Ever since Bruno began to be studied seriously as a key figure in the European philosophical tradition, there has been uncertainty as to what kind of philosopher he was. John Toland proposed him to the more radical components of the Enlightenment culture of his time as a fundamentally anti-hierarchical thinker, drawing out all the most subversive implications of his post-Copernican, infinite cosmology, with its relativization of values, not only spatial but also social, political, historical, and religious.1 But when Friedrich Heinrich Jacobi included some pregnant passages from one of Bruno’s major philosophical dialogues in Italian, De la causa, principio et uno, in the second edition of his critique of the pantheism of Spinoza, Über die Lehre des Spinoza in Briefen an Herrn Moses Mendelssohn, published in 1789, it was Bruno’s metaphysical enquiry that was being brought to the reader’s attention, and that, in defiance of Jacobi’s disapproval of its pantheistic tendencies, would become a strong influence in the following half century on the post-Kantian idealists, not only in Germany.2

In the opening years of the nineteenth century, when in Germany Schelling was writing his dialogue entitled Bruno: or a Discourse on the Divine and Natural Principles of Things, Samuel Taylor Coleridge, in England, started what would become a lifelong reading of Bruno’s philosophy, which is remarkable both for its conceptual subtlety and for its depth of vision.3 For, on one side, Coleridge admired

the studies of electricity of Joseph Priestly whose *Disquisitions on Matter and Spirit* of 1777 refers to “the famous Jordano Bruno” as a precursor of Locke and Andrew Baxter in the conviction that all the vital powers of matter should be considered the direct work of God, thus making Bruno the first exponent of a dynamic philosophy in the physical sciences. And it is in these terms, as one of the first thinkers to develop a fully dynamic idea of the processes of both being and thought, that Coleridge refers to Bruno in his most famous work, the *Biographia Literaria* of 1816, in a chapter entitled “Philosophy as Science.” On the other hand, Coleridge linked Bruno closely to the Christian mysticism of Jacob Böhme, and to an idea of the Divinity as an absolute synthesis of a cosmic struggle between contraries. Indeed, Coleridge would go so far as to write in his marginal notes to Böhme’s works, read in the English translation by William Law: “Plato in *Parmenides* and Giordano Bruno passim have spoken many things well on this awful Mystery/the latter more clearly.”

Throughout the nineteenth century, comment on Bruno ran along this double track. His works regularly found a dignified niche in the most qualified histories of science of the period, such as the section on the diffusion of the Copernican theory in William Whewell’s *History of the Inductive Sciences from the Earliest to the Present Times* of 1837, or John Tyndall’s widely read *Fragments of Science for Unscientific People* of 1879. There was also much discussion throughout the century of the influence that Bruno’s vitalistic theory of matter had exercised on the major scientific debate of the period, the theory of evolution, which culminated in the substantial reference to his natural philosophy by Henry F. Osborn in *From the Greeks to Darwin, an Outline of the Development of the Evolution Idea*, published in New York in 1894. It was Bruno’s intrepid enquiry into the new scientific theories of the late Renaissance, such as the implications of the Copernican revolution or the newly revived atomism, heedless of the protests being raised by the European theologians on both sides of the religious divide, which was celebrated by American figures of note, such as Thomas Davidson during a memorable evening dedicated to *Giordano Bruno: Philosopher and Martyr* by the Philadelphia Contemporary Club in 1890. But the other side of the picture was always present, if often in a subdued form. Emerson, for example, was reading Bruno as one of “the waiting lovers of the primal philosophy,” or “that fragmentary highest teaching which comes from the half (poetic) fabulous personages Heraclitus and Hermes Trismegistus,” although he kept such thoughts to his private notebooks and journals. In the same mid-century years, the militantly Catholic and anti-Hegelian philosopher Franz Jakob Clemens, in Germany, made an important comparison between the theory of the coincidence of opposites in Cusanus and in Bruno. Although unfavorable to the Italian, accused of illegitimately transposing an absolute identity from God to the infinite universe, thus


confusing the identity that characterizes the substance of God with that of the substance of His effects, Clemens was the first to study Cusanus as a major source of Bruno’s metaphysics: a theme that continues to lie at the center of comment on his philosophy today. Toward the end of the nineteenth century and the beginning of the twentieth, with the revival of spiritualistic, esoteric themes, often of Oriental inspiration, which aimed at polemizing with the dominant scientific positivism of the age, Bruno can be found permeating the ardently undisciplined thought of the theosophical societies of the period. For Annie Besant, he was *Theosophy's Apostle in the Sixteenth Century*, according to whom “man’s true and primitive form is divinity; if he has the consciousness of his own divinity, if he realizes it, he may regain his primitive form, and raise himself to the highest heaven.”

