may be worth, Brooke's comparison of the birds to a military unit makes what a
modern critic could term perfect unity of image and thought; the exactness of the description, without improbable flights of fancy, is certainly consistent with scientific didacticism.

Miss Scurr points out at least one fault in *Universal Beauty* that, if indeed it is necessarily a fault, cannot be redeemed. Brooke puts no human element into *Universal Beauty*—no people, no details from normal living, no reference to humanity except in satire against atheists and politicians. The beauty of the universe, or rather, much natural detail, is presented objectively, to be received intellectually by the reader and then translated into emotion. Several times Brooke consciously reminds the reader that he should express gratitude in real life for what has just been described in verse. The discussion of poetic periphrasis in this study attempted to demonstrate that certain elements in the poem have a closer human reference than might superficially be suspected. Yet the periphrases do not substitute, say, for Celadon and Amalia, or for Damon and Musidora. There is no point, however, in accusing a writer of not writing something that another writer had already written. In general, *Universal Beauty* is too tightly organized to allow the interludes the place that they occupy in the *Seasons*. When Brooke compares nerve impulses to the circulation of the blood and then to trade winds over the globe, and then draws a physico-theological moral concerning the relativity of size in the physical world as contrasted to the absolute size of deity,
there is no room in the discussion for pleasant pastoralism. If Brooke's intellectual position were still engrossing, the lack of melodrama might not be felt at all, although one might always welcome a peek at Musidora. Brooke wishes humanity to realize its kinship to lower animals, and to associate the activities of the minutely described insects, for example, with similar human activities on a larger scale; for conciseness, perhaps, Brooke does not describe the human activities. Miss Scurr concludes: "See, think, then feel! he seems to be saying. In this respect, Universal Beauty is very different from his novels, of a later period." So far as pastoral interludes are concerned, Dobrée claims that they are no longer interesting even in the *Seasons*. Neither, he goes on to say, are the set pieces or the landscapes still as exciting as they once were. Perhaps Dobrée is unfair in restricting his interest. He recommends in Thomson "occasional lines or short passages" which unconsciously (since some of them were revised away) lift "the shutter of intensely imaginative vision." The result of Dobrée's emphasis is an extraction of poetical touchstones from the *Seasons*; from *Winter*, 1726, Dobrée offers:

the Bear
Rough Tenant of these Shades! shaggy with Ice
And dangling Snow, stalks thro' the Woods, forlorn.

In *Spring*, 1744, Burnet's *Theory* puts the earth under the Deluge:
Till, from the centre to the streaming clouds
A shoreless ocean tumbled round the globe.

Intensely imaginative lines may, of course, be found in *Universal Beauty*, even though the promise of such lines is not likely to rouse enthusiasm for a scientific poem. Generally Brooke's poetical flashes are more to the point of his argument than Thomson's—as we said, Thomson occasionally took out the good lines for the sake of scientific accuracy. Perhaps more interesting is the fact that Brooke employs relatively little visual imagery; in his scientific descriptions he makes intellectual comparisons and abstract arguments, but there seems to be surprisingly little in the way of colors, shapes, or sizes. Perhaps a paucity of visual imagery in all his writing, if such paucity really exists, would indicate that the poet's eyesight was poor, or that he was color blind. The lines offered here as touchstones "of intensely imaginative vision" reflect Brooke's usual perception which is not visual, but tactile. A fine couplet, perhaps the best in the poem, presents in a tactile image a physico-theological speculation about what would happen if the earth did not rotate:

```
Not self revolv'd, throughout its airy Race,
It might expose one constant sultry Face,
Draw its Antipodes with endless Night,
And curse with Fire the restless Sons of Light.
(I 278-282)
```

"Restless" seems to be a fitting word. Brooke has stated
that all senses are functions of touch; so far as hearing is concerned, nerve impulses wait about the ears, respond to "each sonorous Undulation,"

And thrill in Rapture to the mental Seat.

"Thrill," according to the Oxford English Dictionary, was used at least as late as 1700 to mean "pierce."

Similar to Miss Scurr's complaint about the absence of living people in Universal Beauty was her further complaint against the personification of abstract qualities, especially of Nature. Of course, such personification was common enough, but Brooke's use of it, although sparing, is admittedly undistinguished:

Peace, Pleasure without End,
Thro' Mansions numberless their Guests attend.

It should not pass notice, however, that Brooke indulges in what Jean Ingström would call pictorial description, that is, description of a scene from a picture or a statue, or a description which is highly visual and nearly static, with motion reduced—a description composed, in other words, as a picture. Many other eighteenth century verse descriptions simply present the leading features from a print or statue or landscape garden, and rely upon the reader's familiarity with the work of art to fill in the sparely presented imaginary scene. The advantage of poetry was supposed to lie in the poet's having more choice of what
to describe—he did not need to fill a canvas from corner
to corner with unimportant details. Both poets and painters
were expected to imitate the nature available to the senses.
As readers of poetry became more and more familiar with
prints and original works of art, the poetry, which often
chose themes similar to those of art, became less detailed,
since they were able to depend upon the mere suggestion of
something familiar. Thomson in one place took no chance for
recognition to fail; Musidorra has suddenly realized that
someone has been watching her bathe in the stream:

With wild Surprise,
As if to Marble struck, devoid of Sense,
A stupid Moment motionless she stood:
So stands the Statue that enchants the World,
So bending tries to veil the matchless boast,
The mingled Beauties of exulting Greece.12

A note calls the Statue "The Venus of Medici." Such precise
connection to painting, such a plainly iconic description,
is, needless to say, uncommon in Augustan verse. Common
enough, however, is the pictorial description which may
be more or less taken from a specific artifact.

Brooke hails the muse of the sky and astronomy in
pictorial fashion:

Venus Urania! born the Babe of Smiles,
When from the Deep thy bright Emergence sprung,
And Nature on thy Form divinely hung,
Whose Steps (by Love's and Graces list) advance,
And laughing Hours lead on the sprightly Dance;
While Time, within eternal Durance bound
Harmonious moves on golden Hinges round—
Such, Goddess! as when Silence wondering gaz'd,
And ev'n Thyself beheld Thyself amaz'd;
Such hap'ly by that Coon Artist known,  
Seated apparent Queen on Fancy's Throne,  
From thence thy Shape his happy Canvas blest,  
And Colours dipt in Heav'n, thy heav'nly Form  
confest---

Such, Goddess! thro' this virgin Foliage  
Universal Beauty] Shine,  
Let kindling Beauties glow thro' ev'ry Line,  
and ev'ry Eye confess the Work divine [nature].  
(I. 9-24)

In another place we learn that, "Time leads on the smiling  
Hours around."13 The "Coon Artist," Brooks explains, is  
Apelles, and from that hint one may elucidate Brooke's  
pictorial hailing of the muse. No work of Apelles has  
survived, but the tributes of Pliny, Petronius, and Lucian  
establish him as the foremost artist of antiquity, reputed  
to have duplicated nature exactly with only four colors on  
his canvas. According to The Oxford Companion to Classical  
Literature, "The distinctive quality of his work was grace  
and charm, coupled with ease of execution. He painted  
mainly portraits, but his most famous picture was that of  
Aphrodite Anadyomene, wringing from her hair the water of  
the sea from which she had just risen."14 The information  
comes originally from Pliny, the story comes originally from  
a "Hymn to Aphrodite." Brooke could, of course, have  
taken his description from either literary source, and  
certainly the myth of the birth of Venus would have been  
familiar to him. But the Italian poet Poliziano wrote his  
Giostra from Homer, and Botticelli painted his Birth of Venus  
from the poetical description.15 Reversing the inspiration,  
Brooke certainly could have taken his description from a
painting, if not from Botticelli's (since Botticelli was not cultivated in Brooke's time), then perhaps from Titian's *Venus Anadyomene*, or Rubens' *Birth of Venus*, a famous design on a dish. There is, as a matter of fact, a *Birth of Venus* painted on the ceiling of the Wilton House outside Salisbury, the home of the Earls of Pembroke, by Lorenzo Sabbatini, which is described as a painting of Venus, just emerged, surrounded by little figures. Brooke may certainly have seen some picture of the birth of Venus, and his Loves, Graces, Time, and Hours must be visually conceived in the manner of the auxiliary nudes or the little cherubs that decorate sixteenth and seventeenth century paintings; Brooke did not need, in other words, to describe loveliness or gracefulness because his readers knew what a Grace looked like. William Congreve, in his translation of the "Hymn to Aphrodite," reports:

> The ready Graces wait, her bath prepare, And oint with fragrant oils her flowing hair.

In tone, Brooke's description seems to recall visions of a different theme, the Triumph of Galatea, which inspired populous, exuberant, beautiful paintings by the great painters most familiar to the Augustans—Carracci, Poussin, and Raphael. At any rate, the poets Brooke and Congreve versify according to what Jean Bagetrum calls the pictorial method: a nearly static scene, not necessarily visual or sensuous, is presented with references to devices familiar
in painting—Graces and Hours and so forth.

Admittedly pictorial elements do not take up much space in *Universal Beauty*. There are, however, a few instances worth noting. Speaking of the atmosphere, Brooke explains:

- For Nature how the smiling Glass expands;
- Narcissus like, how beauteous Nature stands,
- Self-lov'd within the splendid Mirror shines,
- But self-enjoy'd; nor like Narcissus pines.

(II 37-40)

In this passage Brooke has taken the pictorial method to make a classical allusion that expresses the scientific theory that light made visible only what was surrounded by air. Nature itself is viewed in the next passage as if it were a statue reflecting light unevenly:

- while he turns,
- Views Nature round, and still with Rapture burns;
- Now in this Light the Charm he surveys,
- This Light he hopes her ev'ry Charm displays;
- But here unthought of Charms discover'd lie,
- And flash new Wonders on th' admiring Eye.

(II 5-10)

Light, a painter, lends its constituent colors:

- In Prospect wide, th' illustrious Work [nature] display;
- And gem the Pavement of the Milky Way;
- Make Grace from Use, and Use from Beauty flow;
- With florid Pencil, shade the Jasper Bow.

(II 75-78)

In this passage, Brooke uses the pictorial method to describe the prismatic colors of light. In general, the point of mentioning pictorialism at length, even though there are few elements of it in the poem, is to demonstrate.
that Brooke's personifications, classical allusions, and some technical description are not so dry, abstract, or empty as they have at times been considered.

The hailing of the muse is one of several hundred epic devices in *Universal Beauty*. These devices, let it be said, are self-conscious and arch, and they by no means imply that the poem is some sort of physico-theological epic of creation—Providence is not included in the epic devices here. The devices, at any rate, are interesting. Insects coming from cocoons don armor:

Gem'd o'er their Heads, the lines of India gleam,
And Heav'n's own Wardrobe has array'd their Frame;
Each spangled Back bright sprinkling Specks adorn,
Each Plume imbibes the rosy tinctur'd Morn.

**Epic similes occur, as when, for example, a queen bee leaves a hive to find a place for a new hive:**

As when from Tyre imperial Dido fled,
And o'er the Main her future Nation led;
Then stay'd her Rest, of Africa's mated Land,
And in Strait Bounds a mighty Empire plann'd:
So works this Rival of the Tyrian Queen;
So founds, and models with assiduous Mien,
Instructs with Little to be truly Great,
And in small Limits forms a mighty State.

**Deities are propitiated, when plants "perform pagan Rites:"**

Here, winding to the Sun's magnetic Ray,
The solar Plants adore the Lord of Day,
With Persian Rites idolatrous incline,
And worship 'towards his consecrated Shrine;
By South, from East to West obsequious turn,
And mov'd with sympathetic Ardours burn.
To these adverse, the Lunar shafts dissent,
With Convolution of opposed Bent;
From West to East by equal Influence tend,
And towards the Moon's attractive Crescent bend;
There, nightly warship with Sidonian Seal,
And Queen of Heaven Astartes' Idol hail.

Professor Fairchild says of Universal Beauty: "It is, to be sure, loose in structure and redundant in style... Despite his enthusiasm for nature, Brooke does not look at anything very closely; his poem is versified oratory." Miss Scurr had also argued that Brooke had "little of accurately observed detail," a strange comment upon the most detailed scientific poem in an age of detailed, scientific poems.

In Universal Beauty science gives subject matter to even the most vivid epistemology or pictorialism. On the matter of oratory, however, no one could deny Fairchild's perspicuity. Brooke talks constantly—to muses, to nature, to deity, to the reader, and even to his own poem. Moral reminders are offered periodically. Whenever possible, the poet's tone is enthusiastic. Information is given in lecture style, and seldom, as we have noted, does Brooke present a static picture; focus shifts rapidly from one thing to another, always carried along by the smooth rhetoric of the couplets. And, after all, the main purpose of Universal Beauty is persuasive rather than descriptive. At any rate, it is easy to believe that Brooke delivers a speech or a sermon, supposedly borne upon the wings of verse and virtuosity.

Pursuing in this study the notion of oratory a bit
further, *Universal Beauty*, in general, makes a good aural impression. Any part of the poem reads well. Certainly no one could catch the details that hide too often behind a screen of periphrases, but nearly any scientific passage in the poem reads sonorously, or lightly, or wistfully, or cheerfully—nearly any part, that is, seems tuned to the ear of the listener—apart from whatever sense the passage is supposed to make. The point is not that the lines have careful vowel and consonant patterns in the manner of Tennyson or of Pope, but rather that the lines usually please the ear. Brooke is said to have had a melodious voice, and one should imagine that his favorite original poem sounded melodious when he read it aloud. Perhaps the interest in the effects of different vocal sounds prompted Brooke not to concentrate upon visual matters aside from the common pictorialism.

The aural emphasis in *Universal Beauty*, although it certainly should not be thought more important than the scientific and moral theory to the poet, seems to dictate certain habits apart from the expression of the central theme. One of Brooke's most regrettable tricks is the endless fabricating of names for deity. Here, for example, is an especially vacant passage:

THOU SOLE PREROGATIVE, SUPREME OF RIGHT,
DEEP SOURCE OF PRINCIPLE, AND LIGHT OF LIGHT,
WHOSE IS WELL BE, WHOSE WAS EVER WAS,
OF SELF ESSENTIAL ESSENTIAL CAUSE!

