

Bruno - "On The Infinite Universe And Worlds"

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[From this address](#)

GIORDANO BRUNO

On the Infinite Universe and Worlds

To the Most Illustrious

Monsieur de Mauvissiere

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INTRODUCTORY EPISTLE addressed to the most illustrious Monsieur Michel de Castelnau, Seigneur de Mauvissiere, de Concessault and de Joinville, Chevalier of the Order of the most Christian King, Privy Councillor, Captain of 50 men at arms, and Ambassador to Her most Serene Majesty the Queen of England.

IF, O most illustrious Knight, I had driven a plough, pastured a herd, tended a garden, tailored a garment: none would regard me, few observe me, seldom a one reprove me; and I could easily satisfy all men. But since I would survey the field of Nature, care for the nourishment of the soul, foster the cultivation of talent, become expert as Daedalus concerning the ways of the intellect; lo, one doth threaten upon beholding me, another doth assail me at sight, another doth bite upon reaching me, yet another who hath caught me would devour me; not one, nor few, they are many, indeed almost all. If you would know why, it is because I hate the mob, I loathe the vulgar herd and in the multitude I find no joy. It is Unity that doth enchant me. By her power I am free though thrall, happy in sorrow, rich in poverty, and quick even in death. Through her virtue I envy not those who are bond though free, who grieve in the midst of pleasures, who endure poverty in their wealth, and a living death. They carry their chains within them; their spirit containeth her own hell that bringeth them low; within their soul is the disease that wasteth, and within their mind the lethargy that bringeth death. They are without the generosity that would enfranchise, the long suffering that exalteth, the splendour that doth illumine, knowledge that bestoweth life. Therefore I do not in weariness shun the arduous path, nor idly refrain my arm from the present task, nor retreat in despair from the enemy that confronteth me, nor do I turn my dazzled eyes from the divine end. Yet I am aware that I am mostly held to be a sophist, seeking rather to appear subtle than to reveal the truth; an ambitious fellow diligent rather to support a new and false sect than to establish the ancient and true; a snarer of birds who pursueth the splendour of fame, by spreading ahead the

darkness of error; an unquiet spirit that would undermine the edifice of good discipline to establish the frame of perversity.

Wherefore, my lord, may the heavenly powers scatter before me all those who unjustly hate me; may my God be ever gracious unto me; may all the rulers of our world be favourable to me; may the stars yield me seed for the field and soil for the seed, that the harvest of my labour may appear to the world useful and glorious, that souls may be awakened and the understanding of those in darkness be illumined. For assuredly I do not feign; and if I err, I do so unwittingly; nor do I in speech or writing contend merely for victory, for I hold worldly repute and hollow success without truth to be hateful to God, most vile and dishonourable. But I thus exhaust, vex and torment myself for love of true wisdom and zeal for true contemplation. This I shall make manifest by conclusive arguments, dependent on lively reasonings derived from regulated sensation, instructed by true phenomena; for these as trustworthy ambassadors emerge from objects of Nature, rendering themselves present to those who seek them, obvious to those who gaze attentively on them, clear to those who apprehend, certain and sure to those who understand. Thus I present to you my contemplation concerning the infinite universe and innumerable worlds. [1]

ARGUMENT OF THE FIRST DIALOGUE

YOU learn from the first Dialogue Firstly, that the inconstancy of sense-perception doth demonstrate that sense is no source of certainty, but can attain thereto only through comparison and reference from one sensible percept to another, from one sense to another, so that truth may be inferred from diverse sources.

Secondly, the demonstration is begun of the infinity of the universe; [2] and the first argument is derived from the failure to limit the world by those whose fantasy would erect around it boundary walls.

Thirdly, it will be shown that it is unfitting to name the world finite, and contained within itself, since this condition belongeth only to immensity, as shown by the second argument. Moreover, the third argument is based on the inconvenience and indeed impossibility of imagining the world to occupy no position. For inevitably it would follow that it was without being, since everything whether corporeal or incorporeal doth occupy corporeally or incorporeally some position.