The nineteenth-century commentators of Bruno’s philosophy had no apparent difficulty in reconciling these two dimensions of his thought. Hegel in his lectures on the history of philosophy paid as much attention to Bruno’s dialectical logic of contraries (or what Coleridge before him had called Bruno’s “polar logic”) as he did to his resolution of those contraries in an absolute monad or the identity of an indeterminate One. Influenced undoubtedly by Hegel’s reading of Bruno, Isabel Frith-Oppenheim, in the excellently researched first book-length study of Bruno to appear in English, published in 1887, was as eager to claim Bruno as a pioneer of the early stages of the so-called “scientific revolution” as she was to underline the modernity of his idealism. But with the beginning of the new century, a polarization of interpretations of Bruno’s philosophy becomes clearly evident against a cultural background dominated by the reasons of an increasingly scientific and technological society, with anti-metaphysical and neo-positivist philosophical foundations. The book on Bruno by J. Lewis McIntyre, published in 1903, follows the positivist and neo-rationalist readings of the major Italian commentators of the second part of the nineteenth century, such as Felice Tocco and Domenico Berti, for whom the magical and spiritualistic elements in Bruno’s thought appeared as fastidious frills or leftovers from a previous age. Appreciated in Italy by the early twentieth-century editor of Bruno’s Italian dialogues, Giovanni Gentile, McIntyre’s volume is clearly concerned to present Bruno as primarily a precursor of Francis Bacon’s scientific method, just as Gentile himself, in


9. I. Frith, *Life of Giordano Bruno the Nolan* (London, 1887). Frith’s book was published under a decidedly German influence by the London publisher of German origin, Nicolas Trübner. The book was controlled and revised by the German-born Moriz Carrière, a Hegelian as well as a Bruno scholar.

his essays on Bruno’s thought as the culminating moment of the philosophy of the Renaissance, will place him just before his chapter on Galileo. When, in the central years of the twentieth century, a number of distinguished French commentators dedicate their attention to Bruno, it is the scientific components of his thought that are at the center of their attention.

Paul Henri Michel’s seminal essay on Bruno’s atomism of 1957, followed by his book on the cosmology of 1962, together with the extensive treatment of Bruno’s thought by Alexandre Koyré, both in his From the Closed World to the Infinite Universe (1957) and in his Etudes Galiléennes (1966), represent authentic milestones in the study of Bruno’s works in the context of the natural philosophy of the late Renaissance. And if it is true that Koyré considered what he thought of as Bruno’s “residual animism,” deriving from an earlier phase of medieval and Renaissance neo-platonism, as excluding him from the modern world, he was nevertheless of the opinion that Bruno’s cosmological picture, at once prophetic, rational, and poetic, had profoundly influenced both the philosophy and the science of the centuries to come: a conviction whose enduring importance has been underlined by Eugenio Garin in his volume of 1975 on Renaissances and Revolutions: Cultural Movements from the Fourteenth to the Eighteenth Centuries. This is the Bruno we find in the major publications in English of the middle years of the century, such as Dorothea Singer’s translation of and comment on the De l’infinito universo etmondi of 1950, as well as Paul Oscar Kristeller’s section dedicated to Bruno in his Eight Philosophers of the Renaissance (1964). It is also the Bruno of Hélène Vedrine’s major philosophical study entitled La conception de la nature chez Giordano Bruno, published in 1967, which remains an important point of reference for scholars concerned with Bruno’s natural philosophy and science today.