(IV 75-78)

The Miltonic echo is not important here. Perhaps, with an
effort of historical imagination, one may suppose that for Brooke the lines had some intellectual content aside from orthographical piety toward a hypothetical abstraction. None the less, despite the lack of sensuous content, the lines burst suddenly into the poem, and are somewhat surprising and effective, if they are aurally rather than intellectually conceived—heard rather than thought about. Most of the other names for deity serve similarly; they are less accurate or imaginative designations than honorary titles of address—PRINCE ABYSS, INCOMPRESSIBLE, ABNOMIA, ALMIGHTY'S FORMING HAND, DERIVATIVE GREAT AUTHOR SOLE, ETERNITY OF BLISS, CENTRAL MAGNET, and so on. Extending the point concerning the importance of an aural conception for certain otherwise hopeless elements in the poem, there should be included in the list of weak phrases that sound good such tautological periphrases as,

- Flint's impervious Rock (flint)
- Julian Hero (Julius Caesar)
- Newtonian Rival (Newton)
- Sulfurous Foam (sulfur).

One aspect of Brooke's diction remains to be mentioned, and that aspect is the most important—scientific exactness. One may feel sometimes that Brooke is trying to make verse, like eighteenth century prose, a vehicle for conveying scientific information. Sometimes, of course, he does not try—magick Glass is no exact term for the lens of the eye, although the comparison to a magnifying glass may have been
thought preceptive at the time. But when Brooke is not being fanciful, his diction is obviously chosen for scientific exactness. Examples of precise diction will appear throughout these chapters, but here are examples of what to look for; he speaks of bees drinking nectar:

Imbib'd recluse, the pure Secretions glide,
And vital warmth concocts th' ambrosial Tide.

(VI 75, 76)

The lines describe exactly the actions of a bee inside the bell of a flower: the bee sucks juices that have not been exposed to air or to other insects, and the bee's stomach concocts—an exact cooking process—nectar into honey. The stomach is called a "nectaricus Still." In another place we learn that after an earthworm bores a hole, "all the worm insinuates through the Pore," an exact description of physical motion. Insect wings are "bright Indoreament," that is, something bright loaded upon their backs, when, for example, beetle wings are drawn tight to form the armored appearance of the beetle crawling upon the ground. Many times an apparently high-flown or eccentric word will be precise phrasing of some physical action rather than mere Latinism.

In general, Brooke is an individual and occasionally, considering his material, an effective stylist. His individuality, however, implies that between Brooke and his sources of scientific information there may be few verbal parallels. Such parallels are, in fact, not frequently
encountered in _Universal Beauty_, although it is a matter of judgment how any parallel should be interpreted. When commonly accepted information is phrased in terms similar to some widely read book of the time, it is natural to assume that Brooke had read the book, or heard it talked about. The influence of Shaftesbury is inferred from verbal parallel, from philosophical position, from comparison with other Shaftesburian poets, and from secondary studies that demonstrate Shaftesbury's growing influence in the 1720's, yet Fairchild warns that the influence was probably indirect upon Brooke, coming through Pope, Cooper, Harris, and especially Needler--Brooke may not have wanted to read the works of so notorious a heretic. Some of the scientific information can be trace to definite sources.

Brooke, although his explanatory footnotes take up as much space as the verse, does not reveal his sources, except in one reference to Pliny's _Natural History_ and Derham's _Physico-Theology_. Other scientific poets, for instance Richard Jago and Moses Browne, frequently cite current authorities on matters of science, and often debate the merits of the authorities. As with Jago, they choose sides intuitively and at random. Occasionally Brooke's footnotes are closer than his verse to a probable source. Unfortunately there is apparently no extant catalog of Brooke's library. _Brookiana_ records only the
following comment of a visitor in 1775:

The library was small but well-furnished with the best English and Roman Classics, and a small shelf of the most pious books in our language, such as the works of the author of the "Whole Duty of Man," Dr. Watts's and the works of Bishop Kenn, with the following distich on the fly-leaf, in a neat female hand, probably by Mr. Brooke's mother:

"My son, peruse the works of pious Kenn,
"The best of bishops, and the best of men."

The book named seems to be *The Whole Duty of Man According to the Law of Nature*, by Samuel von Pufendorf, the second edition of which was an English translation of 1698. The collection outlined above does not necessarily lack the works of physico-theology that are important to *Universal Beauty*—the writings of Derham, Ray, Whiston, Woodward, Nieuwentiätz, and Pluche, and the virtuosos who reported in *Philosophical Transactions*. *Physico-Theology*, an undoubted source, was used as a textbook, and Brooke probably read it during the 1720's when he was in school. Pluche's *Spectacle de la Nature* seems to be a likely source, especially for entomology. An English translation of the first volume, on insects, was available in 1736, perhaps before Brooke had completed the last two Parts of his poem. He might have read Pluche in the original French. At any rate, *Universal Beauty* expresses Continental notions concerning gravity and vortices that Brooke did not get from any of the English physico-theologists, and Pluche would seem to be the most popular Continental voice in England at the time. Nieuwentiätz
was purely Newtonian.

The physico-theological books of the period constitute what a historian of important ideas in science calls "ephemeral literature." Brooke may have looked into manuals of gardening or microscopy, or into treatises of aesthetic theory; he reflects ideas from definite sources, whether he read them or not. The unavailability of Hales' *Vegetable Staticks*, 1727, regrettably forbids proof of the suspicion that Brooke used the book to describe the feeding and reproduction of plants. It is generally assumed that scientific passages have definite sources; Brooke, after all, was no independent researcher, and the arrangement of his details corresponds to arrangements in the works of the harmonizers of science and religion. Only a relatively small part of the science in *Universal Beauty* could have come from *Physico-Theology*. Comparison with other poems of the type indicates that Brooke was actually more interested in harmony and beauty than in scientific accuracy, perhaps his saving grace as a poet. Thomson, for example, revised his passage on the water cycle when Pluche disproved the percolation theory, but Brooke left *Universal Beauty* unaltered, and took up political debate in drama and verse. *Universal Beauty* remained its author's favorite original work, his *opus palmarium*.25
CHAPTER III
Aesthetic Concepts

The Augustan mind took for granted at least two more or less opposed aesthetic concepts. First, and basic to discussion, was the classical idea of beauty—symmetry, order, smallness, dependence of parts, the apprehension of all which brought feelings of complacency. On the other hand, there was sublimity, unfortunately associated with Longinus and rhetorical effects, but made significant to the eighteenth century by foreign travel and the discoveries of science. Sublimity, whether considered distinct from beauty, an anti-beauty, or a higher type of beauty, resided in whatever was great in size and unlimited, and whatever could produce feelings of awe or terror or religious transport. Religion was called the true source of the sublime, although science and travel prompted Augustans to compare religious sublimity to the sublimity of tempests, volcanoes, outer space, and the Alps. The development of sublimity from the contemplation of natural phenomena is traced by Marjorie Hope Nicolson in Mountain Gloom and Mountain Glory: The Development of the Aesthetics of the Infinite.

Miss Nicolson says that Shaftesbury considered sublimity
to be a higher type of beauty—implying a god of benevolence—but, because sublimity was associated with longinian pomposity, Shaftesbury did not separate sublimity drawn from nature and religion, from beauty. Addison, of course, distinguished forthrightly between the "fair" and the "great," but did not use the word "sublime." Brooke follows Shaftesbury, however, and we shall see in *Universal Beauty* a hazy intermingling of the two concepts of aesthetic pleasure—beauty and the sublime.

In footnotes Brooke continually equates beauty and "fitness." He says in Part V, "there is a present fitness or Beauty sufficiently obvious in Things, to demonstrate an OVER-RULING WISDOM." "Fitness" must of course be interpreted broadly enough to include the perfection of the universal— the harmonious working-together of all parts of nature, animate and inanimate, for the general good of all. Scientific observation offers special proofs of beauty: for Brooke both "Sense and Science" come from God and are able to perceive as much of true reality as God knows to be good for us; science is disciplined sense, not eccentric hypotheses.

Hutcheson defined beauty as *Uniformity amidst Variety,* and one finds the schematic definition echoed in *Universal Beauty*:

\[ \text{Th' implicit Discipline to Order tends,} \\
\text{And still in regular Confusion ends.} \]

(I 11, 112)
'T is Order above Rule, that guides the Plan.

(II 315)

Brooke ends **Universal Beauty** with the statement that God has made the universe according to the classical ideal of the beautiful dependence of parts:

Hence endless Good, and endless Order springs, Hence that Importance in minutest Things, And endless hence Dependence must endure, Bless'd in his Will, and in his Pow'r secure.

(VI 451-454)

Brooke's concept of beauty goes beyond the dry definitions, however, and when it does, it approaches a concept of sublimity. But **Universal Beauty** is by no means what the 1750's would have called a sublime poem. As an example of the popular, or Gothic, sublime, here is Thomson's famous advice to Mallet:

My Idea of your Poem is a Description of the grand Works of Nature, raised, and animated by moral, and sublime, Reflections. Therefore, befor You quit this Earth, You ought to leave no great Scene unvisited: Eruptions, Earthquakes, the Sea wrought into a horrible Tempest, the Alps amidst whose amazing Prospects, how pleasing must be that of a deep Valley, covered with all the tender Profusion of Spring. Here if You could insert a Sketch of the Deluge, what more affecting, and noble? Sublimity must be the Characteristic of your Piece."

Miss Nicolson points out the constant use by the sublime poets of such Words as sacred, terror, power, severe, delight, elate, dread, astonish, and horrid, words that occur seldom in **Universal Beauty**, and usually in connection with deity or its designs. Although Brooke carefully avoids the naturalist melodrama that Mallet put into *The Excursion*, he does mention
sublimity several times. Miss Nicolson finds that Augustan poets, following Milton, associated sublimity with God, space, and great terrestrial phenomena. Brooke seems typical enough, then, when he associates sublimity with space in contrasting sublimity and beauty:

Just so as when sublime the fancy soars,
And Worlds on Worlds illimited explores;
No End of Thought, or Time, or Space is found,
And Each immense, are Each, in Either drown'd:
So when the Mind to central Beauty tends,
And strict to fix some certain Period binds,
In vain its ultimate Contraction's sought,
And still delusive, shuns the lab'ring Thought;
While THAT IMMENSE! whence ev'ry Essence came,
Still ENDLESS, reigns in each minutest Frame.

A note explains that "central Beauty" refers to animalcules.

Sublimity, as we have pointed out, was thought to have its final cause in religion, or, as Addison said, in God's forming the mind to admire deity. Brooke points out sublimity in the over-all designs of Providence:

Mean while, Earth's minit Populace inspect,
With just Propriety of Beauties deck'd;
Concommate Each, adapted to its State,
And highly, in the Lowest Sphere compleat.
Sublime the Theme, and claims th' attentive Ear,
Well worth the Song, since worth Th' Almighty's Care;
Since ev'n the Smallest from the Great One springs,
Great and Conspicuous, in minutest Things.

Augustans thought that deity, seriously considered, by definition lent sublimity. Although most of Brooke's addresses to deity are too verbose and preposterosus, even if sublime, to matter, the following passage expresses the nature of deity by means of subdued paradox:
THUS Beauty, mimick'd in our humbler Strains,
Illustrous, thro' the World's great Poem reigns.
The ONE grows sundry by creative Pow'r;
Th' ETERNAL's found in each revolving Hour;
Th' IMMENSE appears in ev'ry Point of Space;
Th' UNCHANGEABLE in Nature's varying Face;
The INVISIBLE conspicuous to our Mind;
And DEITY in ev'ry Atom shrin'd.

The passage sounds mystical, but Brooke's consciousness of size and time comes from the discoveries of the telescope, the microscope, and the new geology. Brooke speaks of beauty, but carries it close to sublimity by associating it with deity.

Brooke also associates sublimity with light. Miss Nicolson says, in Newton Demands the Muse, that poets associated light with sublimity and colors with beauty. Addison, citing Locke, said that colors were not a part of matter, but were given by Providence to eyes in order to please mankind. Light, however, seemed inexplicable by philosophy or science—for one thing, it travelled too fast; its "boundless Latitude" made Brooke simply ascribe light to God and forget the question of rational explanations—corpuscles, impulses, and so forth. Brooke ordinarily gives colors short change in Universal Beauty, for though he speaks many times of "purpling" objects, he seldom offers variegation. Here is an example of Brooke's usual treatment of colors:

First to the Deep he sends his eldest Born [light],
Whose rosy Progress, paints the purpling Morn;
Brooke associates light with sublimity and religious feeling in the following couplet:

In awful Transport, the Youth admires,
While Light from Earth the dazzling Shape aspires.

(II 85-86)

Then, bringing together several threads of sublimity, Brooke speaks of deity in terms of illimitability and light:

Th' ETERNAL SPRING! whence streaming Bounty flows;
Th' ETERNAL LIGHT! whence ev'ry Radiance glows;
The ETERNAL HEIGHT! of indetermin'd Space;
The ETERNAL DEPTH! of condescending Grace.

(V 3-6)

Brooke sums up the aesthetic philosophy of his poem by praising science in a beauty-is-truth passage:

Our transient Optick o'er the Surface plays,
And Nature's superficial Mien surveys;
But rare with deeper Inquisition prays,
Where Beauty's wrapt, recluses from vulgar Eyes;
Essential, sits on Truth's eternal Throne,
And universal, reigns o'er Worlds unknown.

(III 165-170)

Universal Beauty demonstrates, Brooke hopes, the harmonious working of the physical universe for the benefit of all its inhabitants. Beauty, because of the classical tradition and the formulations of Addison in his "Pleasures of Imagination" papers, needed no definition. The poet seems not to have distinguished sublimity arbitrarily in Universal Beauty; like Shaftesbury, Brooks apparently expanded beauty to include its higher part, sublimity. The Gothic sublime is seldom found in Universal Beauty; even the passages on deity
are empty of terror and transport, if not of respect and occasionally wonder. Sublime feelings do not ordinarily come from Brooke's rationalistic verses, although sublime topics such as light and space are treated as beautiful, with recognition, however, of their special qualities that were commonly called sublime.
CHAPTER IV
The Water Cycle

Brooke begins his long passage on the water cycle with an exact account of the theory of percolation:

Low as the Sea's capacious Basin sinks,
The thirsty Soil th' incumbent Ocean drinks;
Whence, thro' the Globe diluting Liquors pass,
And circulate, as in our smaller Mass;
The Salts with curious Percolation, strain,
And kindly thro' the porous Strata drain,
Attracted, in a Maze of Tubes exhale;
(A stiff'ning Clay cements the spacious Vale)
From whence oppos'd, the Mountain's Height they claim,
And thence, perpetual pour the winding Stream;
Or loiter, in perennial Fountains rise.
Nor dread the Star that fires Autumnal Skies.