The Fourth argument is based on a demonstration or urgent question put by the Epicureans:

Moreover, suppose now that all space were created finite; if one were to run on to the end, to its furthest coasts, and throw a flying dart, would you have it that the dart, hurled with might and main, goeth on whither it is sped, flying afar, or think you that something can check and bar its way? ... For whether there be something to check it and bring about that it arriveth not whither it was sped, and planteth not itself in the goal, or whether it fareth forward, yet it set not forth from the end. [3]

Fifthly, Aristotle's definition of position [4] is unsuited to primal, vast, universal space [4] and it befitteth not to take the surface nearest and adjoining the content or other such foolishness which would regard space [4] as mathematical and not physical, not to mention that between the containing surface and the content which moveth therein, there is always and inevitably an intermediate space [5] which should rather be named position; [4] and if we wish only to take the surface of space, [5] we need to go seeking a finite position [4] in the infinite.

Sixthly, if we posit a finite world, it is impossible to escape acceptance of the void, if void is that which containeth naught.

Seventhly, this space in which is our world would without it be indeed a void, since where the world is not, there we must infer a void. Beyond our world then, one space is as another; therefore the quality of one is also that of the other; wherefore too this quality cometh to action, for no quality is eternally without action, and indeed it is eternally linked to action or rather is itself action, for in eternity there is no distinction between being and potential being [nor therefore between action and potential action].

Eighthly, none of our sense-perceptions is opposed to the acceptance of infinity, since we cannot deny infinity merely because we do not sensibly perceive it; but since sense in itself is included in infinity, and since reason doth confirm infinity, therefore needs must that we posit infinity. Moreover, if we consider well, sense doth present to us an infinite universe. For we perceive an endless series of objects, each one contained by another, nor do we ever perceive either with our external or our internal sense, an object which is not contained by another or similar object.

Lastly before our eyes one thing is seen to bound another; air is as a well between the hills, and mountains between tracts of air, land bounds the sea and again sea bounds all lands; yet in truth there is nothing outside to limit the universe ... so far on every side spreads out huge room for things, free from limit in all directions everywhere. [6]

From the testimony of our sight then we should rather infer the infinite, since there is no object which doth not terminate in another, nor can we experience aught which terminateth in itself.

Ninthly, only verbally is it possible to deny infinite space, as is done by pertinacious fellows. For the rest of space where the universe is not, which is called void, where indeed it is pretended that nothing doth exist, cannot be conceived as without the capacity to contain no less a magnitude than that which it doth contain.

Tenthly, since it is well that this world doth exist, no less good is the existence of each one of the infinity of other worlds.

Eleventhly, the virtue of this world is not communicable to any other world soever, just as my being cannot be communicated to the being of this or of that man.

Twelfthly, there is no reason or sense-perception which, since we accept an infinity undivided, utterly simple and all-embracing, will not permit also a corporeal and extended infinity.

Thirteenthly, our own surrounding space which appeareth to us so immense is neither part nor whole in relation to the infinite; nor can it be patient of infinite activity; compared to such activity, indeed, that which can be comprehended by our imbecile minds is merely nonbeing. And to a certain objection it may be replied that we base our argument for infinity not on the dignity of space but on the dignity of the natures [of worlds], since for the same reason that our space doth exist, so also should exist every other possible world; and their power of being is not actuated by our world's being, just as Elpino's power of being is not actuated by the existence of Fracastoro.

Fourteenthly, if infinite active power doth actuate corporeal and dimensional being, this being must necessarily be infinite; otherwise there would be derogation from the nature and dignity both of creator and of creation.

Fifteenthly, the universe as vulgarly conceived cannot contain the perfection of all things, save in the sense that I contain the perfection of all my members, and every globe containeth its entire contents. It is as though we named everyone rich who lacketh naught which he possesseth.

Sixteenthly, efficient infinity would be utterly incomplete without the [infinite] effect thereof, as we cannot conceive that such an effect [of infinity] should be the efficient infinity itself. Furthermore, if such were or could be the effect, this doth in no way detract from that which must appertain to every veritable effect, wherefore theologians name action ad extra or transitive in addition to imminent action, so that thus it is fitting that both one and the other be infinite.