For the first sixty years or more of the twentieth century, then, it seemed as if the die had been cast finally in favor of a Bruno whose philosophy found its historical collocation as a prelude and prophecy of the scientific revolution of the later Renaissance, which was thought of as the origin of the modern world. It was precisely this interpretation of both Bruno and of the modern world that was questioned by the studies of Frances Yates, and particularly by her influential book, Giordano Bruno and the Hermetic Tradition of 1964. It is worth noticing that Yates herself made no mention, and indeed seemed quite unaware, of the nineteenth-century anticipations of her Hermetic reading of Bruno: rather, she

interpreted that century entirely in the light of the scientific positivism, which was its dominant, if not only, outcome. In this conviction, it became for her the reign of error itself, which had given rise to what she began to define as the “old” reading of Bruno, which had enclosed him within the scientific-technological organization of existence while disregarding the magical and hermetic dimension of his thought expressed in his search for the divinity as the ineffable unity of being.

Undoubtedly the influence of the studies of Aby Warburg and his successors with their alternative reading of Renaissance culture in the light of its search for primitive origins, or a prisca theologiad, cannot be overvalued in a consideration of the Bruno proposed by Frances Yates, a distinguished member of the Warburg Institute in London with which she had begun an association as far back as 1936. Clearly the book by her Warburg colleague D. P. Walker on Spiritual and Demonic Magic from Ficino to Campanella, published in 1958, is present in the background. The immediate source of this radically overturned reading of Bruno, however, as Yates explicitly indicates in the introduction to her book, was the contemporary study of the Renaissance in the light of the presence of the Hermetic texts translated from Greek into Latin by Marsilio Ficino at the request of Cosimo dei Medici in 1463: a previously unsuspected presence demonstrated in a seminal paper by Paul Oscar Kristeller of 1938, which had become the basis of a new study of the period in the light of its magical and hermetic doctrine proposed by Eugenio Garin and his school of scholars in Florence. Garin himself had not extended this reading of the Renaissance to Bruno, and indeed has repeatedly insisted, despite his admiration of Yates’s work, on the necessity of making distinctions between the different ways in which the Hermetic texts permeated different periods and areas of Renaissance culture. However, the Yates thesis itself, both in the original book on Bruno and in her later works, belies such distinctions. If Bruno is differentiated from Ficino and his neo-platonist reading of the Hermetic texts, it is only in the sense of a less cautious and more radical assumption on Bruno’s part of the Hermetic doctrines, made even more anti-rationalistic and anti-scientific by the Cabalistic and magical strands that were later introduced by Pico della Mirandola and Cornelius Agrippa. From this perspective, it is Bruno’s science that becomes for Yates a leftover from a previous century, which had, in her view, insisted on dressing him in clothes that were theirs rather than his. And if it was difficult to deny that he had been reading Copernicus in a cosmological context and Lucretius in an atomistic one, and that such readings had been the subject of serious attention both by Bruno’s contemporaries and in the following centuries, Yates thought she could explain away, in a few sentences or even in a footnote,

18. See on this subject Garin’s more recent Ermetismo del Rinascimento (Rome, 1988).
both the infinite universe and the atomistic theory of matter as emblematic images of the mysterious secrets of being.  