(II 131-132)

A footnote explains that subterranean waters pass through the globe as liquid passes through a piece of sugar; salts are separated by filtration, and the rising waters are opposed by the hard clay topsoil which diverts the waters up inside mountains, from which the purified waters burst forth as springs. Physico-Theology discusses the types of strata in which wells may be dug, and says, "But for Clay, they never find Water therein, if it be strong, stiff Clay."

Furthermore, Barham continues, "That Springs have their Origins from the Sea, and not from Rains and Vapours, among many other strong Reasons, I conclude from the Perennity of divers Springs; which always afford the same quantity of
Brooke's comparison of the earth to the microcosm—
diluting liquors pass,
And circulate, as in our smaller mass—
was ordinary enough for a time that called for simple,
universal principles to govern both man and nature; in
Part IV (163-204) he compares the human circulatory system
to trade winds. The "Maze of Tubes," besides echoing
Lucretius and referring to the microcosm analogy, also
specifies that we call capillary action, as the waters
rise by attraction and atmospheric pressure.

"The Star that fires Autumnal Skies" is Sirius, the
Dog Star, which was thought to cause lowering skies and
storms when it rose in the day with the sun. Reference
to Sirius commonly hot, dry, weather; Brooke says in Part
IV (317), "Ardent Sirius shoots a thirsty Ray," and Pope's
Iliad describes the sun shining on a shield:

Th' unwearied blaze incessant streams supplies,
Like the red star that fires th' autumnal skies.

William Broome, in his paraphrase of Job 35, complements
Brooke's percolation passage:

Say, can thy Voice when saltry Sirius reigns,
And Suns intensely glowing cleave the Plains,
Th' exhausted Urns of thirsty Springs supply,
And mitigate the Fever of the Sky?

Brooke, it seems, has put the moral of the passage in the
last two lines, formulated in Greek terms of familiar
erudition. For Brooke, "perennial Fountains rise" by
percolation and attraction perpetually, with the possible opposing natural forces held in good check.

In spite of Derham's affirmation, by the 1730's the percolation theory had fallen upon evil days. Nieuwentijdt's *The Religious Philosopher* (1724) attacked percolation in order to champion Balley's evaporation theory, and in so doing denied each of Brooke's assertions: sand limits the sea and does not absorb it; rain and vapors account for springs; and, strata are unnecessary for filtration, because water vapor leaves behind all salts. Brooke himself, discussing the ocean, had actually said much the same thing as Nieuwentijdt:

> The spacious Beds the liquid Realms contain,  
The seasing Tinctures purge the foamy Main;  
But pois'd by Balance of eternal Weight,  
The Salts, perpetual hold their wat'ry Seat.  

(II 89-94)

Thomson in 1730 described percolation in *Autumn*, but, after reading Pluche's *Spectacle de la Nature*, he added, "hence this vain / Amusive Dream!" and then added a passage on evaporation. Miss Collier's *Cosmoconies of Our Fathers* indicates that all seventeenth century writers on natural subjects accepted some theory of subterranean waters. Hidden waters, either subterranean or celestial, accounted for the Deluge. Burnet's *The Theory of the Earth*, which as everyone knows insisted that God made a smooth earth (a Mundane Egg watered from beneath by vapors--whose shall, after Adam's fall, dried and cracked, and fell into pieces
beneath a torrent of underground seas), provoked such protest from both natural philosophers and divines, that writers feared to suggest rational accounts of the Flood. The water cycle in Blackmore's *The Creation*, Cooper's *The Power of Harmony*, Browne's *Essay on the Universe*, Brooke's *Universal Beauty*, and Jago's *Edge Hill*, is, as in Derham and Ray, offered without any divine historical comment, even though percolation and underground waters remain. Thomson, at the end of his passage criticizing percolation, muses upon the effort of a previous generation to associate percolation with the Deluge, and he implies that there is a weakness of logic in the effort:

Old Ocean too, suck'd thro' the porous Globe,
Had long ere now forsook his horrid Bed,
And brought *Deucalion's* watry Times again. 5

It may be doubted that Brooke wrote his water cycle passage with *Phylos-Theology* opened to appropriate pages. Verbal parallels are hard to find, and appear more frequently between Brooke and Halley in the passage on evaporation. None-the-less, both Derham and Brooks try to demonstrate design in the placing of continents, mountains, and oceans for the convenient and necessary cycle of percolations and vapors. Derham, the same as Ray, Woodward, Whiston, Keill, and Cheyne, addresses his chapter to Burnet, intending to prove that oceans, continents, and mountains were designed on purpose, and were not just the artless rubble of a fallen world. Percolation explains the uses of oceans and continents;
evaporation more nearly explains the uses of mountains. Brooke, at any rate, takes over the scientific account and the inferences of harmony, but leaves behind the Flood and the Burnet controversy.

It has been suggested in this study that Brooke wants a scientist to observe carefully, and not to theorize; he might likely have wanted a divine not to depart from revelation and pieties. Simple principles and general laws should be obvious behind the apparent diversity of nature. Without our trying to see too far into Brooke's unwritten assumptions, it appears safe enough to claim that he disliked controversy. There is, for example, no opinion about the Deluge and no attempt to explain fossils. So far as the poet was concerned, an account of the water cycle ought to specify the origin of springs and the uses of mountains. Therefore, Brooke gives more scientific detail to the water cycle than any other poet, before or since.

Immediately following the account of percolation is a much longer account of Halley's theory of evaporation. In 1692, *Philosophical Transactions* published "An Estimate of the Quantity of the Vapours raised out of the Sea, derived from Experiment; Together with an Account of the Circulation of the watry Vapours of the Sea, and the Cause of Springs, presented to the Royal Society." The article was re-printed and expanded in *Berham's Miscellanea Curiosa* (1726). Professor
McKillop's *The Background of Thomson's "Seasons"* says, "Halley's theory of the origin of springs from the condensation of vapors at or near the summits of mountains was universally known and respected," even though objectors claimed that evaporation could not be imagined to account for both rainfall and rivers. Halley measured the water evaporated from a pan, guessed the area of the Mediterranean and the volume of the rivers that poured into it, and claimed that evaporation could do more than it was given credit for.

In exact terms, Brooke describes evaporation caused by heat:

> While Ocean thus the latent Store bequeaths,  
> Above, its humid Exhalation breaths;  
> Its Bosom pants beneath the vig'rous Heat,  
> And eager Beams th' expanding Surface beat;  
> Insinuating, from the lucid Cell,  
> To Bladders the circumfluous Moisture swell;  
> Th' inflated Vapours spurn the nether Tide,  
> And mounted on the weightier Aether ride;  
> As tho' in Scorn of Gravitating Pow'r,  
> Sublime, the cloudy Congregations tour.  
> (ff. 133-142)

Brooke's footnote explains:

Heat being the most subtle, light, and agile of all Bodies (if it may be called more than a Quality of Body) by its Subtility penetrates, and by its Levity rarifies the humid Parts of Matter; and then, by its Agility, breaking loose, carries off the Parts so rarified; which being by that Means render'd lighter than the Air, mount till they rest or float in that Part of the Atmosphere that bears a specific, or proportionable Gravity.

Derham defines levity:

Levity is that whereby, what we call light Bodies
swim; a thing no less useful to the world than its opposite, Gravity, is in many respects, to divers Tribes of Animals, but particularly serviceable to the raising up of Vapours, and to their conveyance about the world.... There is no such thing as positive Levity, but that Levity is only a lesser Gravity.°

And Halley adds his authority to the theory of the bubble-atom:

I have in another place attempted to explain the manner of the rising of Vapour by Warmth; by showing, that if an Atom of Water were expanded into a Shall or Bubble, so as to be ten times as big in Diameter as when it was water; such an Atom would become specifically lighter than Air, and rise so long as that Flatus or warm Spirit that first separated it from the Mass of Water, shall continue to distend it to the same Degree.°

Derham thought that bubble-atoms of water were filled with atoms of air.

In very inexact terms, Brooke continues a description of "the cloudy Congregations," clouds which cast shade and look like knights and battlements:

O'er towrid Climes, collect their sable Train,
And form Umbrellas for the panting Swain;
Or figurn'd wanton in romantic mould,
Careering Knighl's, and airy Ramparts hold.

(II 145-146)

The next two lines apparently describe a rainbow, the only reference to the optical phenomenon in Universal Beauty:  

(Imblaz'ning Beams the flitting Champions [the bubble-atoms] gild,
And various, paint the visionary Field;)

Wind disperses the clouds, and blows the bubble-atoms upward until condensation occurs. Now we shall see, says the
poet in a footnote, "the Use, Beauty, and Variety of our Meteors," that is, atmospheric phenomena; "for as the chief operator in raising the vapours is heat, so on the other hand the chief artist in forming the several meteors out of those vapours, is cold." Bubble-atoms, according to the story, shiver with cold, knock together, conglob, grow heavier than air, and fall down as rain-drops:

When lo! th' afflicting Ather checks their Pride,
Compressing chill, the vain dilated Tide;
Their shivering Essence to its Centre shrinks,
And a cold Multipart their Coherence links;
With artful Touch, the curious Meteor forms;
Parent, prolific of salubrious Storms,
(When from on high the rapid Tempest's hurl'd,
Enliv'n ing as a Sneeze to Man's inferior World.)

Within his account of a rain-storm, Brooke takes on the problems of thunder and lightning, and the nature of cold. Such problems, being unsolved at the time, were often given weird speculation. In this instance, Brooke's fancy makes understanding nearly impossible. None the less, much common eighteenth century belief seems to be contained in the passage. Mieuwentijdt, whose explanation of "meteors" was more extensive than Derham's, believed that the air was full of a great variety of particles; as Halley said, the air was filled with "all terrestrious, saline heterogenius Vapours";

Brooke says that cold causes a chemical reaction:

The frigid Chymist [cold] calls the mineral Store,
The Glossy Sphaerules of metallick Ore.

Both Derham and Mieuwentijdt consider it important to deny the
existence of "dry Fumes"; all vapors are wet, and subject
to hydrostatic laws. Among the most important vapors,
Nieuwenhjdt says, are nitre, or salt-petre purified by
evaporation, and sulfur; in Brooke, cold

Sublimes with Nitre the sulphureous Foam,
And hoards contagion in Heav'n's ample Dome;
Where Nature's Magazine fermenting lies,
Till the bright Ray athwart the Welkin flies;
High Rage the small Incendiary [cold] inspires,
Whose kindling Touch the dread Artillery fires.
(II 165-170)

In other words, bubble-atoms of nitre and sulfur remain in
clouds until cold condenses them together; a chemical
change, called fermentation at the time, occurs, and a
spontaneous explosion shortly follows. Since Franklin's
kite it has seemed reasonable to compare lightning to
electricity; in the 1730's, however, thunder and lightning
were discussed as if they were most analogous to artillery.

Halley specifies the presence of salt in the air:

'Tis possible and not improbable, that some sort
of Saline or Angular Particles of Terrestrial
Vapour being immix'd with the Aqueous, which I
take to be Bubbles, my cut or break their Skins
or Coats, and so contribute to their more speedy
Condensation into Rain.'

And Pluche explains lightning:

From those fiery Particles lodged in the Center of
the Bubbles before mention'd, and from the different
Particles of Oil, Sulphur, Nitre, and other
combustible Matter carried up into the higher
Regions of the Atmosphere along with the rarified
Vapours, is form'd an inflammable Substance which
becomes more or less visible according to the
different Strength of the Composition, and the
Quantity of it.
Flucho's "fiery Particles" were the heat that caused the water atoms to swell and evaporate.

Cheyne's *Philosophical Principles of Natural Religion* informs us that, "Cold and Freezing, seem to proceed from some Salin Substance floating in the Air," because, "we know, from Mr. Boyle's *History of Cold*, that Freezing increases the Dimensions both of Solid and Fluid Bodies."

Nieuwentijdt says that nitre comes from the north, but, as in gunpowder, nitre must be combined with sulfur before it would become active. Cold was considered an influence whose manifold powers were later associated with static electricity, oxygen, ozone, and so forth. Brooke says:

> With various Skill, the chilling Artist works,
> And Operator Chief, in ev'ry Meteor lurks.

(II 176, 177)

Thomson, in *Winter*, speaks of cold as the presence of nitre in the air, which rejuvenates mankind marvelously:

> the joyous winter days,
> Frosty, succeed; and through the blue serene,
> For sight too fine, the ethereal nitre flies,
> Killing infectious damps, and the spent air
> Storing afresh with elemental life. 12

Brooke describes the effect of lightning:

> Quick, with Effusion wide, the Lightnings glare;
> Disploding Bolts, the cloudy Entrain's tear;
> The cleansing Flames sweep thro' th' ethereal Room,
> And swift, the gross infectious Steam consume,
> Our vital Element the Blaze refines,
> While Man, ingrateful, at his Health repines.

(II 171-176)

Clearly enough, Brooke believes that lightning purifies the air by burning up excess chemicals. The theory of the
thunder-bolt marked an advance of enlightenment. The seventeenth century (for example, Comenius) believed that a thunder-bolt was a solid object, like a cannonball, but the physico-theologists took pains to disprove the theory. Rohault's Physics compares thunder and lightning to a gun fired blank, without a bullet, and Pluche says that the bolt is lightning only, and explains thunder as follows:

When the Lightning descends in great Flashes like an impetuous Torrent of Fire, it is what we call a Thunder-bolt; and this has different Effects according to the different State and Disposition of the Air, and the different Force and Proportion of those Ingredients which enter into the Composition of the Lightning.