Seventeenthly, to call the universe [7] boundless as we have done bringeth the mind to rest, while the contrary doth multiply innumerable difficulties and inconveniences. Furthermore, we repeat what was said under headings two and three.

Eighteenthly, if the world be spherical, it hath figure and boundary; and the boundary which is yet beyond this boundary and figure (though it may please thee to term it nullity) hath also figure, so that the concavity of the latter is joined to the convexity of the former, since the beginning of this thy nullity is a concavity completely indifferent to the convex surface of our world.

Nineteenthly, more is added to that which hath been said under the second heading.

Twentiethly, that which hath been said under heading ten is repeated.

In the Second Part of this Dialogue, that which hath already been shewn concerning the passive power of the universe is demonstrated for the active power of the efficient cause, set forth with arguments of which the first deriveth from the fact that divine power should not be otiose; particularly positing the effect thereof outside the substance thereof (if indeed aught can be outside it), and that it is no less otiose and invidious if it produce a finite effect than if it produce none.

The Second argument is practical, shewing that the contrary view would deny divine goodness and greatness. While from our view there followeth no inconvenience whatever against what laws you will, nor against the matter of theology.

The Third argument is the converse of the twelfth of Part 1. And here is shewn the distinction between the infinite whole and the completely infinite.

The Fourth argument sheweth that no less from lack of will than from lack of power, omnipotence cometh to be blamed [by the Aristotelians] for the creation of a finite world, the infinite agent acting on a finite subject.

The Fifth argument doth demonstrate that if omnipotence maketh not the world infinite, it is impotent to do so; and if it hath not power to create it infinite, then it must lack vigour to preserve it to eternity. And if finite in one respect, it would be so in all, for every mode therein is an object, and every object and every mode are the same, the one as the other.

The Sixth argument is the converse of the tenth of Part 1, and sheweth the reason why theologians defend the contrary view, not without expedient argument, and discourseth of friendship between these learned divines and the learned philosophers.

The Seventh doth propound the reasons which distinguish active power from diverse actions, and dischargeth such argument. Further, it expoundeth infinite power intensively and extensively in more lofty fashion than hath ever been done by the whole body of theologians.

The Eighth doth demonstrate that the motion of the infinity of worlds [8] is not the result of external motive force, but of their own nature, and that despite this there existeth an infinite motor force.

The Ninth sheweth how infinite motion may be intensively verified in each of the worlds. To this we should add that since each moving body at the same time moveth itself and is moved, needs must that it may be seen in every point of the circle that it describeth around its own centre. And this objection we discharge on other occasions when it will be permissible to present the more diffuse doctrine.

ARGUMENT OF THE SECOND DIALOGUE

THE second Dialogue reacheth the same conclusion. Firstly, four arguments are brought forward. The first sheweth that all the attributes of divinity are together as each one singly. The second doth demonstrate that our imagination should not be able to aspire beyond divine action. The third doth postulate the indifference of the distinction between divine intellect and divine action, and doth demonstrate that divine intellect conceiveth the infinite no less than the finite. The fourth argument enquireth, if the corporeal quality perceptible to our senses is endowed with infinite active power, then what will be the absolute totality of active and passive power inherent in the totality of all things?

Secondly, it is demonstrated that a corporeal object cannot be terminated by an incorporeal object, but either by a Void or by a Plenum, and in either case, beyond the world is Space which is ultimately no other than Matter; this is indeed that same passive force whereby active force, neither grudging nor otiose, is roused to activity. And the vanity is shewn of Aristotle's argument concerning the incompatibility of dimensions. [9]

Thirdly, the difference is taught between the world and the universe, because he who declareth the universe a single infinity necessarily distinguisheth between these two terms.