It is not necessary here to trace in detail the long and complicated _querelle_ that followed the publication of Yates’s book of 1964. Some general comments on how the field of Bruno studies adapted itself to the dramatic swing of the pendulum that led from the scientific Bruno of the first half of the twentieth century to the Hermetic Bruno of the last decades are, however, desirable in order to define the sense in which his natural philosophy will be considered in this paper. For there can be no doubt that Yates raised a valid point in claiming that large areas of Bruno’s works, such as his many texts devoted to Lullian and mnemotechnical themes, which Yates herself would look into in more detail in her volume on _The Art of Memory_ of 1966, had been ignored or even despised by previous commentators. These texts are today considered by many to be more closely connected to logic or to rhetoric than to the magical arts that Yates so insistently underlined. Nevertheless, Bruno’s detailed knowledge of ancient, medieval, and Renaissance magic, which depended conceptually on the ubiquitous presence at the heart of matter itself of a vital spirit or universal soul, is nowadays considered, largely thanks to Yates’s studies, to be present as a major aspect of his works. It is a concept that Bruno tends to radicalize rather than reject, incorporating it into his matter theory as a substitute for the traditional idea of form, which thus acts from inside the universal material substance as a kind of creative force, or yeast. At other times, Bruno posits a boundary line between the world of things or becoming and the eternal envelope of indeterminate being, which is seen as the magic or indefinable moment at which the logic of contrary forces begins. There seems no reason why such speculative definitions of magic, which appear again and again in Bruno’s published works, should necessarily invalidate the scientific endeavor, or the attempt to penetrate, and appropriate for the use of civilized society, the forces at work within the world of becoming. And in fact, many of the most valid studies of Bruno in the post-Yatesian era have been concerned with an attempt to understand in what ways his natural philosophy, unwaveringly emphasized by scholars, such as Giovanni Aquilecchia, Hélène Vedrine, Ramon G. Mendoza, or Leen Spruit, among others, can be reconciled with his magic, his reading of the Cabala, and his frequent references to the Hermetic texts. So that what appears

19. See, for example, the famous page in which Bruno’s Copernicanism is dismissed as “a Hermetic seal hiding potent divine mysteries of which he has penetrated the secret,” in _G. B. and the Hermetic Tradition_, op. cit., 241, or footnote 1 on p. 265, which contains all that Yates has to say on Bruno’s neo-Lucretian atomism.


21. This alternative reading of Bruno’s art of memory goes back to the study by Paolo Rossi, _Clavis universalis_ (Milan, 1960), recently published in English translation by the University of Chicago Press.


to be the agenda for the coming century is a reading of Bruno’s works in their completion that accounts both for his science and for his magic, without becoming shipwrecked in the shallows of the either/or attitude that dominated the twentieth-century debate.

A development of the critical discussion along such lines is made even more necessary by the recent publication of the first volume to present in integral form, surrounded by a dense apparatus of comment and notes, the unpublished manuscripts that Bruno left unfinished at his death. Entitled *Opere magiche*, this large and well-produced volume gives the confusing impression that all the manuscripts published in it are concerned with Bruno’s thoughts on the magical arts, although this is not in fact the case. By far the longest, and undoubtedly the major work that Bruno himself never published, the *Lampas triginta statuarum* actually contains few if any references to magic, as the editors of the new volume admit in their notes to the text. It is rather an elaboration of Bruno’s ontological considerations, already developed in his philosophical dialogue in Italian *De la causa, principio et uno*, written and published in London in 1584, on the relation of the apparently fragmented world of becoming and of things to the original principle of unified being: one of Bruno’s most constant and characteristic themes, as Coleridge rightly claimed. Other works, such as the *Theses de magia* or the *Medicina Lulliana* appear to be little more than compendiums of notes of reading on those subjects, as the detailed quotations from Bruno’s sources, which are one of the major characteristics of this valuable volume, make clear. This leaves the four brief works on magic, *De magia mathematica*, *De magia naturali*, *De vinculis in genere*, and *De rerum principiis*, which Yates already knew, although only in the reduced form in which they were published in the nineteenth century in the third volume of Bruno’s collected Latin works. Curiously, however, as Michele Ciliberto notes in his introduction to the new volume, she made little use of these final, unpublished texts on magic, despite the fact that they indicate a definite interest on Bruno’s part, in the final months before his arrest and imprisonment on the part of the Roman Catholic Inquisition, in the possible uses of magical techniques as a means of achieving a new dominion within the world of time and nature.

As we have already seen, the technical details of Bruno’s natural philosophy have been the subject of a number of major studies during the twentieth century, and, therefore, are too well known to need repeating here. Rather there is a need to re-state the relationship he establishes between the two distinct philosophical poles between which his ontology constantly moves—of being and becoming, of permanence and time—and the sense in which he contemplates a new scientific activity in the context of a constant reference to eternal principles, or divine truths. This appears, indeed, in a general way, to be more and more clearly understood as the major characteristic of the so-called “scientific revolution” of the late European Renaissance, which today, after the discussion that has in the