The Air which gets loose from those broken Bubbles in which it was before imprison'd, and that which happens to be pent in betwixt the Clouds, is necessarily very much dilated by these inflammable Substances, and therefore being hemm'd in on every side by thick Clouds which contrary Winds heap together round it, or by the falling in of one Cloud upon another, does by its expansive Force burst its Passage through them with a violent Explosion, and causes that Crack or Rumbling which we call Thunder.

Of course, Brooke may have believed literally in the thunder-bolt, but he more likely spoke about it figuratively.

Brooke continues with a description of "sudden Nitre" captivating a cloud and causing snow, and "Cold" suddenly chilling a tempest into hail. We have seen that cold was associated with nitre, and apparently identified with it.

Abruptly, Brooke gives us mountains. The Burnet controversy made standard the pragmatic defense of mountains, first associated with springs and evaporation by Halley, who
catalogued the same ranges as examples of felicitous location in the middle of continents, as had Burnet, who compared them to old bones randomly scattered. Miss Nicolson's *Mountain Gloom and Mountain Glory* delineates the recognition by the Augustans, spurred by their pragmatic defenses of mountains, that the sight and contemplation of mountains could arouse feelings of theistical sublimity. Brooke's passage is a near-perfect fossil; his ideas were so common that he could depend upon a reader's catching the allusions without the footnotes appended to each of the other passages considered so far. Effects of Gothic sublimity were too commonly associated with mountains for Brooke to escape entirely.

"Or constant, where this Artificer [cold] dwells, And alcid, from his Heights the Mist repels; Th' ALMIGHTY ALCHEMIST his Limbeck rears, His Lordly Taurus, or his Alpine Peers; Suspending Fogs around the Summit spread, And gloomy Columns crown each Naughty Head, Obstructed, drench the constipating Hill, And soaking, thro' the porous Grit distil; Collecting from a thousand thousand Cells The subterraneous Flood impatient swells; Whence issuing Torrents burst the Mountain's Side, And hence impetuous pour their headlong Tide. (II 191-202)"

Waters do not percolate up through the hill, as the last three lines imply, but rather, as a note says, rain soaks into the hill, seeps downwards, and bursts out at a lower point.

Although Brooke does not go into the old arguments concerning mountains, he implies that his own attitude
is positive. For example, in Part I, in the hexaemeral catalog, "Ten thousand, thousand worlds profusely gay" have their landscape Hill, and Dale,

The lowly Sweetness of the Flow'ry Vale,
The Mount elate that rises in Delight,
The flying Lams, that wanton from the Sight,
The florid Theatres, Romantick Scenes,
The steepy Mountains, etc...

(I 133-138)

Landscaped hills and flying lams—God saw every thing that he had made, and, behold, "it had capability." At any rate, Brooke says that mountains were created at the same time as everything else, and apparently did not rise on account of Original Sin; that opinion of Brooke's seems common to the Augustan poets, as opposed to the dislike of mountains registered by the theology-saturated early seventeenth century poets. Brooke's mountain passage sounds much like Thomson's Autumn, and even describes an identical evaporative process taken from Halley. The mountain-top obscured by fog, a familiar but special phenomenon, occurred in Pope's Odyssey:

And woody mountains half in vapours lost.

When the similarity is pointed out, it seems exact and natural to call a mountain an alembic. Halley made the comparison, and speaks of the water cycle in his grand manner, "the Hills are the grand Agent in this prodigious benefit to all the Earth: Those vast Masses and Ridges of Earth serving as sommany huge Alembicks, or Cola in the noble Work of Nature."15
With the stylized description of mountains, the scientific information on the water cycle runs out. No single authority has been specified—Pluche and Barham seem closest to Brooke's point of view, but Nieuwentijdt explains many of Brooke's technicalities that the others omit. Brooke presents information familiar enough to be found in many places. His passage continues for another forty lines, rhapsodizing the fact that water seeks its lowest level; the stream

with Rapture shoots the nether Glade,
And whitening, silvers in the steep Cascade.

The stream eventually turns into very still waters, and gently where the humid Mirrors pass,
The Forest rises to the wat'ry Glass.

Those lines, superior because of Brooke's careful choice of verbs and poetic periphrases, illustrate the passage which, though empty of science and therefore irrelevant here, completes the water cycle as the waters return to the sea.

Besides the uses for storms or mountains that could be pointed out in various lines, the whole concept of a water cycle may exemplify perfection and order. Brooke sums up:

Thus Beauty flows in one perpetual Ring,
And Uses circling from our Oceans spring;
Beneath, attracted thro' the Strata rise;
Above, exhale'd, usurp the ambient Skies;
Meet in the limpid Source, or purling Rill,
And bathe the Vale, or sweep the shelving Hill;
From hence their tributary floods arise,
And grateful, nourish the recruited Sea;
The sea replenish'd, trafficks as before,  
And back to earth returns the fruitful store,  
To earth; for here, (concentring) air, and fire,  
And flood, in mutual triple league conspire:  
Since he, on whom, the mighty fabrick leans,  
Th' eternal, from eternity ordains  
Variety, which union must produce;  
And order knit consummate, into use;  
That deity, throughout the world may shine,  
And nature's birth, confess her sire divine.  

(II 245-260)

Rings and circles had been thought literally to be perfect figures, and were associated before Kepler with the paths of planets; Brooke, however, speaks figuratively, and in Part III compares plant reproduction to a ring. The water cycle allows Brooke to refer again to Hutcheson's definition of beauty—Uniformity amidst Variety.

Brooke in general presents a well organized summary of current belief concerning the water cycle. He does not choose between percolation and evaporation, but says that both processes occur. Derham, although he preferred percolation, admitted that the two processes could work with perhaps equal efficacy. Brooke speculates on the nature of cold, and of atmospheric phenomena. The water cycle, as we have seen, could be presented complete, and almost demanded certain metaphors of circles and fitness. Brooke has organized his passage starting with water on the earth and ending with precipitation forming streams, supplied much curious information, and designed a "set piece" on a subject which, by supplying evidences of design, guaranteed to confute Lucretianism.
CHAPTER V
Light, Vision, and the Atmosphere

Marjorie Hope Nicolson quotes from Universal Beauty in her study of the influence of the Opticks. Newton Demands the Muse, to show how Brooke, inspired by Newton, versified the physics of atmosphere, light, and vision. Although Brooke's "treatment of the new scientific theories was an able encyclopedia in verse,"¹ he wrote after the most perplexing arguments had been temporarily laid aside, and assumed Newton's authority to be final.

The scholastic philosophers, and later Descartes, had described light as a sort of stick, or string of beads; an impulse on one end would cause identical motion along the length of the stick, but light would not be thought to move in time. Romer's famous observations of the moons of Jupiter proved the opposite. Derham quoted Romer's conclusions as they had been in turn repeated by Newton in the Opticks:

Light is propagated from luminous Bodies in time, and spends about seven or eight Minutes of an Hour in passing from the Sun to the Earth. This was first observed by Romer, and then by others, by means of the Eclipses of the Satellites of Jupiter. For these Eclipses, when the Earth is between the Sun and Jupiter, happen about seven or eight Minutes sooner than they ought to do by the Tables; and when the Earth is beyond the (O), they happen about seven or eight Minutes later than they ought to do: The
reason being, that the Light of the Satellites
hath farther to go in the latter Case, than in
the former, by the Diameter of the Earth's Orbit.
Newt. Opt. L. 2. Part. 3. Prop. 11. 2

The motion of light in time had been established, said
Derham in 1711, for some eight years.

Earlier poets than Brooke—Reynolds and Blackmore—had
taken up the question whether or not light is a Newtonian
corpuscle moving in "fits," and although Reynolds agreed
with Newton, Blackmore, with unexpected acuteness, criticized
the corpuscular theory:

The ever-rolling Orb's impulsive Ray
On the next Threads and Filaments does bear
Which form the springy Texture of the Air,
That those still strike the next, till to the Sight
The quick Vibration propagates the Light:
'Tis still as hard, if we this Scheme believe,
The Cause of Light's swift Progress to conceive. 3

In his more ordinary vein, Blackmore talks of light and eyes
created each for the other, and advises the followers of
Epicurus to rejoice in the fact that God did not restrict
the blessings of sight to theists.

Brooke, although he speaks in several places of
Cartesian vortices, rejects the Cartesian theory of light
and accepts Newton and Romer, referring to light as a ray or
beam, and mentioning the motion in time.

Derham quotes Hooke: light "is as boundless and unlimited
as the Universe it self, or the Expansum of all material
Beings: The vastness of which is so great, that it exceeds the
Comprehensions of Man's Understanding. Insomuch that very
many have asserted it absolutely Infinite, and without any limits or bounds." And Brooke says:

For wide as universal Nature spreads,
Light's sacred Fount its streaming Lustre sheds.

Brooke speculates further:

Still orient, to the parting Beam succeeds;
Thro' azure Climes a sunless Journey speeds;
Its restless Longitude the Glory darts,
Nor less, a boundless latitude imparts.

A footnote adds: "What can be more amazing than the Expansion and Extension of Light, which, though a Body, propagated from Body, and ponderous in its Nature, is so thin and subtle, as to reach and dilate, through an inconceivable Compass of Space, before the whole Content would amount to one Drachm of Weight."

Derham refers to Boyle's paper, *Exp. to Make Fire and Flame ponderable*, and adds a regretful comment that Boyle did not live to measure the weight of sunbeams. Nieuwentijdt mentions Boyle's experiments and Newton's claim therefrom that light could become part of a solid body, increasing the weight of that body. Light, according to the "law of Divergency," did not proceed in concentric spheres, but passed in straight beams from the illuminating sources, the sun and the stars, to all parts of the universe. Since focussing lenses had proved that fires could be started by light, the theory of beams was used to explain the apparent fact that the further a planet was from the sun, the less danger it suffered from combustion--the earth was, of course,
situated at a providentially perfect, and even an agreeably variable, distance. Hutcheson finds the variety of light and darkness, and of the seasons, to be intuitively agreeable to all mankind. In the lines quoted above from *Universal Beauty*, the "orient" or rising beams rush out through the ether (the "azure Climes" of substance in which the universe floats) and become visible when they encounter atmosphere. But light, which fills all space, has endless latitude as well as longitude—strange properties for a beam to possess.

(Curiously enough, it was a latitude-longitude experiment upon the speed of light that allowed Michelson and Morley in 1877 to offer final evidence against the theory of ether.)

The speed of light was estimated variously. Brooke gives little attention to the problem, but his note (II 60) specifying the speed of light at 200,000 miles per second suggests a point concerning sources. *Physico-Theology*, third edition (1714), says 260,000, but the twelfth edition, (1754), says 200,000, an estimate closer to Roman's.6 Brooks, who assuredly used an edition of *Physico-Theology*, probably used an edition printed between 1715 and 1755.

The speed of light, great and unimaginable to the eighteenth century, was immediately put to theological use. Benevolent Providence could give light to humanity without being bound to laws of nature. Light, then, comes from deity, and actually exists apart from the world of nature.
Therefore, Brooke says:

the Light's invigorating Force,
Its active Energy, or secret Source,
Must be ascrib'd to that eternal SPRING,
Whom First, and Last, and ever Blest we sing.
Who only could his effluent Angel [light] send,
Athwart the Gulph the radiant Blaze extend,
Kindle the Mass to incorporeal Speed;
The Flame, with never dying Splendors feed.

(II 65-72)

Newton suggested in the Opticks that space was a kind of divine sense organ or "sensorium" by which God perceives celestial objects. The poets compared light to thought. Reynolds and Blackmore considered light as fast as, or faster than thought:

Swift Streams, that almost Leave the Thought
    Behind;
Almost Out-fy the Sallies of the Mind:

Amazing Progress! At its utmost stretch,
What human Mind can this swift Motion reach?

But Brooke says that thought, which also comes from deity, is faster:

Mysterious Thought! swift Angel of the Mind....
Swifter than Light, outspeed the Flame of Day.

(I 57, 63)

At this point it may be well to note that Brooke repeats the familiar use that Milton had made of light:

Hail, holy Light, offspring of Heaven first-born!
Or of th' Eternal coeternal beam
May I express thee unblamed? since God is light,
And never but in unapproached light,
Dwelt from eternity, dwelt then in thee,
Bright effluence of bright essence increate!

THOU SOLE FEROCATIVE, SUPREME OF RIGHT,
DEEP SOURCE OF PRINCIPLE, AND LIGHT OF LIGHT.
(Universal Beauty IV 75, 76)
Brooks also compares "the vital Flame," or the principle of life in the world of nature, to light:

_Essence of Effluence of ESSENTIAL DAY._

Brooke, in other words, praises God and life in Miltonic terms, but talks in other parts of the poem of light itself in view of the newer scientific attitudes; light could be discussed scientifically, even if a merely mystical conclusion had to be drawn. Poets who wished to echo Milton's "sublimity" wrote less of light than of darkness. Pope concluding his _Dunciad_ and Young sitting in the graveyard were following Locke rather than Newton—light only revealed secondary qualities, while darkness loomed awful and forbidding.

Versifiers of Newton's _Opticks_, according to Nicolson, wrote the newly revealed beauties of gems (which were prisms), rainbows, and the shifting colors of the day into their verses. Newton's _camera obscura_ experiments implied that colors were a part of light, not just subjective secondary qualities of matter. Colors, then, were a part of reality. Brooke describes the colors of gems, saying the colors were given by light and set by heat and air:

_Thro' sparkling Gems the plastick Artists play,_  
_And petrify the Light's embodi'd Ray;_  
_Now kindle the Carbuncle's ruddy Flame;_  
_Now gild the Chrysolite's transparent Beam;_  
_Infuse the Sapphire's subterraneous Sky,_  
_And tinge the Topaz with a Saffron Dye;_  
_With Virgin Blush within the Ruby play,_  
_And o'er the Jasper paint the show'ry Bow._

(III 47-54)
Brooke says that only light can make heat. In the camera obscura, any object placed on the rainbow spectrum assumed the colors of the bands that fell upon it. Thus, colors were as real as matter.