Fourthly, there are brought forward contrary arguments, that regard the universe as finite, wherein Elpino referreth to all the sentences of Aristotle, and Philotheo examineth them. Some are derived from the nature of simple, others from that of composite, bodies. And the vanity is shewn of six arguments taken from the definition of motions which cannot be infinite, and from other similar propositions which are without meaning, purpose or plausibility, as will be seen. For our arguments shew forth more convincingly the reason for the differences and for the termination of motion. And so far as comporteth with the occasion and place, they demonstrate the true understanding of strong and of weak impulses. For we shall shew that an infinite body is in itself neither heavy nor light, and we shall demonstrate in what manner a finite body can or again cannot receive such variations. Thus will be made clear the vanity of Aristotle's arguments against those who posit an infinite world, when he supposeth a centre and circumference, maintaining that our earth doth attain to the centre whether of a finite or of an infinite. Finally there is no proposition, great or small, adduced by this philosopher in order to destroy the infinity of the world, either in the first book of his *De coelo et mundo*, or in the third book of his *Physica*, which is not adequately discussed.

ARGUMENT OF THE THIRD DIALOGUE

IN THE third Dialogue there is first denied that base illusion of the shape of the heavens, of their spheres and diversity. For the heaven is declared to be a single general space, embracing the infinity of worlds, though we do not deny that there are other infinite 'heavens' using that word in another sense. For just as this earth hath her own heaven (which is her own region), through which she moveth and hath her course, so the same may be said of each of the innumerable other worlds. The origin is shown of the illusion of so many moving bodies subordinated to each other [10] and so shaped as to have two external surfaces and one internal cavity, [11] and of other nostrums and medicines, which bring nausea and horror even to those who concoct and dispense them, not less than to the wretches who swallow them.

Secondly, we expound how both general motion and that of the above-mentioned eccentrics, and as many as may be referred to the aforesaid firmament are all pure illusion, deriving from the motion of the centre of the earth along the ecliptic and from the four varieties of motion which the earth taketh around her own centre. Thus it is seen that the proper motion of each star resulteth from the difference in position, which may be verified subjectively within the star as a body moving alone spontaneously through the field of space. This consideration maketh it understood that all their arguments concerning the [primum] mobile and infinite motion are

vain and based on ignorance of the motion of this our own globe.

Thirdly, it will be propounded that every star hath motion even as hath our own and those others which are so near to us that we can sensibly perceive the differences in their orbits and in their motions: but those suns, bodies in which fire doth predominate, move differently to the earths in which water predominateth; thus may be understood whence is derived the light diffused by stars, of which some glow of themselves and others by reflection.

Fourthly, it is shewn how stars at vast distances from the sun can, no less than those near to it, participate in the sun's heat, and fresh proof is given of the opinion attributed to Epicurus, that one sun may suffice for an infinite universe. [12] Moreover, this explaineth the true difference between stars that do and stars that do not scintillate.

Fifthly, the opinion of the Cusan is examined concerning the material and the habitability of other worlds and concerning the cause of light.

Sixthly, it is shewn that although some bodies are luminous and hot of their own nature, yet it doth not follow that the sun illumineth the sun and the earth illumineth herself, or that water doth illumine itself. But light proceedeth always from the opposed star; just as, when looking down from lofty eminences such as mountains, we sensibly perceive the whole sea illuminated; but were we on the sea, and occupying the same plane thereof, we should see no illumination save over a small region where the light of the sun and the light of the moon were opposed to us.

Seventhly, we discourse concerning the vain notion of quintessences; and we declare that all sensible bodies are no other, and composed of no different proximate or primal principles than those of our earth, nor have they other motion, either in straight lines or circles. All this is set forth with reasons attuned to the senses, while Fracastoro doth accommodate himself to the intelligence of Burchio. And it is shewn clearly that there is no accident here which may not be expected also on those other worlds; just as if we consider well we must recognize that naught there can be seen from here which cannot also be seen here from there. Consequently, that beautiful order and ladder of nature [13] is but a charming dream, an old wives' tale.

Eighthly, though the distinction between the elements be just, yet their order as commonly accepted is by no means perceptible to the senses or intelligible. According to Aristotle, the four elements are equally parts or members of this globe -- unless we would say that water is in excess, wherefore with good cause the stars are named now water, now fire, both by true natural philosophers, and by prophets, divines and poets, who in this respect are spinning no tales nor forging metaphors, but allow other wiseacres to spin their tales and to babble. These worlds must be understood as heterogeneous bodies, animals, great globes in which earth is no heavier than the other elements. In them all particles move, changing their position and respective arrangement, just as the blood and other humours, spirits and smallest parts which ebb and flow are absorbed and again exhaled by us and other minor animals. In this connection a comparison is adduced shewing that the earth is no heavier by virtue of the attraction of her mass toward her own centre than is any other simple body of similar composition; that

moreover the earth in herself is neither heavy, nor doth she ascend or descend; and that it is water which unifieth, and maketh density, consistency and weight.

