Introduction

Geometry and Blake's *Newton* Print

Figure I.1. William Blake, *Newton*, 1795/1805. Tate Collection.

For half a century or more, Blake's color print *Newton* (1795/1805) was regarded as a savage rejection of Newton, mathematics, and *l'esprit géometrique* (figure I.1). Did not Blake fulminate all his life, "God forbid that Truth should be Confined to Mathematical Demonstration" (E 659)? Newton is shown in splendid profile similarly to the two-dimensional picture of "The Tyger" a couple of years earlier, which associates such flattening with the argument of divine Design while implying that, in reality, good and evil intertwine in antinomian fashion without right-left Manichaean "symmetry." Then came Donald Ault's *Visionary Physics* (1974), which opens by showing how Blake's print exposes a profound contradiction in Newton's thought—evidence, Ault argued, of Blake's close knowledge of Newtonian mechanics, the calculus, and the problem of gravitation's physical cause. Ault says that in Blake's print "the human figure is constructing a limited, fixed, and unchanging model of his fundamental bodily experiences to stave off the sense of the dissolving quality of the outer world. Yet . . . it is the very act of constructing the model that separates the world into inner and outer, definite and indefinite, action and background, symmetry and asymmetry. The background is both the cause and the effect of the central action."[1]

Much as Ault's argument would suggest, my claim here is that Blake did not simply reject Newton, geometry, and science. Quite the opposite—Blake's way of representing perspective, geometric figures, and nested relations between objects builds on Newton's physics through insights and intuitions which we today ascribe to Einstein and relativity's tendency to suspend cause and effect by dissolving objects into their background "field." He was not anti- but rather post-Newtonian. Contrary to what generations of Blake critics have supposed, the outlook of Romantic-period physics and chemistry was far from materialist.[2] By redefining the idea of material substance, these sciences foregrounded a deep (and, today, well-known) Neoplatonic tendency in Newton's thought that until the middle-late twentieth century had been obscured by his emphasis on contact mechanics—an emanationist tendency that Blake recognized and embraced.

Ault's point that Blake collapses cause and effect has since been noticed in a variety of contexts. Marxist critics have deemed it part of the poet's dialectical-materialist critique of how mystified social reality reconstitutes the past within the present.[3] On the other hand, Steven Goldsmith has argued, against liberal academic criticism's sentimental adoption of Blakean radical "enthusiasm," that Blake subscribed to Paine's liberal-democratic assumption "that power can be collapsed into indeterminate signs, that freedom corresponds to the capacity for perpetual subversion in and by language," such that change and difference become institutionalized within democratic discourse as an endless play of competing representations: Derridean deferral made real.[4] Thus, Blakean prophecy tends to conflate speech and action, event and discourse, without necessarily changing anything. More positively, for Angela Esterhammer, Blake's poetry transforms the force of speech acts based on social convention into "the phenomenological performative," whose force is metaleptic and derives from "an author's ability to 'create' reality through poetic or fictional utterance": "Prophecy and performativity interconstitute one another; what the poet predicts will happen *is* happening in and through his writing, and vice versa."[5] One concludes that if "Let there be light" (Gen. 1:3) was the original speech act that "does what it says"—unlike human speech acts grounded in conventional social agreement about which kinds of syntax signal performance in the world ("hereby," "henceforth," "it is decreed that," etc.)—then prophetic poetry operates as mankind's conditionalized mortal reiteration of God's command. By contrast, Robert Essick has examined the dark downside of such prophesizing. He shows how *Newton* and the other great color prints of 1795 merge graphic media with pictorial content and themes of fallenness, thereby making the medium the message. Says Essick, the sometimes deliberately blotchy tactility of these prints, so contrary to Blake's celebrations of radiant "Florentine" fresco and determinate outline, instantiates corporeal fears that were beginning to occlude the artist's vision[6]—perhaps because the government's November 1794 clampdown on dissent was driving him into the complicity of self-censorship, as I'll argue in chapter 5.

Most recently, Sarah Haggarty has developed these paradoxes in relation to geometry, based on her claim that Blake was "intrigued by diagrams" because of their proximity to line drawing. Blake's "engagement with—and fascination by—geometry as such, or more precisely, with both Euclidean and practical geometry as they were taught and theorized by his contemporaries," leads Haggarty to conclude that the *Newton* print "temporize[s] geometry's very origin, exhibiting demonstration as practical intelligence rather than act of pure thinking," and so "allows geometry to coexist with artistry."[7] In other words, the print's fusion of cause and effect no longer conveys Newton's entrapment by mathematic formalism but rather his redemption through the materialized self-consciousness of Blake's art. It seems that the closer critics look, the more complicated, sympathetic, and even self-projected Blake's image of Newton becomes.