Like gems, insects, which were iridescent in the sunlight, were remarkable for color:

Gemm'd o'er their Heads, the Mines of India gleam,
And Heav'n's own Wardrobe has array'd their Frame;
Each spangled Back bright sprinkling Specks adorn,
Each Plume imbibes the rosy tinctur'd Charm;
Spread on each Wing the Flory Seasons glow,
Shaded and verg'd with the celestial Bow,
Where Colours blend an ever varying Die,
And wanton in their gay Exchanges vie.

(1 274-281)

Miss Nicolson has said that the Opticks influenced poets to take interest in the shifting colors of the day. Although Brooke makes little use of color in Universal Beauty, he describes the effect of passing shadows:

when some Cloud
Thaws on the Beamy Moon her sable Shroud;
Wide o'er the Green a Dusk and Stillness creep,
And glitt'ring Swarms beneath the Verdure sleep;
Quick, and at once, the drowsy Shade gives way;
At once breaks forth, the bright salivating Ray;
At once, the gay, the quickening Insects rise,
And gilded Squadrons strike our wondering Eyes;
Musick flies wanton from ten thousand Wings,
And Life, and Joy thro' ev'ry Region rings.

(1 149-158)

Brooke contrasts light and darkness in a fine couplet; if the earth did not rotate, the sun would

Damn its Antipodes with endless Night,
And curse with Fire the restless Sons of Light.

(1 231, 232)

Experiments with refraction made the poets aware of a
certain relationship between light and the atmosphere.
Brooke says that light is invisible (only objects are visible) and that air facilitates the passage of light to the eyes. The action of air upon light is noted precisely:

How, as a Talisman of magick Frame,
This Atmosphere converses th' enlight'ning Beam,
Reflects, inflects, refracts the orient Ray;
Anticipating shade the rising Day;
High from his Seat the Solar Glory heaven,
(Whose Image fires the Horizontal Waves;)
Abridging, shears the cale Robe of Night,
And thro' the Globe refracts the cheerful Light;
With sweet Preambling Twilight blends the Shade,
And gently lets our Evening Beam recede.

A note to the passage gives details:

Its [the atmosphere's] still more wonderful Quality, in not only reflecting, but refracting, and inflecting the Morning and Evening Beam; in Appearance, lifting the Sun about four Degrees above his Station, and refracting the Light to us when the Sun is about eighteen Degrees below the Horizon; by which Means our Day is prolonged about two Hours, and the tedious Night in the frigid Zones shortened annually about thirty-two Days / By Refraction of the Rays creating the Dawn and gradual Twilight; without which we should be suddenly immers'd in an intolerable Flood of Day, and without a Moment's Warning shut up in immediate Darkness.

Physico-Theology is the likely source for the passage.
Derham says that the "dismal Nights" of the frigid zones are shortened, and a note adds, "no less than a whole Month;" twilight occurs when the "Sun is about Eighteen Degrees beneath the Horizon." Perhaps Brooke was able to take Derham's advice: "What the Refractions amount unto, what Variations they have, and what Alterations in time they
cause, may be briefly seen in a little Book called, The
Artificial Clock-Maker, Chap. 11. The "little Book," as
an advertisement in the back of Rohault's Physics makes
known, was written by Berthem himself.

With a more fanciful comment upon the nature of air,
Brooke tries to anticipate and subvert the notion that God
made the world in order to receive its praises:

For while the circumambient Air we sing,
Its springy Tension, and elastic Spring,
The quick Vibration of the yielding Mass,
How Objects thro' its lucid Medium pass;
For Nature how the smiling Glass expands;
Narcissus like, how beauteous Nature stands,
Self-lov'd within the splendid Mirror shone,
But self-enjoy'd; nor like Narcissus pines.

Addison had said that the final cause of beauty was man's
pleasure, although the final cause of sublimity was God's
forming the mind to admire deity.

Miss Nicolson cites the Opticks (Book I, Part I, Axiom VII)
as the source for Brooke's passage on what she calls the
"geometry of vision."15 Providence, according to Brooke,
makes visual machinery--retinas and nerves:

So temper'd wondrous by mechanic Scheme,
The SOV'REIGN GEOMETRICIAN knits the Frame;
In Mode of organizing Texture wrought,
And quick, with spirited Quintessence fraught:
When Objects on the exterior Membrane press,
Th' Alarm runs inmost thro' each dark Recess,
Impulsive, strikes the corresponding Springs,
And moves th' Accord of sympathetic Strings.

According to Newton, light was refracted through the lens
and the humors of the eye so
as to converge and meet again in so many Points in the Bottom of the Eye, and there to
paint the Picture of the Object upon that skin (called the Tunica Retina) with which the bottom
of the Eye is covered. For Anatomists, when they have taken off from the bottom of the Eye that
cutward and most thick Coat called the Dura Mater, can then see through the thinner Coats, the
pictures of Objects lively painted thereon. And these Pictures, propagated by Motion along the
Fibres of the Optick Nerves into the Brain, are the cause of Vision. 14

Brooks describes the atmosphere apart from its relationship to light (Part I 350-391). Air, the sense
organ of the earth,

with Polinance delicato, pervades the whole,
its Ear, Eye, Breath, and animating Soul;
Active—serene—comprass—Tare—cool'd—or warm'd—
For Life—Health—Comfort—Pleasure—Business—Form'd;
Useful around—throughout—above—beneath—
By This, the Quadrupeds, the Reptiles breathe,
This gives the Bloom of vegetative life.

(1 350-352)

Physico-Theology reports several of Derham's experiments with birds and insects put into "one of Mr. Hawksbee's Compressing Engines." He discovered that air-breathing creatures needed a certain amount of fresh air (a diving bell, for example, could not submerge too long) and that animals which could live in compressed air could not live if the air were too much rarified. In Physico-Theology, Derham records, as common knowledge, Boyle's claim that a fluid had been invented that could supply fresh air in diving bells, and that birds often could fly higher than mountains where the air was too thin for man. Derham mentions the swim-bladders of fishes, and the necessity of air for the growth of plants.
Although Brooke's passage on air has little verbal parallel with Barham's account, their information is similar. Brooke's fanciful, but scientifically accurate, account is given in a passage with heroic couplets that have more of the terse, end-stop quality than those of the rest of the poem. The atmosphere

Brooks o'er the Eggs, in airy Caverns laid,
(Warm's in the Down of their ethereal Bed)
Given Motion, to the Swimmers of the Flood;
Given Music, to the Ramblers of the Wood;
Rebound'd in Echo from the doubling Vale,
And waits to Hear'in the undulating Gale.
Here hush'd, translucid smiles the gentle Calm;
And here impear'd, sheds meek the show'ry Balm;
Salubrious here, a lively Rapture d'ning,
And winnows pure the pestilential Steams.
Here buoy's the Bird, high on the Chrystal wave,
Whose level Plumes the azure Concave shave;
Here sits voluptuous in the swelling Sail,
(The Vessel dances to the sprightly Gale.)
(I 362-378)

The passage continues with an alchemical formulation of the atmosphere performing an occult reconciliation of opposites. Paracelsus, whom Brooke might have come across in his youthful reading, refers to a "menstruum or matrix of the world, wherein all things are framed and preserved. It is a certain oleaginous and ethereal water." 16

Its [the atmosphere's] vary'd Pow'r to various Uses tends;
And Qualities concur to achieve contrarious Ends;
With generative warmth fomenting breed,
Or alimental, with nutrition feed;
In Opposition reconcile'd to Good,
Alike the Menstruum, as sustaing Food;
Or here restorative—destructive here,
Here Nature's Cradle—here her Fun'ral Bier
(With keen Dispatch) on all Corruption broods,
And grateful, from our aching Sense conveys;
For two reasons this chapter on light and the atmosphere has not tried to survey the important and extensive influence of science upon the early eighteenth century poets and philosophers. First, such a survey already exists in *Newton Demands the Muse*. And secondly, Brooke did not by any means survey light and air as thoroughly as he surveyed the water cycle. As a poet, he writes about what interests him, and apart from a few instances of odd information, says vaguely that light is unaccountable by any reasonable laws of nature. If this unaccountability made light less "fit" or beautiful than the clear and accountable pageant of the water cycle, it no doubt made light closer to deity, or "sublime." Light was valuable (besides being necessary to life) because it allowed man to pry into the secrets of nature:

Thus, borne on airy wings, the Radiance flies,
Quick'ning the Vision of Poetic Eyes;
Whence we may pierce into the deep Profound,
And, searching, view the wondrous System round.

(II 51-54)

Brooke's use of light, traditional enough when he compares deity to light, suddenly draws on his scientific learning when he discusses light itself. His use of colors, as Miss Nicolson points out, like his use of light, may be referred to the influence of the *Opticks*—poets felt that they did
not need to ignore the claims of a science that put colors back into things that had been made colorless by Locke's philosophy. Although Miss Nicolson is no doubt correct in saying that the Opticks influenced two generations of poets to write about prisms, rainbows, and colors in daylight, Brooke may have received the influence second-hand—it is perhaps more certain that he read Derham's Physico-Theology. The poet Jago, in the age of Hume, had to deal with a new separation of man and nature, and wrote of colors in terms of common sense rather than of science. But Brooke actually made little, and only perfunctory, use of colors, as if he were somewhat color-blind; most of his descriptions simply attribute human expressions of face and emotion to inanimate objects. In Universal Beauty there is no description of darkness. So far as light is concerned, Miss Nicolson considered Brooke the most accurate and extensive transcriber of information on the physics of light. One may be certain of the aesthetic implications in Universal Beauty that light makes the pleasures of Imagination possible, and is itself sublime.

As for the atmosphere, Brooke explains refraction, and describes air very precisely. Benevolent Providence and the beauties of nature—the creation of that Providence—should be seen and acknowledged by anyone who knows the many functions of the atmosphere and understands the complex but perfectly ordered working together of air and light.
CHAPTER VI

Insects

Henry Needler, in his essay, "On the Beauty of the Universe," says:

The very Insects tho' so much inferior to other Animals in Bulk, do not at all fall short of them in respect of Form and Ornament. With how exact a Proportion and Harmony of Parts has Nature fram'd their little Bodies? What a shining Glass and Polish has she cast over their Limbs, and with what gay and lively Colours has she painted them? I might instance in the Butterfly, the Spanish-fly, the Adderspear, and many others. 1

Brooke recommends to the reader Part V of Universal Beauty, "which chiefly treats of the Arts and Instincts of the inferior Animal System; which Subject, as it is less abstruse, so it is probable, it will be more agreeable than any hitherto treated of." 2 Brooke's attitude is optimistic and serious; Shadwell, on the other hand, had perhaps been closer to popular opinion when he satirized the Virtuoso who wasted time studying "the Nature of Ants, Flies, Humble-bees, Savvies, Mille-pedes, Egg's-Lice, Maggots, Mites in a Cheese, Tea-poles, Worms, Neuts, Spiders" under microscopes. 3 Insects then, as now, were considered contemptibly small and disgusting. Brooke, as we shall see, finds beauty in the tiny structures of insects.

The theory of equivocal generation was still believed, and insects were considered disgusting because they were believed
to come from fire and putrefaction. Redi only in 1668 proved that insects come from eggs laid by parent insects of the same species, and his conclusions were quoted by Ray, Cheyne, Derham, Nieuwentijdt, and Fluche against the classical theory of equivocal generation—found in Virgil, Pliny, and Ovid—that was still popular belief.

The discoveries of the microscope, the toy of the "girl-scientist," were widely publicized. The author of Plurality of Worlds says:

"We see from the Elephant to the very Hand-worm, beyond which our sight fails us; and yet, counting from that minute creature, there are an infinity of lesser animals, which were they perceptible, would be as little in comparison with a mite, as a mite is of an ox. How lately have our virtuoso's found out the pepper-worms, which in the least drop of water appear like so many dolphins, sporting in the ocean! Nay, they tell you that the sharpness of vinegar consists in the fierceness of the little animals that bite you by the tongue....Do but consider this little leaf: why, it is a great world, of a vast extent....In the hardest stones, for example, in marble there are an infinity of worms....In short, every thing is animated, and the stones upon Salisbury-plain are as much alive as a hive of bees."

Microscopical researches implied that the world was truly a plenum, the opposite of a vacuum, and that everywhere in the world were living creatures. God, by nature generous, could not neglect to put a living creature creature into every conceivable place. Addison, although he poked fun at the bug collector (Talor 216), recommended seriously the contemplation of minute life (Spectator 519):
Infinite goodness is of so communicative a nature, that it seems to delight in the conferring of existence upon every degree of perceptive being. It is wonderful to observe, by what a gradual progress the world of life advances through a prodigious variety of species, before a creature is formed that is complete in all its senses. The whole chasm in nature, from a plant to a man, is filled up with diverse kinds of creatures, rising one over another, by such a gentle and easy ascent, that the little transitions and deviations from one species to another are almost insensible. The intermediate space is so well husbanded and managed, that there is scarce a degree of perception which does not appear in some one part of the world of life. Is the goodness or wisdom of the Divine Being more manifested in this his proceeding?

Addison concludes that there are infinite discrete species on the Chain of Being, and that Fontenelle was probably correct in arguing that God in his generosity and wisdom had peopled other worlds besides the earth with perceptive creatures—only perceptive creatures could appreciate existence.

Entomology at the time was a great body of strange information without any unifying principle other than that tiny creatures occupied a low link in the Chain. Comments such as Addison's, quoted above, suggest to us Darwinian evolution, but actually reflect the Augustan habit of using entomological information for moral or theological persuasion. John Ray, the great English biologist, suggested the conception of species in Methodus insectorum (1705), and the conception became standard after Linnaeus' Systema naturae (1735). A species, however, was considered the immutable creation of God, not an arbitrary grouping of evolving animals. For Brooke, whose observations are scientifically accurate,
entomology was a series of lively moral essays on insects, earthworms, snails, and spiders.

Robert Hooke made weekly reports over a period of twenty years to the Royal Society concerning his microscopical observations. By the turn of the century, however, the Royal Society had lost interest in the microscope, and the instrument was used mostly by amateurs. Derham in 1714 noted the situation of the world of the microscope:

Having dispatch'd that Part of the animal world, which used to be accounted the more perfect, those Animals stiled less perfect or imperfect, will next deserve a Place in our Survey, because when strictly enquired into, we shall find them to be so far from deserving to be accounted mean and despicable Parts of the Creation, owing their Original and Production to Putrefactions, &c. as some have thought, that we shall find them, I say, noble, and most admirable Works of God.