Ninthly, since the famous order of the elements is seen to be vain, the nature is deduced of these sensible compound bodies which as so many animals and worlds are in that spacious field which is the air or the heaven, or the void, in which are all those worlds which contain animals and inhabitants no less than can our own earth, since those worlds have no less virtue nor a nature different from that of our earth.

Tenthly, after it hath been seen how the obstinate and the ignorant of evil disposition are accustomed to dispute, it will further be shewn how disputes are wont to conclude; although others are so wary that without losing their composure, but with a sneer, a smile, a certain discreet malice, that which they have not succeeded in proving by argument -- nor indeed can it be understood by themselves -- nevertheless by these tricks of courteous disdain they [pretend to have proven], endeavouring not only to conceal their own patently obvious ignorance but to cast it on to the back of their adversary. For they dispute not in order to find or even to seek Truth, but for victory, and to appear the more learned and strenuous upholders of a contrary opinion. Such persons should be avoided by all who have not a good breastplate of patience.

ARGUMENT OF THE FOURTH DIALOGUE

FIRSTLY in this Dialogue is repeated that which hath been said on other occasions concerning the infinity of worlds and how each one of them moveth, and what is the configuration thereof.

Secondly, as in the second Dialogue arguments against the infinite mass or size of the universe were refuted, after the vast effect of immense vigour and power had been demonstrated with many arguments in the first Dialogue; even so, the infinite multitude of worlds having been demonstrated in the third Dialogue, we now refute the numerous contrary arguments of Aristotle; though this word world hath indeed one meaning when used by Aristotle and quite another when used by Democritus, Epicurus and others. Aristotle, in arguments based on natural and impressed motion and on the nature of each which he formulateth, holdeth that one Earth should move toward another. To refute these doctrines, Firstly, principles are established of no little importance for the elucidation of the true foundations of natural philosophy; Secondly, it is shewn that however closely the surface of one Earth were contiguous with that of another, it would not happen that parts of the one, that is to say, heterogeneous or dissimilar parts -- I speak not of atoms nor of simple bodies -- could move to the other Earth. Thereby the need is recognized to consider more carefully the nature of heaviness and of lightness.

Thirdly, wherefore have these great bodies been disposed by nature at so great a distance one from another, instead of being placed nearer so that it would have been possible to pass from one to another? Thence to a profounder vision it doth appear why worlds could not be placed as it were in the circumference of the ether; that is, they could not be adjoining unto a void which hath neither power, virtue nor force, for it would then be impossible from one side to derive

either life or light.

Fourthly, we consider in what respect local space may or may not change the nature of a body. And why it is that if a stone be equidistant between two earths, it will either remain stably poised or if it do not so, why it will move rather toward one than toward the other.

Fifthly, we consider how mistaken was Aristotle in holding the belief that between bodies, however distant, there is a force of heaviness or lightness attracting from one toward the other, [14] whence proceedeth the universal tendency to resist change of state (however lowly), whence arise flight and persecutions.

Sixthly, it is shewn that movement in a straight line doth not appertain to the nature of our earth or of other principal bodies, but rather to the parts of these bodies which, if not at too great a distance, move toward one another from the most diverse positions.

Seventhly, it is argued from the behaviour of comets that it is not true that a heavy body, however distant, suffereth attraction or motion toward the body which containeth it. This hypothesis indeed was based not on truly physical principles, but on Aristotle's purely philosophical suppositions, formulated by him from a consideration of those parts which are vapours and exhalations of our earth. [15]

Eighthly, concerning another line of reasoning, it is shewn that simple bodies of identical nature in innumerable diverse worlds have similar motion, and that merely arithmetical diversity causeth a difference of locality, each part having his own centre and being also referred to the common centre which cannot be sought within the universe.