The source of these various critical observations may be seen to lie in Blake's substitution of a creative principle of immanency for Newtonian mechanism's transcendental first cause.[8] In a physics context, *Newton*'s underwater background—less than transparent, seemingly oozy, and suffocatingly silent, "both the cause and the effect of the central action" as Ault says—resembles the aether, an entity Newton had boldly conjectured in the General Scholium to his *Principia Mathematica* as constituting gravity's "physical seat" (as he often phrased it), and that he described at length in the *Opticks*. The aether, frequently deemed to be a liquid or "subtle fluid"—only by the later nineteenth century did it become "fixed" and "luminiferous"—was dualist mechanism's acknowledgment that some medium was needed by which to connect mind and matter: a *tertium quid* such as Coleridge was always calling for.[9] This "subtle matter" served to ground gravity by enabling it to act not just mechanically on the surfaces of bodies but on all their parts. By flowing through masses with different degrees of density, so highlighting the distance between them, the aether could supply a physical basis for Newton's inverse-square law. The aether's ubiquity provided a platform for measurements and established a uniform observational perspective on all objects, as required by Newton's idea of "absolute" space.[10]

Following the work of David Hartley, eighteenth-century investigations of this semimetaphysical "third kind" were increasingly undertaken by medical scientists and anatomists, who located it in the human brain and nerves. Their physiological approach had the sanction of Newton himself. As "a certain most subtle Spirit which pervades and lies hid in all gross bodies," the aether might transmit the force of gravitation across planetary space and along the nerves to the brain.[11] It filled in the pore between hard particles while remaining, itself, real and atomic, and not just a physical property of space (as classical aether physicists would argue during the 1910s in a last-ditch attempt to defuse Einsteinian Relativity). Perhaps, Newton wondered at the very end of the *Principia*, "all sensation is excited, and the members of animal bodies move at the command of the will, namely, by the vibrations of this Spirit, mutually propagated along the solid filaments of the nerves, from the outward organs of sense to the brain, and from the brain into the muscles." Hitherto, the *Principia* had relegated all bodily interaction to the level of accidental changes in the relations of masses. Here, Newton readmits substantial contact, potentially restoring the place of the experimental observer within his system because "this electric and elastic Spirit" is an implicitly anthropomorphic one. In his open letter to Henry Oldenburg, secretary of the Royal Society, Newton calls it a "Mediator of Sociablenes"[12] by means of which we become acquainted with objects metacognitively (we not only perceive objects but are reflexively aware of it), as opposed to accessing them through independent mental representations as Locke subsequently seemed to suggest.

In Blake's *Newton*, the glowing background murk—illumined, perhaps, by inner light emanating from the human figure—portrays aetherous "Sociablenes" in its alienated materialist form. Hence, the curious drapery hanging over Newton's left shoulder. If this represents the skintight bodysuit or tunic with which Blake typically clothes his spirits, then Newton's having shuffled it off (though it apparently remains attached by a neck strap below his jaw) signifies the ascetic side of his dualism. He seems oblivious to the huge undifferentiated reef of matter—rocky corral coated with algae and bits of ectoplasm—whose bench supports his muscular buttock and thigh. The denseness of the aether's all-surrounding invisible medium is suggested by a pair of anemones below him, their tentacles drifting in a current. Hunched over to form a series of triangles in imitation of his compass, Newton is bending his body into another measuring instrument in a kind of parody of Vitruvian Man. (If he fell forward, however, his posture would resemble the similarly triangulated Nebuchadnezzar crawling on all fours like a beast along the floor of *his* cavern in another of Blake's large color prints.)