By the 1730's, however, the microscope was re-established as a standard scientific device (Henry Baker's handbooks for the microscope, published in 1743 and 1753, describe the advances in knowledge made possible by the instrument), and the subject of insects had been given scientific respectability. Brooke agreed with Derham and Ray that equivocal generation was a dead issue, and that knowledge of parent creatures, eggs, and metamorphosis on such a small scale was marvelous and valuable. The microscope showed that the insects were as well designed as larger creatures:

These have their Organs, Arts, and Arms, and Tools, and Functions exercised by various Rules;
The Saw, Axe, Auger, Trowel, Piercer, Drill;
The neat Alambick, and nectarous Still.

Information on insects was available from the works of the pioneer entomologists—Malpighi, Swammerdam, Redi, Lieuwenhoek, and Ray, all of whom were published in *Philosophical Transactions* and quoted by the physico-theologists. Much practical advice was available in books on husbandry and gardening. Richard Bradley wrote several books on gardening, plus a system of physico-theology. Thomson took a passage on plagues caused by insects from Bradley’s *New Improvements of Planting and Gardening* (1717-18). Cheyne discusses animalcules at some length, claiming that they were made whole and had perpetual motion. In his book, *Philosophical Principles of Natural Religion* (1705), Cheyne also explains metamorphosis and says that animalcules formed like men live in semen. (Richard Savage repeated the familiar notion concerning semen in his poem “The Animalcule.”) Cheyne, following Ray’s disproof of spontaneous generation, says that insects come from parent insects, and draws the appropriate moral that nature is “frugal in principle, but various in effects.” Brooke refers to Derham’s *Physico-Theology* and to Pliny’s *Natural History* in his notes to Part V. These are the only authorities referred to in *Universal Beauty*, and there is reason to doubt that he used Pliny directly. Two passages are taken from the *Natural History* and are quoted in footnotes by both Brooke and Derham, in similar contexts, and
both writers cite the source:

Derham—Flin. Nat. Hist. Lib. XI. Cap. 4.\textsuperscript{10}

Brooke—Flin. Nat. Hist. Lib. XI. Cap. 4.\textsuperscript{11}

In both the Reinemueh and the Bohn Library editions of Pliny, the quotation appears in Chapter 3 rather than Chapter 4. Derham's \textit{Physico-Theology}, however, does not give more than half of the entomological information that can be found in \textit{Universal Beauty}. The first volume of Humphrey's translation of Pluche's \textit{Spectacle de la Nature} appeared in 1735, containing a long chapter on insects. Pluche, although not necessarily a direct source for \textit{Universal Beauty}, makes clear most of the notions that Brooke expresses, and is sometimes quite close, especially in the description of wasp nests.

Part V carefully describes earthworms, snails, spiders, beetle-wings, and metamorphosis; Part VI adds bees, wasps, and "aurelius." There is much minute information, such as the line upon bird flight:

\begin{quote}
spread the plumy \textit{Sail}---
The Flumosocrates, and then directs the Cale.
\end{quote}

\textit{(V 49, 50)}

But there is no systematic presentation. Entomology was not an ordered science, and Brooke was able to choose whatever fascinated him. He defends himself by claiming the inability of poets to mention all species:

\begin{quote}
But who in unmeasur'd Prose, Memorial long!  
Or Volubility of num'rous Song?
\end{quote}
Can Nature's infinite Productions range,  
Or with her ever varying Species change?  
Not the fam'd Bard, in whose surviving Page,  
Troy still shall stand, and fierce Pelides rage;  
Not this the Mantuan's rival Muse could hope,  
Nor Thou, sole Object of my Envy!—P—e.  
(V 53-60)

Nature's variety is plainly the work of deity:

Nature amply spreads th' illustrious Scene,  
And renders all Pretext of Error vain:  
Unfolded wide her obvious Pages lie,  
To win Attention from the wand'ring Eye;  
Full to convince us, to instruct us sage,  
Strict to reform, and beauteous to engage.  
Like Nature's Law no Eloquence persuades,  
The mute Harangue our ev'ry Sense invades;  
Th' apparent Precepts of the ETERNAL MILL,  
His ev'ry Work, and ev'ry Object fill;  
Round with our Eyes HIS Revelation wheels,  
Our ev'ry Touch HIS Demonstration feels.  
(V 17-28)

The preceding passage from Universal Beauty may be compared  
to the conclusion of Addison's ode, "The Spacious Firmament:"

What though, in solemn silence, all  
Move round the dark terrestrial ball;  
What though, no real voice, nor sound,  
Amidst their radiant orbs be found,  
In reason's ear they all rejoice,  
And utter forth a glorious voice;  
For ever singing as they shine,  
The hand that made us is divine.

The "music of the spheres," which mankind had been too base  
to hear, had by the eighteenth century become metaphorical.

No part of nature, says Brooke, should be thought  
contemptible. The little insects are frequently beautiful,  
he says in a prefatory passage, and, as we noted in the third  
chapter of this study, the over-all designs of deity are  
"sublime:"
Meanwhile, Earth's miniscule populace inspect,
With just propriety of Beeties deck'd;
Consummate Each, adapted to its State,
And highly, in the lowest Sphere complect,
Sublime the Theme, and claims th' attentive Ear,
Well worth the Song, since worth Th' Almighty's Care;
Since ev'n the Smallest from the Great One springs,
Great and Conspicuous, in minutest Things.
(V 65-72)

Insects know how to use their faculties. The mosquito lays its eggs in "mathematical Order," and Derham's illustration is cited:

A slender Cord the floating Jelly binds,
ELudes the wave, and mocks the warring Winds,
O'er this their Sperm in spiral Order lies,
And Pearls in living Ranges greet our Eyes.
(V 222-225)

As Derham's illustration makes clear, one could see the Pearls, or separate eggs, in the string of jelly. It was not known at the time whether it was eggs or sperm that were thus deposited—Brooke refers to the deposit as one in the text, and the other in the note. Brooke mentions the gall-nut, or oak gall, which was given attention by Pluche and Derham. Some insects, they report, lay their eggs in holes scooped out of oak trees:

In firmest Oak they scoop a spacious Tomb,
And lay their Embryo in the Mourious Tomb.
(V 226, 227)

The point is that insects instinctively do the right thing.

Nature, for Brooke, was good and wise. Even examples of harshness and cruelty could be rationalized into the scheme of harmony. Pluche gives the usual criticism of the unkind ostrich:
'Tis the Custom of the Ostridge to hide them [its eggs] inconsiderately in the Sand; and to leave, as we are told, the Care of hatching them to the Sun. This Disposition, that seems to manifest so much Disregard to her Young, has acquire'd her no extraordinary Reputation. In all Countries, where she is known, when they would speak of a Mother who has little Tenderness for her Children, they compare her to the Ostridge. Derham even quotes Scripture against the ostrich. But Brooke interprets the action of mother ostriches as conformable to the notion of beneficent nature which takes up the duties of hatching that the bird could therefore afford to forget.

Brooke describes the earthworm as a good example of an animal perfectly outfitted for its environment with combinations of ordinary animal parts—muscles, fluids, skin. In other words, there is nothing magic about tiny creatures, and their resemblance to larger animals makes them all the more interesting, and their skilled creator all the more praiseworthy.

\begin{verbatim}
The Reptile first, how exquisitely form'd,
With vital Streams thro' ev'ry Organ warm'd,
External round the spir'al Muscle winds,
And folding close th' interior Texture binds;
Secure of Limbs, or needless Wing to steer,
And all one locomotive Act appears.
His Rings with One elastic Membrane bound,
The prior Limb'd; mov'd th' obequious Round,
The Next, and Next its due Obedience owes,
And with successive Undulation moves.
The mediate Glands, with unctuous Juice replete,
Their Stores of lubricating Guile secrete;
Still opportune, with prompt Emision flow,
And slipping, frustrate the deluded foe;
When the stiff Clod their little Augurs bore,
And all the worm insinuates thro' the Pore.
\end{verbatim}
The question of the spiral muscle is taken up by Derham:

Their Body is made throughout of small rings, and these rings have a curious Apparatus of Muscles, enabling those Creatures with great Strength to dilate, extend, or contract their Annuli, and whole Body.¹⁵

But in another place Derham gives a somewhat differing opinion:

This Muscle in Earth-Worms, I find is Spiral, as in a good Measure is their Motion likewise; so that by this means they can (like the Form of an Auger) the better bore their Passage into the Earth. Their rentile Motion also, may be explained by a Wire wound on a Cylinder, which slips off, and one and extended and held fast, will bring the other nearer it. So the Earth-Worm, having shot out, or extended its Body (which is with a wreathing) it takes hold by those small Feet it hath, and so contracts the hinder part of its Body.¹⁶

Brooke moves on to an even more detailed account of the snail. For the post, the snail was another animal designed to fill a special place in nature.

Slow moving next, with grave majestic Pace
Tenacious Snails their silent Progress trace,
(Ⅶ 89, 90)

A note explains that snails move "by a broad and strong skin on either side at the belly, and the emission of a glutinous slime; by the assistance of which they adhere to any surface more firmly than they could do with claws or talons." Snails erect their own houses, seal them up for the winter, and open them in the spring:

Their Domes self-wreath'd, each Architect attend,
With Mansions lodge them, and with Mail defend:
But chief, when each his wint'ry Portal forms,
And mocks, secluded from incumbent Storms;
Till Gates, unbarring with the vernal Ray,
Give all the secret Hermitage to Day.

Pluche calls the snail shell a "Mansion," and describes the process of hibernation:

At the Approach of the Cold, she retires into some Cavity, and her Body distills a certain Glow that condenses at the Aperture of the Shell, and entirely closes it up. When she is thus shrouded, she passes the disagreeable Season, like a number of other Creatures, free from all Pain and Want. When the Spring paints the Earth with a new Bloom of Flowers, the Snail opens her Door, and seeks her Fortune.

Brooke enters a small controversy concerning the snail:

Then peeps the Sage from his unfolding Doors,
And cautious, Heaven's ambiguous Brow explores,
Towards the four Winds Four Telescopes he bends,
And on his own Astrology depends.

Pluche continues:

but in her creeping Progress, and charg'd as she is with the weight of her Apartment, if her Eyes were sunk as low as the Body she trails along the Ground, she could not perceive the Objects she ought either to avoid or approach, and would at least, be perpetually liable to plunge and soil her Eyes in the Dirt; to prevent which Inconvenience, Nature has supplied her with Four Telescopes, to assist her in the Discovery of all Objects that surround her.

Derham refers to Lister and says, "Snails send out their Eyes at a Distance, they being contained in their four Horns." Pluche refers to both Lister and Derham, and says the same thing: "You are not to imagine that those Projections which are commonly called the Snail's Horns, are really such. They are Four Tubes, with a Glass fixed in the Extremity of each;
or they may be called four optick Nerves, ending in as many beautiful Eyes." Brooke says in a note, however: "I have inserted this opinion of mails having eyes at the ends of their horns, rather in submission to authority, than that I am really persuaded it is so. However, they may, in a great measure, be said to see with their touch, which in this part is extremely sensible, and equally serves their purpose." Brooke in this instance is more correct and less fanciful than the prose writers.

Another small controversy involved spiders:

Or who all native Vehicles despise,
And buoy'd upon their own Inventions rise;
Shoot forth the Twine, their light aerial Guide,
And mounting o'er the distant Zenith ride.

Do spiders travel by shooting out a thread and letting the wind blow it along? Derham refers to Lister and Pliny, and adds his own assent, "I have with pleasure often seen Spiders dart out their Webs, and sail away by the help thereof." But Bradley in his Philosophical Account of the Works of Nature admits the phenomenon with the reservation that he had not observed it himself; Brooke may have made his own observations.

A passage upon what Bradley calls "cased Wing'd Creatures," such as beetles and Lady Cows follows the lines on spiders in Universal Beauty, as Brooke dwells at length upon the surprise involved in watching the pretty "cases" rise, to reveal wings underneath:
Deceiv'd our fellow Reptile we admire,
His bright Indorsement, and compact Attire,
When lo! the latent Springs of Motion play,
And rising Idas disclose the rich Inlay;
The tissu'd Wing its folded Membrane frees.

Then, calling the beetle wings a "superficial Scene,"
Brooke says:

"O think if superficial Scenes amaze,
And e'en the still familiar Wonders please,
These but the Sketch, the Carve, the Veil of Things,
Whence all our Depth of shallow Science springs;
Think you'd this Curtain of CONSCIENCE rise,
Think of the Sight! and think of the Surprise!
Scenes inconceivable! essential! now!
Whelm'd on our Soul! and lightning on our View!
How you'd the vain disputing Wretches shrink!
And shivering, wish they cou'd no longer think;
Rejet each Model, each reforming Scheme,
No longer dictate to the GRAND SUPREME,
But waking, wonder whence they dar'd to dream."

The passage does not exactly refer to Platonic dualism.
Brooke is preparing to talk of insect metamorphosis, and his point is that, "the bare light of nature, or reason" could not, from the contemplation of a mosquito or a butterfly, deduce the metamorphosis of insects. Brooke disparages reason, but not sense—close observation of nature, as he implies throughout the poem, will reveal beauty and truth. The conclusion to which the passage on metamorphosis leads is stated explicitly in a note; in the first chapter of this study, Brooke's conclusion was compared with what Professor McKillop calls "empirical immortality" in James Thomson's "Hymn." Here again is the general conclusion to Universal Beauty, in its context in the passage on insects:
One great Truth is evident, that (though our Reason apprehends a Propriety and Fitness in the Relations of many Things and Actions both natural and moral, yet as we cannot comprehend the Whole of INFINITE WISDOM / There is doubtless a further Design, and more latent Fitness and Beauty in Things and their Relations, than we can apprehend, or are aware of... The Sum of all (which for so long and copiously employ'd the Pens of the Learned) is this,--First, that there is a present Fitness or Beauty sufficiently obvious in Things, to demonstrate an OVER-RULING WISDOM.--Secondly, that this OVER-RULING WISDOM, or GOD, now does, and ever will conduct all Things for the best.--But, Thirdly, since Things change, they can't be now in their State of Perfection.--Therefore, Fourthly, there must be some other or future State, to which all Things tend and are directed, for the final and unchangeable Perfection of all Things.