Ninthly, it is demonstrated that bodies and their parts have no determined upper or lower portions, save in so far as the direction of their conservation may be toward this way or that.

Tenthly, it is shewn that motion is infinite, and that a moving body tendeth toward infinity and to the formation of innumerable compounds; but that heaviness or lightness do not therefore follow, nor infinite speed; and indeed the motion of adjacent parts, inasmuch as they preserve their own nature, cannot be infinite. Moreover the attraction of parts to their own containing body can only take place within the local space thereof.

ARGUMENT OF THE FIFTH DIALOGUE

IN THE beginning of the fifth Dialogue is presented a learned person of a happier talent who, howbeit educated in the contrary doctrine, yet by power to judge what he hath heard and seen, can distinguish between two disciplines and can easily alter and correct his views. Those too are indicated to whom Aristotle doth appear a miracle of nature, who misinterpret him and, with little talent, have an exalted opinion concerning him. Wherefore we should pity them, and flee from disputation with them, since against them it is only possible to lose.

Here Albertino, a fresh interlocutor, introduceth twelve arguments which comprise every point against a plurality or multitude of worlds. The First suggesteth that outside our own world we

can appreciate neither position, time, nor space, neither simple nor composite body. The Second asserteth the unity of the single motor power. The Third is based on the positions of mobile bodies; the Fourth, on the distance of the centre from the horizons. The Fifth argueth from the contiguity of the orbs of the worlds; the Sixth from the triangular spaces which are caused by their contact. The Seventh doth maintain infinity in action (which hath indeed no existence), and supposeth a determinate number [of worlds] which is indeed no more rationally probable than the other. From the same reasoning we can infer not merely as well but much more easily that the number of worlds is not determined but is infinite. The Eighth [Aristotelian argument of Albertino] is based on the determination of natural bodies, and on the passive force of bodies which doth not yield to divine influence and active power. But here we must consider that it is highly inconvenient to suppose the Supreme and Highest to be similar merely to a performer on the zither who cannot play in the absence of the instrument; thus would a Creator be unable to create because that which he is able to create cannot be created by him. This would lay down an obvious contradiction which cannot be overlooked save by the most ignorant. The Ninth argument is based on urbane courtesy which lieth in conversation. The Tenth doth aver that from the contiguity of one world with another must be deduced that the motion of one doth impede that of the other. The Eleventh maintaineth that if this world is complete and perfect, it is impossible that one or more others should be added to it.

These are the doubts and motives whose solution involveth only so much doctrine as will suffice to lay bare the intimate and radical errors of the current philosophy, and the weight and force of our own. Here is the reason wherefore we must not fear that any object may disappear, or any particle veritably melt away or dissolve in space or suffer dismemberment by annihilation. Here too is the reason of the constant change of all things, so that there existeth no evil beyond escape, nor good which is unattainable, since throughout infinite space and throughout endless change all substance remaineth one and the same. From these reflections, if we apply ourselves attentively, we shall see that no strange happening can be dismissed by grief or by fear, and that no good fortune can be advanced by pleasure or hope. Whereby we find the true path to true morality; we will be high minded, despising that which is esteemed by childish minds; and we shall certainly become greater than those whom the blind public doth adore, for we shall attain to true contemplation of the story of nature which is inscribed within ourselves, and we shall follow the divine laws which are engraved upon our hearts. We shall recognize that there is no distinction between flight from here to heaven and from heaven hither, nor between ascent from there hither and from here to there; nor yet is there descent between one and the other. We are not more circumferential to those others than they to us; they are not more central to us than we to them. Just as we do tread our star and are contained in our heaven, so also are they.

Behold us therefore beyond reach of jealousy, liberated from vain anxiety and from foolish concern to covet from afar that great good which we possess close by and at hand. Behold us moreover freed from panic lest others should fall upon us, rather than encouraged in the hope that we may fall upon them. Since the air which sustaineth our globe is as infinite as that which sustaineth theirs, and this animal [the earth] wandereth through her own space and reacheth

her own destination as freely as do those others. When we have pondered and understood this, ah, how much further shall we be led to ponder and understand.