One wonders if Blake's design alludes to Newton's famous statement, supposedly made "a little before he died," that to himself he seemed "only like a boy playing on the sea shore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me."[13] These words were well known. Wordsworth appears to recall them when his Immortality Ode tells how aged adults, "Though inland far we be," still "have sight of that immortal sea / . . . / And see the Children sport upon the shore, / And hear the mighty waters rolling evermore."[14] Less reverently than Wordsworth, Blake's print takes Newton at his (reported) word. The "great ocean of truth"—the world aether whose created human form is Albion the Divine Humanity, as we'll see—"[lies] all undiscovered" before the mathematician fixated upon his geometrical abstractions. The print's 1795 version, which shows light entering a subterranean cavern through a rift in the rock above Newton's back, makes the allusion to Plato's Cave more explicit, perhaps linking it with the unspecified "dark chamber" where Newton says he performed the optical experiments described in his *Opticks*.[15] Turned away from the light, the figure in Blake's design is preoccupied with shadow representations, ironically those of so-called "divine" geometry itself. In both versions, Newton bending to his task recalls the antihero of Blake's *Book of Urizen*, published less than a year earlier, who "formed golden compasses / And began to explore the Abyss" (*BU* 20:39–40, E 81)—the cause-effect transposition being, here, that the conditions of measurement are established through Urizen's own acts of creation by division, by which Eternity's space-time of pure duration is reduced to metric space and chronological time (itself measured spatially by the movement of the sun or clock hands). Blake knew it was by means of geometry that the ancient astronomers measured time. They divided the 360 degrees of a circle or the sphere of Earth into sixty parts or "minutes" and then divided each minute into sixty "seconds." Time as a form of movement is invisible, but geometry serves to arrest and reify it. Like the supreme Blakean reifier, Urizen, Newton is evidently constructing a model of Creation similarly to the Demiurge in Plato's *Timaeus*, the ultimate source of the triangles in Blake's print. There, Plato portrays the requisite intermediate "third thing" between mind and matter as the barely real Receptacle, a "room" (*khora*) that is the "place" of things without containing them in a definite "space," and that is said to contain molecular particles of matter configured as regular geometrical solids made up of various arrangements of atoms in the form of elementary right triangles (53c–55c).

Let me suggest that Blake's engagements with geometry were not incidental but key to how he understood the workings of the universe. It's no accident that his first books in illuminated printing, the little tractates of 1788, *All Religions Are One* and *There Is No Natural Religion* [a] and [b], are sets of axioms or postulates in the form of Euclidean proofs. Elsewhere, I've argued they are not direct satires of Reason so much as incremental skewings of rational argumentation that dramatize its dependence upon rhetoric, persuasion, performance, and feeling, following the example of Hume's dramatically emotional *Dialogues concerning Natural Religion*.[16] That Blake should have launched his career this way is hardly surprising, given geometry's enormous cultural prestige ever since Plato's *Meno* linked it with eternal truth. The "Euclidean method" of deducing propositions from theorems became the very paradigm of knowledge. In Blake's time, geometry was regarded not as a waystation between algebra and calculus, as it is today, but as a philosophy of the world, the soul of mathematics, and a representation of space in its purest form independent of limited human perception. In 1805, Wordsworth called it "An independent world, / Created out of pure intelligence," perhaps echoing his Kantian friend, Coleridge, who later observed: "the Circle in [a] diagram is only a picture or *remembrancer* of the Circle, on which the mathematician is *reasoning*."[17] Coleridge here recalls the *Meno*'s Doctrine of Recollection, set forth by means of an ignorant slave boy's ostensibly intuitive knowledge of geometry. Kant even claimed Euclidean geometry was true a priori, as the necessary form of cognition that structures human experience of external objects. Similarly, fifty years before Kant, Hume asserted from an opposing empirical perspective that geometrical propositions "are discoverable by the mere operation of thought" instead of being "matters of fact": "Though there were never a circle or triangle in nature, the truths demonstrated by Euclid would for ever retain their certainty and evidence."[18] So, when Hume wanted to contrast his "experimental method of reasoning" on "moral" subjects with demonstrative reasoning from propositions, he *attacked* the Parallel Postulate for exhibiting "the fallacy of geometrical demonstrations, when carry'd beyond a certain degree of minuteness": "How can [a mathematician] prove to me . . . that two right lines cannot have one common segment? . . . [S]upposing these two lines to approach at the rate of an inch in twenty leagues, I perceive no absurdity in asserting, that upon their contact they become one. . . . The original standard of a right line is in reality nothing but a certain general appearance."[19] And when Thomas Reid then wanted to preserve practical "common sense" against Hume's broader argument that mere facts of experience alone daily suffice to subvert reason, he devised a geometrical thought experiment, albeit a non-Euclidean one. To an eye placed in the center of a sphere, all "great" lines traced across the sphere's surface will "return to themselves" and appear straight even though they curve. Visible straight lines therefore differ from the tangible straight lines of Euclidean geometry, which if projected will never return to their starting point. This suggested the possibility of a spatial fourth dimension; though, as a recent critic points out, Reid's paradigm remained "notionally Euclidean."[20] What all these different positions share is a view of Euclidean geometry as the universal basis for reasoning about truth claims and an accurate representation of the space of thought itself.