last decades involved the science of Isaac Newton with relation to his recently discovered papers on alchemy and his massive Biblical studies, can no longer be discussed in terms of a science versus religion interpretative scheme. In the case of Newton, this new realization has given rise to numerous differing emphases on the relative importance of his religion with respect to his science, or to the traditional inquiries in which he was still deeply involved, such as alchemy, with its cult of secrecy and its recognition of magical or occult qualities, and the modern scientific undertaking, based on shared and repeatable experiments, projected into the public domain. But despite some extreme positions to the contrary, such as that expressed by Betty Jo Teeter Dobbs in a much discussed paper of 1993, the consensus of the most qualified Newton scholars appears to be determined by their desire to preserve his position as the major figure of the early modern scientific experience, while at the same time recognizing the deeply felt need that his private papers—largely unpublished at his death, and for centuries ignored by Newton scholars—clearly express to relate his science to a dimension beyond logic and reason, which clearly involves an element of faith.26

The reference to Newton is not to be considered irrelevant here, as the purpose of this paper is to propose just such a synthesis as the basis of a new discussion of Bruno’s philosophical endeavor. Indeed, it is Bruno himself who spells out the meaning of his philosophy in these terms in the work that will be proposed here for comment and analysis: the work entitled Lampas triginta statuarum, or The Torch of the Thirty Statues, which Bruno also left unpublished at his death. As we have seen, this work, first published in the third volume of the nineteenth-century edition of Bruno’s Latin works, has recently appeared in the new volume of the posthumous manuscripts, together with an excellent Italian translation and detailed comment and notes. Bruno is concerned here with precisely that relationship between eternal truths and the world of becoming that appears to have been a constant preoccupation of the new scientists up to and including Newton himself. Indeed, in a section of this work entitled The Field of Minerva, or Knowledge, Bruno spells out with particular clarity his thought on such a relationship.

The Lampas shows a marked desire on Bruno’s part to contain his very complex ontology within a coherent system of discourse. The statues, although they can be considered as magically endowed with their original light, should be seen primarily as the files in which Bruno stores his distinctions relating to the various grades of being. Each statue is itself divided into thirty subfiles, the Field of

26. Dobbs’s paper was delivered at the Annual Meeting of the History of Science Society and has been published as “Newton as Final Cause and First Mover” in Rethinking the Scientific Revolution, ed. Margaret Osler (Cambridge, 2000), 25–39. It was at once contested, above all by Newton’s biographer Richard S. Westfall, in the paper “The Scientific Revolution Reasserted” published in the same volume at 43–55. Also of much interest on the theological outlook that underlies the structure of Newton’s Principia is the paper by J. E. McGuire, “The Fate of the Date: The Theology of Newton’s Principia Revisited,” published in the same volume at 271–295. For a more general treatment of the relation of the new science to its theological premises, see Brian P. Copenhaver, “Natural Magic, Hermeticism, and Occultism” in Reappraisals of the Scientific Revolution, eds. D. C. Lindberg and R. S. Westman (Cambridge, 1990), 261–301.
Minerva being no exception to this rule. Knowledge, according to Bruno in these thirty sections, derives from an inner light in the mind that illuminates us as to the conclusions which we may draw from the first principles. These principles, or eternal truths, are not themselves the domain of reason but rather of intuition or of faith. This is of two sorts: what Bruno calls a “well regulated” faith, characterized as a simple recognition of the necessity of the first principles themselves, and what he considers an over-excited or perverse faith, based on the superstition of false prophets. This last remark clearly refers to revealed religions and includes a reference to Bruno’s long-standing anti-Christian polemic. The first principles themselves are not known by the mind, except insofar as it reasons a number of conclusions from them. These conclusions constitute what Bruno calls “science,” or knowledge, which he defines in a later paragraph in suggestive terms that, although based on ancient sources among which Aristotle’s Analytics are specially mentioned, clearly project his idea of science into the modern world.