Thus by means of this science we shall certainly attain to that good which by other sciences is sought in vain.

For here is the philosophy which sharpeneth the senses, satisfieth the soul, enlargeth the intellect and leadeth man to that true bliss to which he may attain, which consisteth in a certain balance, for it liberateth him alike from the eager quest of pleasure and from the blind feeling of grief; it causeth him to rejoice in the present and neither to fear nor to hope for the future. For that Providence or Fate or Lot which determineth the vicissitudes of our individual life doth neither desire nor permit our knowledge of the one to exceed our ignorance of the other, so that at first sight we are dubious and perplexed. But when we consider more profoundly the being and substance of that universe in which we are immutably set, we shall discover that neither we ourselves nor any substance doth suffer death; for nothing is in fact diminished in its substance, but all things wandering through infinite space undergo change of aspect. And since we are all subject to a perfect Power, we should not believe, suppose or hope otherwise, than that even as all issueth from good, so too all is good, through good, toward good; from good, by good means, toward a good end. For a contrary view can be held only by one who considereth merely the present moment, even as the beauty of a building is not manifest to one who seeth but one small detail, as a stone, a cement affixed to it or half a partition wall, but is revealed to him who can view the whole and hath understanding to appraise the proportions. We do not fear that by the violence of some erring spirit or by the wrath of a thundering Jove, that which is accumulated in our world could become dispersed beyond this hollow sepulchre or cupola of the heavens, be shaken or scattered as dust beyond this starry mantle. In no other way could the nature of things be brought to naught as to its substance save in appearance, as when the air which was compressed within the concavity of a bubble seemeth to one's own eyes to go forth into the void. For in the world as known to us, object succeedeth ever to object, nor is there an ultimate depth from which as from the artificer's hand things flow to an inevitable nullity. There are no ends, boundaries, limits or walls which can defraud or deprive us of the infinite multitude of things. Therefore the earth and the ocean thereof are fecund; therefore the sun's blaze is everlasting, so that eternally fuel is provided for the voracious fires, and moisture replenisheth the attenuated seas. For from infinity is born an ever fresh abundance of matter.

Thus Democritus and Epicurus, [16] who maintained that everything throughout infinity suffereth renewal and restoration, understood these matters more truly than those who would at all costs maintain belief in the immutability of the universe, alleging a constant and unchanging number of particles of identical material that perpetually undergo transformation, one into another.

Make then your forecasts, my lords Astrologers, with your slavish physicians, by means of those astrolabes with which you seek to discern the fantastic nine moving spheres; in these you finally imprison your own minds, so that you appear to me but as parrots in a cage, while I watch you dancing up and down, turning and hopping within those circles. We know that the

Supreme Ruler cannot have a seat so narrow, so miserable a throne, so straight a tribunal, so scanty a court, so small and feeble a simulacrum that a phantasm can bring to birth, a dream shatter, a delusion restore, a chimera disperse, a calamity diminish, a misdeed abolish and a thought renew it again, so that indeed with a puff of air it were brimful and with a single gulp it were emptied. On the contrary we recognize a noble image, a marvellous conception, a supreme figure, an exalted shadow, an infinite representation of the represented infinity, a spectacle worthy of the excellence and supremacy of Him who transcendeth understanding, comprehension or grasp. Thus is the excellence of God magnified and the greatness of his kingdom made manifest; he is glorified not in one, but in countless suns; not in a single earth, a single world, but in a thousand thousand, I say in an infinity of worlds.

Thus not in vain is that power of the intellect which ever seeketh, yea, and achieveth the addition of space to space, mass to mass, unity to unity, number to number, by the science which dischargeth us from the fetters of a most narrow kingdom and promoteth us to the freedom of a truly august realm, which freeth us from an imagined poverty and straitness to the possession of the myriad riches of so vast a space, of so worthy a field, of so many most cultivated worlds. This science doth not permit that the arch of the horizon that our deluded vision imagineth over the earth and that by our fantasy is feigned in the spacious ether, shall imprison our spirit under the custody of a Pluto or at the mercy of a Jove. We are spared the thought of so wealthy an owner and subsequently of so miserly, sordid and avaricious a donor. Nor need we accept nourishment from a nature so fecund and pregnant, and then so wretched, mean and niggard in her fruit.