The whole carefully drawn pageant of metamorphosis "may be looked on as allegorical, and representative of the present state of man and his future hopes; yet the case with them [the insects] is already real, and their change and resurrection most evident to sense." The allegory is not drawn out in the poem, however, because Brooke turns his attention instead to the scientific details and literary implications of metamorphosis. Who would guess, the poet asks, that beautiful adult insects come from "reptiles?"

Who'd think these airy Wantons so adorn,
Wore late his vile Antipathy and Scorn,
Prone to the Dust, or Reptile thro' the Mire,
And ever thence unlikely to aspire?
(V 170-173)

Flucke, at the same point in his own discussion, has an amusing conversation upon which Brooke amplifies:

Chev. How, My Lord! Will a Caterpillar ever be any thing but a Caterpillar? and has a Bee ever been any Animal different from a Bee?
Count. Without doubt. There is an infinite
Number of these little Animals who are composed
of two or three Bodies very differently organized,
the second of which unfolds itself after the
first, and the third receives its Birth from the
second. These are so many Metamorphoses. Have
you never seen those of Ovid, sir?

Gove. I am now reading them, and have gone through
half of that Work. Those agreeable Fables divert
me exceedingly; but, after all, they are but
Fables, unless they contain some hidden Meaning;
and that is what I wish somebody would discover
to me.

The Count promises to do so:

But since I find you as much a Friend to Truth as
you are to the Marvellous, I shall charge myself
with the Care of all your Pleasures, and intend to
bring you acquainted with a System of Metamorphoses
infinitely more surprising than those of your Ovid,
and of whose Reality your Sight and Touch shall
fully convince you.

Brooke:

No Fictions here to willing Fraud invite,
Led by the marvellous, absurd Delight;
No golden Ass, no Tale Arabians feign;
Nor fleeting Forms of Naso's magic Strain,
Deucalion's Progeny of native Stone,
Or Armies from Cadmean Harvests grown;
With many a wanton and Fantastic dream,
The Laurel, Mulberry, and bashful Stream;
Arachne shrunk beneath Tritonia's Ease;
Tithonus chang'd and garrulous with Age.
Not such Mutations deck the Cluster Song,
Adorn'd with Nature, and with Truth made strong;
No Debt to Fable, or to Fancy due,
And only wondrous Facts reveal'd to View.
(¥ 186-199)

"The Laurel, Mulberry, and bashful Stream" refer respectively,
according to a note, to Daphne, Pyramus and Thisbe, and
Arethusa.

The insects, newly hatched and still in a grub state,
think that all is perfect:

All by their Sam's prophetic Care receive
What'er peculiar Indigence can crave.
Promise at Hand the plenteous Table's spread,
And various Appetites are artly fed.
Nor less each Organ suits each Place of Birth,
Finn'd in the Blood, or Reptile o'er the Earth;
Each Organ, apt to each precarious State,
As for Eternity design'd compleat.
Thus nurs'd, these inconsiderate stretches grow,
Take all as due, still thoughtless that they owe.
(V 239-247)

But abruptly nature instructs them otherwise:

When loc'l strange Tidings prompt each secret
Breast,
And whisper Wonders not to be express'd;
Each owns his Error in his later Cares,
And for the new unthought of World prepares.
New Views, new Tastes, new Judgments are acquir'd,
And all now loath Delights so late admir'd.
In Confidence the solemn Shroud they wave,
Or build the Tomb, or dig the deadly Grave;
Intrepid there resign their parting Breath,
And give their former Shape the Emphasis of Death;
But reconniv'd as in a second Tomb,
Thro' Metamorphosis, new Forms assume.
(V 248-259)

Part VI gives a further description of the "aurelia," or
caterpillar, going into the cocoon stage. "Aurelia" is now
a technical name for the common jellyfish, but for Brooke an
aurelia was any caterpillar; Brooke's "gnat" (culex) is our
mosquito (Culicidae); both "aurelia" and "gnat" were used in
various ways before the general adoption, after 1735, of the
Linnaean system of binomial classification. Derham describes
an aurelia as the nymph stage of mosquitoes, but Brooke's
aurelia is definitely a caterpillar.
-115-

Not so [that is, publicly], the multipede Aurelias dwell,
But form, sole Architects, the pensive Cell;
Like Seers of old, they seek some lonely Seat,
And from the vain, the busy World retreat;
Here fondly form a Structure of their own,
And bind the Vault of solitary Stone,
Or Clay, or Timber, oft attempting, mould,
And round their Form the ducile Mansion fold.
Or in peculiar Occupations skill'd,
A wondrous Dome of silken Fabrick build,
No Debt to foreign Implements they owe,
But from themselves the mantling Tissues flow;
Themselves the gorgeous Canopy they spread;
Themselves the Loom, the Distaff, and the Thread.
The Thread as fam'd Arachne's Texture fine,
When thwart the Morn she darts her floating Line,
Or spins the Scheme of implicated Wiles,
And o'er her great Newtonian Rival smiles;
Reveals the deep Abhigia of his Trade,
And square's the Circle in the vernal Glade;
The sportive Plans of matchless Art displays,
While round, and round, the dextrous Wanton plays.  
(VI 252-273)

Interestingly enough, Brooke imputes to the caterpillar an activity considered blasphemous by the early seventeenth century. Donne and Marvell had warned that the Circle was the perfect figure, and that therefore only God could square it. Various "solutions" showing how to square circles appeared in Philosophical Transactions, and some were reprinted in Miscellanea Curiosa, but no one to this day has come up with the answer. The Newtonian Rival is Newton, who was Brooke's usual example of the limits of human reason. Nature itself was

Beyond what Clarke can prove, or Newton can explore.  
(II 323)

Brooke avoided praising Newton for giving out the unifying principle of gravity in the universe by admitting the Cartesian
vortices to equal importance in his discussion.

Referring again to the circle, as he had done in the passage on the water cycle, Brooke describes the last stage of metamorphosis:

The Fullness now of circling Time arrives,
Each from the long, the mortal Sleep revives;
The Tombs pour forth their renovated Dead,
And, like a Dream, all former Scenes are fled.
But of what Terms expressive, may relate
The Change, the Splendour of their new form'd State?

Their Texture nor compass'd of filmy Skin,
Of cumbersome Flesh without, or Bone within,
But something than corporeal more refin'd,
And agile as their blithe informing Mind,
In ev'ry Eye ten thousand Brilliants blaze,
And living Pearls the vast Horizon gaze.
Gemm'd o'er their Heads, the Mines of India gleam,
And Heav'n's own Wardrobe has array'd their Frame;
Each splendid Back bright sprinkling Specks adorn,
Each Plume imbibes the rosy tinctur'd Morn;
Spread on each Wing the florid Seasons glow,
Shaded and verg'd with the Celestial Bow,
Where Colours blend an ever varying Die,
And wanton in their gay Exchanges vie.

In a note to line 268, Brooke quotes Pliny, possibly from Derham, and rather for authority than information:

Insecta non videntur Nervos habere, nec Ossa, nec Spinas, nec Cartilaginem, nec Pinguia, nec Carnes, nec Crustan quidam fragilum ut quaedam Marina, nec quae jure dictatur Cutis: sed mediae cujusdam inter omnia haed Naturae Corpus.

So far as is perceptible, insects do not appear to possess sinews or bones or spines or cartilage or fat or flesh, and not even a fragile mind, such as some sea creatures have, nor anything that can properly be termed a skin, but a substance of a nature intermediate between all of these.

Marjorie Hope Nicolson in Newton Demands the Muse points out the influence of the Opticks in Brooke's description of the
prismatic colors of insects. The conception of metamorphosis comes from Pluche:

Prior. The Caterpillar, who is changed into a Nymph, and the Butterfly that proceeds from it, are two Animals entirely different. The first was altogether Terrestrial, and crawled heavily along the Ground. The second is agility itself, and is so far from limiting its Motions to the Earth, that it, in some measure, disdains to repose on its Lap. The first was all shaggy, and frequently of an hideous Aspect. The other is array'd in Colours of the most beautiful Glow. The former stupidly confined itself to a gross Food; whereas this ranges from Flower to Flower, regales itself with Honey and Dews, and perpetually varies its Pleasure. This new Animal enjoys all Nature in full Liberty, and is itself one of her amiable Embellishments.

Countess. The Prior has given us a very agreeable Image of our own Resurrection.

It might be noted here that Brooke's account of metamorphosis, despite the rhetorical comparison of cocoons to sepulchres and the modest comparison to human hopes of resurrection, is scientifically accurate. He apparently knew what a dissected cocoon revealed. Overlooking the poet's insistence that God designed parts of insects to fit environment, one notes that, "the Texture of their former Organs suffers an actual Dissolution; and whatever the Principle of Regeneration may be, a new, and in Appearance, a quite different Creature, is conceived from the Remains of the old one." The description fits the process. Pluche points out that the adult insects do not arise from dead nymphs.
In a note to "In ev'ry Eye ten thousand Brillants blaze," Brooke states that insects are "Multocular," and "Every lens (of which there are innumerable number) is a distinct eye, which has a branch of the optic nerve ministering to it." Insects thereby see in most directions without having to move their heads. Derham says, "I imagine that every Lens of the Cornea, hath a distinct Branch of the Optick Nerve ministering to it." Nieuwetlijdt says that "whole Books have been writ upon this Subject" of insect vision.30

Brooke puts surprisingly little emphasis upon his allegory of metamorphosis and immortality. But he elaborates at length upon a favorite topic—moral and political points drawn from animal life. The poet claims that men should observe the following virtues and talents of insects:

The social Friendship, and the firm Ally,
The filial Sanctitude, and nuptial Tie,
Patience in Want, and Faith to persevere,
Th' endearing Sentiment, and tender Care,
Courage o'er private Interest to prevail,
And die all Deed, for the publick Seal.

Nor less for geometric Schemes renown'd,
And skill'd in Arts, and Sciences profound,
Their textur'd Webs with matchless Craft surprise,
Their Buildings in amazing Structures rise;
To them each Cline, and Longitude is know,
Each finds a Chart, and Compass of his own;
They judge the Influence of ev'ry Star,
And calculate the Seasons from afar,
Thro' devious Air pursue the certain Way,
Nor ever from the conscious Dictate stray.

Brooke elaborates the description in Part VI. Ever reminding man not to be grasping and selfish, Brooks recommends nature
as a guide, and addresses his own poem:

Waft me to Teane, and her flow'ry Dale,
Borne on the wings of ev'ry tuneful Call;
Amid the wild Provisions let me stray,
And share with Bees the Vertues of the Day.

(VI 51-54)

There are several consistent features of early eighteenth century discussions of bees. Pliny and Virgil were respected authorities, and their anthropomorphic descriptions of bee societies appealed to poets. Certain notions prevailed: the queen was variously called the King, or Queen, the latter name gaining prominence; the drones were thought, because of Pliny, and correctly enough, to be males in the royal court. Plucho accounts them males, for they apparently serve no purpose other than reproduction. 31 Brooke says that a "Queen" is surrounded by her court of drones. The bees fly to flowers:

The vivid Tribes amid the Fragrance fly,
And ev'ry Art, and ev'ry Business ply.
Each Chemist now his subtle Trunk unseathes,
Where, from the Fl ow'r, the treasur'd Odour breathes.

(VI 61-64)

"The Head is armed with two Jaws, and a Trunk," says Plucho, who later suggest a pressing question: do bees get honey from flowers, or do they distil or concoct it somehow from whatever they get from flowers?

Prior. For my Part, I am apt to think the Bee makes no Alteration in the Honey, but collects this delicious Syrup as Nature produces it; and first fills her Bag, and then discharges it into the Magazine.
Count. I am of your Opinion in that Particular, and could never observe they were able to condense the Honey, when it was too liquid, as Virgil affirms. Perhaps it may be true, that when they receive it into their Body, they purify, and give it some Consistence. But all I have remarked on the Article of Honey amounts to no more than this: They suck it up with their Trunk, and empty it into the Cells appropriated to receive it.38

But Brooks gives bees credit for making honey:

Here sip the Liquid, here select the Gum,

they pry,

where lodge'd the prime essential Juices lie.

The dainty Suckle, and the fragrant Thyme,
By chymical Reduction, they sublime;
Their Sweets with bland attempting Suction strain,
And, curious, through their most Alcubicks drain;
Inbld'd reclose, the pure Secretions glide,
And vital Marath concocts the ambrosial Tide.

(VI 65-76)

Like Issue should the daring Chemist see,
Vain Imitator of the curious Bee,
Nor Arts improv'd thro' Ages once produce
A single Drachm of this delicious Juice.

(VI 81-84)

Like Pliny, Brooks compares the beehive to politics.

In beehive politics, "We read revers'd each Polity of Man."

Who first in Council form'd your Embryon State?
Who rose a Patriot in the deep Debate?
Greatly propos'd to reconcile Extremes,
And weave in Unity opposing Schemes?
From Fears, infer'd just Reason of Defence,
And from Self-Int'rest rais'd a publick Sonses.
Then pois'd his Project with transposing Scales,
And from the publick, shew'd the private Seal.
Mence aptly summ'd, these Politicians draw
The Trust of Loy'ry, and Sanctitude of Law.

(VI 95-104)

Brooke expressed similar ideas of ideal government two years after Universal Beauty in his play Gustavus Vasa, wherein the
hero gives up the heroine in order to serve his country as an administrator. Brooke obviously finds no accurate parallel in a beehive for the following sentiment:

The Law's protected o'en for private Ends, Whereon each Individual's Right depends.

*(VI 109-110)*

*Universal Beauty* may be Brooke's first public statement of democratic ideas, even though the autocratic and instinctual beehive may be the worst example possible:

The Publick thus each private End pursues, Each in the Publick drowns all private Views.

*(117, 118)*

The clashing Populace obsequious wait, Or speed the different Orders of the State.