Science is related to our powers of judgement, and it involves both sense experience and a process of reasoning. The results of the logic of such science must be articulated in some sort of discourse, which becomes a shared experience. The logical process defined must be repeatable: it requires a second examination that controls and verifies its exactitude. Only this process of verification guards the new scientific truth against the lies of imposters. Bruno thinks of geometry as an essential example of such a science. But another kind of science derives from the necessity of matter as much as from the necessity of form, and these two elements can concur together to constitute the “garment” of a new form of knowledge. This is knowledge as form, or the knowledge of knowledge, or the matter of intellectual truth.

These sections dedicated to Minerva, which also include references to far more traditional forms of knowledge, precede a long final section of the work dedicated to Venus and Cupid, who are seen as the forces of concord or harmony, which bring sense and meaning into an otherwise confusing world. Confusion, for Bruno, has to be clearly distinguished from Chaos, which, on the contrary, together with the abyss and privation, constitutes—in Anaxagorean terms together with what appears to be a clear reference to the Liber chaos of Ramon Lull—the first of the first principles themselves. Chaos, the Abyss and privation, which Bruno calls Ancient Night, are nothing or everything—substance in a state of com-

27. The thirty sections relating to the Field of Minerva are in Opere magiche, op. cit., 1227–1239.
28. See sections XXIV and XXV of the thirty considerations dedicated to Minerva’s Ladder, or the Disposition towards Knowledge, which immediately follows the Field of Minerva. In Opere magiche, op. cit., 1246–1247.
29. For the sections dedicated first to Venus and then to Cupid, see Opere magiche, op. cit., 1248–1277.
30. For Lull’s Liber chaos (circa 1275), see Frances Yates, “Essays on the Art of Ramon Lull: Ramon Lull and John Scotus Eriugena,” now in Lull and Bruno: Collected Essays vol. I (London, 1982), 95–98. It is significant that Yates, in the introduction to her essays on Lull, states quite unambiguously that “The Lullian artist is not a magus,” and that his arts are logical not magical. She underlines how Lull traces the passage from Chaos, through Bonitas, to the elements of the natural world.
plete indetermination—and as such “they are so far from being accidents of things that they are, on the contrary, the principles according to which the accidents come into being, are related to one another, and enter into relation with substance.”

For this to be the case, however, there must be a “superior” triad, which Bruno denominates the Universal Apollo, or a universal spirit or light, which brings the state of indeterminate privation into an ordered whole as a universe of individual entities. These are perceived by the mind as realities through the senses, but their order is “modelled by the artifice of fantasy and imagination,” which, as the ancient philosophers understood, was in its proper function not a faculty designed to confuse the truths of reason, but rather to illustrate them, to explicate their order and maintain such order in the memory. The imagination is thus, for Bruno, an intimate part of the scientific activity.

It is only in what Bruno calls this “universal perspective” that the world of nature can be understood as a third order of things, which, precisely because it is illuminated by the light of the one Apollo, or divine Monad, can also be considered as the good: “id est bonitate naturali.” Science, therefore, for Bruno, is closely related to ethics: an understanding of the correct order of things in the natural world leads to a correct perception of what is virtue and what is vice. The essence of the scientific endeavor itself, however, is founded on the notion of quantity, and as such Bruno presents it as the field of Ocean. Here we find the attributes of magnitude in all its characteristics, which lead to a perception of the universe as a physical entity founded on the concepts of multiplicity and number. Within these concepts, Bruno emphasizes in particular the notion of addition, for it is through ideas such as increase, expansion, aggregation, and completion that the mind is able to conceive of a universe that is not susceptible to any further increment of any kind. That is to say, it is precisely the post-Copernican universe that is eternal in time and infinite in space: the universe that Bruno had presented to his readers in his Italian philosophical dialogues written and published in London in 1584 and that, probably at the same time as he was writing the Thirty Statues, he defined for the last time in his Latin masterpiece De immenso et infigurabili, published as the last work of his so-called Frankfurt trilogy in 1591.