Very different are the worthy and honourable fruits which may be plucked from these trees, the precious and desirable harvests which may be reaped from the sowing of this seed. We will not recall these to mind that we may not excite the blind envy of our adversaries, but we leave them to the understanding and judgement of all who are able to comprehend and judge. These will easily build for themselves on the foundations we have given, the whole edifice of our philosophy whose parts indeed, if it shall please Him who governeth and ruleth us and if the undertaking begun be not interrupted, we will reduce to the desired perfection. Then that which is inseminated in the Dialogues concerning Cause, Origin and Unity and hath come to birth in these Dialogues on the Infinite Universe and Worlds shall germinate in yet others, and in others shall grow and ripen, in yet other works shall enrich us with a precious harvest and shall satisfy us exceedingly. Then (having cleared out the tares, the darnels and other accumulated weeds), we shall fill the stores of studious and talented men with the best wheat that the soil we cultivate can produce.

Meanwhile (though I am sure it is unnecessary to commend him to you), [17] I shall yet not omit as part of my duty truly to commend to you one whom you maintain among your court not as a man of whom you have need, but rather as a person who hath need of you for many reasons you perceive. For in having round you many who serve you, you differ in no wise from the common folk, bankers and merchants; but in maintaining one in some sort worthy to be advanced, defended and prospered, in this you have been (as you have indeed ever shewn yourself) the peer of generous princes, of heroes and gods. These indeed have chosen such as

you for the defence of their friends. And I would remind you, though such reminder is I know unnecessary, that when the end cometh, you will be esteemed by the world and rewarded by God, not because you have won the love and respect of princes of the earth, however powerful, but rather for having loved, defended and cherished one man such as I have described. For those with fortune greater than yours can do nothing for you who exceed many among them in virtue, which will outlast all your trappings and tapestries. But your achievement for others may easily come to be inscribed in the book of eternity -- either that which is seen on earth or that other which is believed to be in heaven. For that which you receive from others is a testimony to their virtue, but all that you do for others is the sign and clear indication of your own virtue.

Farewell.

[THREE SONNETS]

Passing alone to those realms

The object erst of thine exalted thought,

I would rise to infinity: then I would compass the skill

Of industries and arts equal to the objects. [18]

There would I be reborn: there on high I would foster for thee

Thy fair offspring, now that at length cruel

Destiny hath run her whole course

Against the enterprise whereby I was wont to withdraw to thee.

Fly not from me, for I yearn for a nobler refuge

That I may rejoice in thee. And I shall have as guide

A god called blind by the unseeing.

May Heaven deliver thee, and every emanation

Of the great Architect be ever gracious unto thee:

But turn thou not to me unless thou art mine.

Escaped from the narrow murky prison

Where for so many years error held me straitly,

Here I leave the chain that bound me

And the shadow of my fiercely malicious foe

Who can [19] force me no longer to the gloomy dusk of night.
For he who hath overcome the great Python [20]
With whose blood he hath dyed the waters of the sea
Hath put to flight the Fury that pursued me. [21]
To thee I turn, I soar, O my sustaining Voice;
I render thanks to thee, my Sun, my divine Light,
For thou hast summoned me from that horrible torture, [22]
Thou hast led me to a goodlier tabernacle; [23]
Thou hast brought healing to my bruised heart.
Thou art my delight and the warmth of my heart; [24]
Thou makest me without fear of Fate or of Death;
Thou breakest the chains and bars
Whence few come forth free.
Seasons, years, months, days and hours --
The children and weapons of Time -- and that Court
Where neither steel nor treasure [25] avail
Have secured me from the fury [of the foe].
Henceforth I spread confident wings to space;
I fear no barrier of crystal or of glass;
I cleave the heavens and soar to the infinite.
And while I rise from my own globe to others
And penetrate ever further through the eternal field,
That which others saw from afar, I leave far behind me. [26]