*(137, 138)*

Brooke tries to make the hard-working life of the bees attractive as the worker bees frequent at the busy Gate arrive, And fill with Amber Sweets their fragrant Hive; Or seek Repairs to close the fractur'd Cell; Or shut the waxen Tombs where Embryos dwell; The Gat'ters prompt, a frugal Portion deal, And give to Diligence a hasty Meal.

*(VI 141-146)*

In these obvious attempts to attack Mandeville's notions of self-interest, Brooke unfortunately sounds less like a follower of Shaftesbury than of Hobbes.

A queen, like Dido, leaves to make a new hive, and the workers construct it. "With what prodigious Geometrical Subtily do these little Animals work their deep hexagonal Cells," says Derham. Of the three possibilities—triangular, quadrangular, or hexagonal—the bees have chosen best.
Ray discusses the bees' choice of the hexagon:

Of these three the Bee makes use of the Hexagon, both because it is more capacious than either of the other, provided they be of equal compass, and no equal matter spent in the construction of each: And Secondly, Because it is most commodius for the Bee to creep into: And Lastly, Because in the other figures more Angles and Sides must have met together at the same point, and so the work could not have been so firm and strong. 34

Brooke speaks further of bees, but pays more interesting tribute to wasps:

Nor be the Wasp exclusive of our Lays;  
Tho' in a Bee, still Merit claims its Praise.  
(VI 219, 220)

Pluche: "Wasps are voracious by a natural Instinct that impels them; whereas Man is a Malefactor by Choice." 35

For deep these subterranean Tribes retire,  
Nor work like Man, that Mortals may admire;  
In Earth's dark Womb their pompous Structures rise,  
Worthy the Sight of HEAVEN'S ALL-SEEING EYES;  
While they recluse, o'er other Kingdoms reign,  
And wrapt as in a little World remain.  
Around this World a waxen Vault extends,  
And wide, like yon enfolding Concave bends;  
Magnific Cupolae on either hand,  
Unfolded, two mysterious Portals stand,  
Emblems of human Life, precarious State,  
At Entrance born, and dying in Retreat.  
(VI 223-234)

The nest is described further:

Here Cities pil'd o'er Cities may be seen,  
And sumptuous Intervals display'd between,
Concerning the building of wasp nests, Pluche states that wasps chew up wood to make paper which they glue onto appropriate parts of the outside of the nest.

Some of his fellow-labourers place new ones on the former, and all these leaves, thus joined and cemented with the same glue, form the grand cupola which bends over the whole habitation. The cells and columns are made with the same materials.36

Concerning the “two mysterious Portals,” Pluche continues:

But that is the meaning of these two openings.

Prior, one is a passage into the edifice, and the other leads out of it.37

Pluche’s description goes on matter-of-factly when compared to Brooke’s rhetoric, but the poet’s details are no different from the prose writer’s. Wasps build levels that are supported by columns, and which are easily passable from one to the other, and the Chevalier remarks (in Pluche), “the finest palace would not astonish me so much as the regularity of these minute apartments.”38

In general, Brooke presents the “beauty” of entomology in the colors of insects, the wonder of metamorphosis, and the geometrical perfection of webs and hives. Much curious information is given, nearly all of which is accurate; moral and political comparisons are skillfully drawn. Instead of ridiculing the virtuosos who collected insects, Brooke says...
that other virtuosos simply cannot match the achievements of the "reptile Minim." As usual, Brooke avoids all unpleasantness, never mentioning the sting of "gnats" or the sacrifice of drones to make room for food when winter comes, nor does he mention the plagues in which Thomson took interest. Parts V and VI of *Universal Beauty* give a genial appreciation of insects, indicating that Brooke had observed his subjects, looking for colors, for social organization, and for rare information. He wrote at a time when there was no real controversy over insects—equivocal generation had been discarded—and entomological data had only to be harmonized, like the data of other sciences, with the poet's interpretation of morals, of politics, of the cosmos, or what not.

At the end of this study, let us say that Henry Brooke reports the discoveries of science wide-eyed and ingenuously. *Universal Beauty*, which is not a descriptive poem, puts more scientific detail than any other poem has ever mustered together, into a bland intellectual system based upon universal harmony. We have seen Brooke repeat the significant analogies of his day in the water cycle, marvel at the reaches, but also the limits, of knowledge concerning light, and advance his own opinions in tiny controversies whether snails have eyes at the ends of their antennae. Brooke's deliberate unoriginality will no doubt forbid his poem ever having as wide an audience as *The Seasons*. Yet the lack of originality
only beguiles the reader to recreate the past, either to
test an Augustan layman's knowledge of science, or to
specify what an ordinary Augustan poet saw in nature.
Brooke, because science at the time did not try to go past
commonly received metaphysics, was among the last poets who
could accept whole-heartedly the revelations of the exact
discipline. Erasmus Darwin's *Botanick Garden* (1791), supposedly
inspired by *Universal Beauty*, carried Brooke's poetic
periphrase into obsolescence, and, in general, poets since
Brooke have held science as far away as either ignorance,
fear, or suspicion would allow. Wordsworth grew old disliking
science, and Shelley's youthful enthusiasm seems to have
inspired him to no systematic study.

Brooke's epistemology depends upon God to make sensible
phenomena consistent enough to be reported and interpreted
accurately by natural philosophers. Science, then, should
be a plain, straightforward activity. And so it actually is--
the physico-theological textbooks give clear and precise and
logical scientific details and speculations (they emphasize
the obviousness of design), and only become ridiculous or
obscure when they admit theology. Although it seems
unfortunate that a scientific poem depended upon the poet's
religion, the poem itself is a scientific fossil with minute
detail preserved. In it we can see what use a typical
Augustan poet made of science and nature. Also there is the
problem, now called semantical, of the exact relationship of
words to phenomena—that Brooke more or less solves without comment, the problem of reporting exactly and comprehensibly a natural phenomenon. Brooke was supported by the permission of his age to use poetics and familiar comparisons, the latter of which are still with us. And, it is not too late to say, even in the last sentence, that Brooke discusses many familiar and interesting things, always in smooth and frequently precise diction, and often in terms so felicitous as to impel the reader to admit that were he himself determined to write a verse about a mill, an annelid, or the elasticity of air, he could not have chosen terms better.
CHAPTER I

Philosophic Content


2. C. H. Wilson, Brockiana (London, 1804), II, pp. 9, 10. Bonamy Dobree, in his English Literature in the Early Eighteenth Century 1700-1740 (Oxford, 1959), pp. 503, 19, says that Brooke wrote two poems on a similar subject—Universal Beauty and Design and Beauty: an Epistle of 1734. If so, Pope may have read both. However, Design and Beauty is usually considered anonymous—see Scurr, Henry Brooke, p. 27. Dr. McKillop does not believe that Brooke wrote Design and Beauty. The poem in question is not listed in the bibliography of anonymous and pseudonymous literature.


6. Universal Beauty, note to Part V, line 163.


9. Scurr, Henry Brooke, pp. 31-46. Miss Scurr, referring to Cecil Moore's "Shaftesbury and the Ethical Poets in England, 1700-1760," in PMLA (1916), 264-325, demonstrated the connection in general, but not such detail as this study has done.


13. Ibid., p. 21.
15. The Works of Mr. Henry Needler (London, 1728). This was the second edition of the works of a young poet who committed suicide. Miss Scurr did not know the date of the first edition, Henry Brooke, p. 14. Rice Institute's copy is dated 1724, and may be the first edition.
16. Ibid. (1724), pp. 94-96, 104.
17. Ibid., p. 107.
28. Ibid., pp. 14, 15.
31. Ibid., p. 479.
32 Ibid.
33 Ibid., p. 431.
34 Ibid., p. 460.
35 Page 1.
36 Henry Brooke, p. 43.
38 Henry Brooke, p. 29.
39 Universal Beauty, note to Part IV, l. 250.
40 English Literature 1700-1740, p. 488.
41 Universal Beauty, note to IV, l. 19.
43 Page 150 ct. al.
44 Religious Trends, I, p. 478.
46 Universal Beauty, III, line 29.
50 Autumn (1744), lines 858-879.
The Background of Thomson's "Seasons" listed "the steps
the mind takes in proceeding through nature" in The Seasons,
pp. 20-22. Professor McKillop finds Thomson examining the
Chain of Being and claiming that knowledge and morality will
advance to infinity in the after-life. Professor McKillop
told me that Thomson did not equate nature with God.

M. N. Nicolson, "The Microscope and English Imagination,"
in Science and Imagination (Cornell, 1956), p. 156. She
summarizes Lovejoy's The Great Chain of Being, Chap. IV.

A. O. Lovejoy, The Great Chain of Being (Massachusetts,
1936), IX.

In the chapter on "Planets about the First Stars,"
pp. 35-41.

Great Chain of Being, IX.

An Inquiry into the Origin of Our Ideas of Beauty and

CHAPTER II

Diction, Technique, and Sources

2. Ibid., p. 15.
3. Aspects of Eighteenth Century Nature Poetry (Oxford,
1933), pp. 11-13.

Lovejoy gives at least 35 normative uses of the word
"nature" in eighteenth century aesthetics. "Nature as
Aesthetic Norm," in Essays in the History of Ideas.

Professor George Williams, who is an ornithologist,
tells me that birds do not play in the mud, although they
may feed there. Brooke's line is not perfectly clear on
the point.
5. Spectator 413.
9 Ibid.


12 *Summer* (1744), 11. 1334-1339.

13 Universal Beauty, VI, 336.


17 *The Sister Arts*, chap. V, sect. I.


23 *Brookiana*, II, p. 82.


25 Henry Brooke, p. 46.
CHAPTER III
Aesthetic Concepts


CHAPTER IV
The Water Cycle

1. P. 65, notes.
2. Ibid.
4. Alan Dugald McKillop, The Background of Thomson's "Seasons" (Minnesota, 1942), pp. 82-83.
5. Autumn (1744), 768-770.
6. P. 77.
7. Physico-Theology, p. 35.
9. Ibid., p. 20.
13. Physico-Theology, p. 78.
CHAPTER V

Light, Vision, and the Atmosphere

1. Phisico-Theology, p. 29.
5. Third edition, p. 29.
11. Universal Beauty, note to I, 74.
13. Newton Demands the Muse, pp. 93, 94.
15. Phisico-Theology, pp. 5-10.

CHAPTER VI

Insects

Universal Beauty, note to IV, 341.

Quoted from The Virtuoso by M. H. Nicolson, The 
Microscope and English Imagination (Smith College Studies, 

Bernard de Fontenelle, Conversations with a Lady, on 
the Plurality of Worlds (London, 1719), pp. 86, 87.

Addison's Works (Bohn Library, London, 1907), IV, 
pp. 41, 42.


The Backward of Thomson's "Seasons," p. 46.

P. 232.

Philosophical Principles, p. 219.


The Natural History (Bohn Library, London, 1657). 
(Heinemann, London, 1938-56).


Universal Beauty, note to V, 232.


Ibid., p. 596.

Spectacle, I, p. 181. (Both passages)

Phys. Theol., p. 92, notes.

Spectacle, I, p. 182.

Quoted from Chalmers, as are all of the quotations 
from Universal Beauty which have normalized punctuation.


P. 132.

Universal Beauty, notes to V, 153 and 162.
24 Spectacle, I, pp. 21, 22.
28 Spectacle, I, p. 44.
29 Ibid., pp. 27, 28.
31 Spectacle, I, p. 31.
32 Ibid., p. 134.
35 Spectacle, I, p. 91.
36 Ibid., p. 94.
37 Ibid., p. 95.
38 Ibid., p. 97.
BIBLIOGRAPHY


Medulla Poetorum Romanorum: or the Most Beautiful and Instructive Passages of the Roman Poets, London, 1737.


New Improvements of Planting and Gardening, Both Philosophical and Practical, London, 1739.


Cheyne, George, *Philosophical Principles of Natural Religion: Containing the Elements of Natural Philosophy, and the Proofs for Natural Religion Arising from them*, London: George Strahan, 1705.


Clarke, Samuel, *A Collection of Papers, Which passed between the late Learned Mr. Leibnitz, and Mr. Clarke, in the Years 1715 and 1716. Relating to the Principles of Natural Philosophy and Religion*, London: James Knapton, 1717.


---

-37-

---

dictionarium Rusticum, Urbanicum, and Botanicum, London:
James Knapton, 1726.

Descartes, René, "Discourse on Method," in Harvard Classics 34,


"James Thomson's Contact with Newtonianism and his Interest in Natural Philosophy," PMLA: LIX (1934), 71-80.


"James Thomson's Ethical Theory and Scientific Rationalism," PC, XIV (1955), 70-82.


Gardner, Martin, Fads and Fallacies in the Name of Science, New York: Dover paperback, 1957.

Glanvill, Joseph, *Plus Ultra or the Progress and Advancement of Knowledge since the Days of Aristotle* (1668), Gainesville, Florida: Scholars' Facsimiles and Reprints, 1958.

*The Vanity of Dogmatizing*, New York: Columbia Text Society, 1921.


Hooke, Robert, *Extracts from Micrographia: or some Physiological Descriptions of Minute Bodies made by Magnifying Glasses*, Edinburgh: The Almain Club Reprints, 1902.


"Optimism and Romanticism," *PMLA*, XLII (1927), 921-945.


*The Background of Thomson's "Seasons,"* Minneapolis: University of Minnesota Press, 1942.


-140-

The Gardener's Kalendar. Directing what Works are Necessary to be done Every Month, London, 1757.


Pluche, Abbe Noel Antoine, *Spectacle de la Nature, or Nature Display'd*, being Discourses on such Particulars of Natural History as were thought most proper to excite the Curiosity, and Form the Minds of Youth, trans. Humphreys, third ed., London, vol. I (1755), vol. II (1757), vol. III (1759), vol. IV (1760).

---


Rohault's *System of Natural Philosophy, Illustrated with*
Dr. Samuel Clarke's Notes, Taken mostly out of Sir Isaac Newton's Philosophy, trans. John Clarke, London: James Knapton, 1723.


Scurr, Helen Margaret, Henry Brooks, University of Minnesota, 1922.


Shaftesbury, Anthony Ashley Cooper, Third Earl of, Characteristics of Men, Manners, Opinions, Times, etc., London: Grant Richards, 1900.