The section of Thirty Statues dedicated to “The Field of Ocean” thus reaches its conclusion with a paragraph entitled “The Universe: The World,” which is the way in which magnitude becomes quantitative and corporeal in its explication as physical reality. And the physical universe is founded for Bruno on one specific

31. See the twenty-sixth consideration on Chaos in Opere magiche, op. cit., 956–957.
32. These considerations on the imagination close a section of the Lampas dedicated to The Multiple Forms of Investigation in Opere magiche, op. cit., 940–941. The relation between Bruno’s science and the imagination has been treated at length by Luciana de Bernart in the volume Immaginazione e scienza in Giordano Bruno (Pisa, 1986).
33. For the investigation into nature as the third order of being in Thirty Statues, see Opere magiche, op. cit., 1164–1295. The remaining part of the work is dedicated to technical instructions as to how to develop the mnemonic techniques, which will allow the statues to be used as a mental filing system.
35. Ibid., 1184–1187.
quality, which is heat: a clear reference to that “giudicosissimo Telesio” whom Bruno had already praised with unusual vigor in the second of his Italian philosophical dialogues written and published in London in 1584, *Cause, Principle and One*. Telesius, in his major work *De rerum natura*, first published in two books in Naples in 1570, had cautiously attempted to replace the Aristotelian physics by a new physical dualism based on a universal dialectical contrast between heat and cold: a contrast that Bruno had incorporated as a fundamental one within his own far more radically post-Copernican, infinite cosmology, using it as an explanation of the movements of the stars and planets of his infinite number of solar systems around their central suns. In *Thirty Statues*, moreover, heat is not only considered as a universal, life-giving quality, but also as one that can be subjected to measurement as a quantity: a fact that guarantees for Bruno the possibility of a rational inquiry into natural things. For the concept of size is to be considered “absolute” among all other physical realities. Size defines perfectly the particular and individual entities, but at the same time it creates a similitude with that which is beyond size, or the infinite. The nature of the universe in its totality as infinite is thus confirmed by the mind as true.

A later section, which is dedicated to motion within the universe or the physical world and is entitled *The Field of the Earth, or of Potency*, appears at first sight to be founded on an Aristotelian concept of potentiality and to lead back to the traditional idea of matter as the passive element subjected to the potentiality of its specific form, which contains within it the impetus toward a motion defined by its individual nature and ends. However, such an impression is mistaken, as Bruno reaffirms here his complete reversal of the Aristotelian equation, making matter into the active substance that underlies an infinite world of finite objects and contains within it the total potentiality of all forms: a potentiality that precedes the single form with its acts of motion, and on which all motion logically depends. Conceptually, this reversal of the Aristotelian relationship between matter and form, in the context of motion, can be considered as supplying the speculative foundation of a quantitative, universal law of motion, such as will eventually be formulated by Newton’s law of gravity. However, Bruno here draws back well before defining such a possibility with any clarity, apparently resolving the question of motion in the more traditional terms of impetus theory. Thus, he can still write that the impetus which leads to the motion of an individual thing derives from the internal principle of that thing’s propensity toward a certain end, even if for Bruno such a propensity depends only in a secondary sense on the potential present in what is for him the accidental and impermanent nature of the individual form. Even Aristotle’s substantial forms, which are the forms of a species rather than an individual of that species, partake in what is, for Bruno, a universal mutability. For they


37. See *Opere magiche*, op. cit., 1192–1199.
also ultimately depend on the universal potentiality present throughout the infinite substance, which precedes the single form and the single act of motion. It is on this infinite, universal potentiality that the single motion ultimately depends.

This line of reasoning reaches its logical conclusion in the following section entitled “The Field of Juno,” who is considered the mediator between the individual things of which the infinite universe is composed.38 Here the idea of universal laws of physics is explicitly defined. Bruno sees the concept of laws in physics as intimately linked to the idea of civil laws, which are generally binding, such as treaties or oaths “or other things of that kind.” The field of physics also contemplates a situation in which superior principles exercise their influence on inferior ones according to some law or prescription. These natural laws constitute the necessary intermediary principles without which nothing can happen in the world of things. Bruno thinks of them as knots, or chains, or even forms of glue which guarantee that all things are linked together in some universal formulation, which, like an oath, is repeatable and generally respected: a public and not a private or secret act. Here it is Plato rather than Aristotle who is called in as witness, insofar as his idea of a universal spiritus or world soul, which reflects throughout the physical universe the divine light of Apollo, is more agreeable to the idea of universal physical laws than Aristotle’s concept of individual souls or forms, or even of substantial forms, whose motions are laws only unto themselves or, at the most, unto their species. Universal physical laws, moreover, are, according to Bruno, an assurance of the central role of humankind within the universe, for they are part of the human intellectual horizon. The eternal truths, or first principles, are explained within the infinite world of things in terms of universally intelligible laws of physics capable of comprehension within the intellectual horizon of the human mind.

This scheme of natural philosophy extracted from Thirty Statues represents an aspect only of that work, which is concerned primarily with defining the complex structure of first principles on which the world or universe depends. Even when Bruno does reach the final part of his work dedicated to the universe itself and the laws on which its movements depend, he has as much to say on the civic and ethical implications of a scientific inquiry into the natural world as he does on the more specifically logical or intellectual character of such an exercise. Nor can it be claimed that his thought on the inquiry into the natural world is always as clearly projected toward an endeavor that would rapidly become the modern scientific enterprise as the pages presented and commented on here would suggest. At times he is evidently concerned with more traditional philosophical concepts and inquiries, for which he found available an already established vocabulary. For example, the concept of links between every aspect of being in the universe, which in Thirty Statues is seen as the necessary rational idea justifying the possibility of universal, natural laws, could be seen from the quite different perspective of the unknowable nature of the links themselves. In their occult essential nature, the links, or vinculi, will later become the center of the magical techniques of persuasion and dominion investigated in the work De vinculis in genere, also left unpub-

38. Ibid., 1198–1209.
lished at his death, where Bruno is attempting to inquire into areas of psychological tension that defeat the understanding of the conscious mind. In many other parts of his oeuvre, however, both in *Thirty Statues* and in a large number of his major published works, Bruno insists rather, in terms which Francis Bacon must surely have appreciated, on the necessity of turning the attention of the active, inquiring intellect toward physical realities too long ignored; attempts to comprehend the first principles that underlie the physical world are necessarily arduous and may finish up by engaging with phantasms whose truth remains in question. So it is Thetis, standing for the natural causes of things, the lover of the universal laws of matter that dictate the multiple and ever-changing forms of the natural world, who turns into the new “tiger” whose forces the human mind must now attempt to know and tame.

Bruno’s considerations on Thetis as the material substance that underlies all the specific formations composing the natural world are of particular interest in indicating at the same time both the possibility and the inevitable limits of an inquiry into natural causes. They may thus be used as the conclusive remarks to this paper. For Thetis, who is associated with the ocean in its infinite Protean capacity for metamorphosis, is by no means easy to “catch” or to define in definite and certain terms. Indeed, Bruno sees her as the wife of many husbands, none of whom can truly be said to possess her. Although her forms can be pursued by reason (“*subiectum ratione formabile*”), she resists all attempts at such dominion and renders the hunt for her secrets difficult and problematic. Bruno portrays her as riding on a dolphin, whose back only at times appears as well defined above the moving waters of becoming. Thetis, after all, is the daughter of both the sky and the earth, and so should not be seen as crude or lowly matter, but rather as divinely inspired. Insofar as she represents nature, she is the object of natural philosophy, but insofar as she represents God, she is the object of theology, or metaphysics, or a philosophy of religion. The natural philosopher would be unwise to think that it is possible to penetrate her essence. All that can be hoped for is to understand something “around and about” her ways and habits. When she assumes specific forms, such as a horse or a tree, then investigation through the senses, reason, and intellect into and about them (“*circa quod*”) is in order and to be encouraged. But it should not be assumed that the knowledge gained will ever reveal the ultimate secrets of the thing in itself. For this reason Bruno, in this section, pictures the human intellect as a sunflower, unwearily turned toward the ultimate truth of things, but destined to find joy mixed always with suffering, without ever reaching the final goal.

As I have already pointed out elsewhere, this crisis epistemology renders Bruno’s inquiry into natural things more consonant with modern, post-relativity science than with the rational optimism of the mechanical sciences of the seventeenth and eighteenth centuries.

40. For the long and beautiful section of the *Lampas* entitled *The Statue of Thetis, or Substance*, see *Opere magiche*, op. cit., 1122–1143.