Newton's tendency to absolutize three-dimensional space even led him, in the early *De gravitatione et aequipondio fluidorum*, to insist that mathematical shapes and figures are already actually contained in spatial extension while they remain beyond human sense: "There are everywhere all kinds of figures, everywhere spheres, cubes, triangles, straight lines, everywhere circular, elliptical, parabolical, and all other kinds of figures, and those of all shapes and sizes, even though they are not disclosed to sight. . . . We firmly believe that space was spherical before the sphere occupied it, so that it could contain the sphere. . . . And so on of the other figures."[21] Space's preexisting dimensions thus made it a receptacle for correspondingly configured bodies, but in a way exactly opposite to the potentiality of sensible body represented by Plato's virtual Receptacle. This is much the same logic as Newton used to devise his theory of fluxions, the infinitesimal straight lines that exist in a space outside of time as the differential of the curve.

Blake abhorred Newton's nonsensible fluxions: "A Thing that does not Exist" (E 783). But he could not have read *De gravitatione*, which remained unpublished until 1962. Still, he satirized Newton's ideas through intuition and inference. About the time of the *Newton* print, *The Four Zoas* Night Two strikingly anticipates the preceding Newton passage when Urizen the Workmaster builds the Mundane Shell as a "weighd & orderd" Euclidean solid space within which the ordered ranks of his Sons and Daughters travel underwater "In right lined paths . . . / And measure mathematic motion . . .":

> Others triangular right angled course maintain. others obtuse
> Acute Scalene, in simple paths. but others move
> In intricate ways biquadricate. Trapeziums Rhombs Rhomboids
> Parallelograms. triple & quadruple. polygonic
> In their amazing hard subdued course in the vast deep.
> (*FZ* 33:32–36; E 322)

Newton-Urizen's descendants form a cadre of dehumanized corpuscles (L. *corpusculum*: small body), their forward march driven not by desire but disciplined obedience to the force of logic. Anybody who doubts Blake's interest in geometry will need to explain his complex attitude toward these baroque anthropomorphisms whose pompous self-importance seems freighted with Gillrayan comedy and pathos. That they appear to allude to a passage in *Paradise Lost* comparing the dance of angels to the motions of planets and stars—"mazes intricate, / Eccentric, intervolv'd, yet regular / Then most, when most irregular they seem"—extends Blake's little satire of self-delusion beyond Newton to Milton, theodicy, and the theory of divine Design in general.[22] What Blake rejects here is not Bacon's "advancement of learning" or the Enlightenment's "grand march of intellect," as Keats later called it,[23] but rather the idea that human progress and forward movement can be reduced to mathematics and the determinations of logical reason.

So, Newton-Urizen's nonsensible absolute space appears as a parody of Plato's creation myth in the *Timaeus*. Urizenic Creation *is* the Fall. Blake recognized the fallacy of misplaced concreteness by which Newton purported to detect substantial forms within the chaotic potentiality of Plato's divine Receptacle as it existed even before heaven was made. Tellingly, the Receptacle—described by Francis Cornford as "nothing yet but a flux of shifting qualities, appearing and vanishing," and by A. E. Taylor, sounding more like a particle physicist, as a matrix "agitated everywhere by irregular disturbances, random vibratory movements, and exhibiting in various regions mere rude incipient 'traces' . . . of the definite structure we know as characteristic of the various forms of body"[24]—is viewed by Urizen as nothing but "the draught of Voidness to draw Existence in" (*FZ* 24:1; E 314). But this also implies that the object of Blake's satire of Urizenic architecture in the rest of the *Four Zoas* passage above is not the *Timaeus*, as Ault seems to suppose (132–33). Rather, Blake satirizes Newtonianism's inability to see Plato's Receptacle as *meta*physical: as a dynamic and mediatory precondition of visibility, unlike the sheer material "Voidness" which is all Urizen sees.[25] Newton's failure to recognize nature's potentiality to produce something more, new, and different results in a circular and self-reinforcing materialism, a "ratio of all we have already known" (*NNR* [b]; E 2, also E 659).[26]

The aetherous background to Blake's *Newton* looks, then, like an effect of Newtonianism's materialist reduction of the Platonic Receptacle to absolute space, the physical container of objects. Notice Newton is touching the straight line in the diagram with his forefinger. Like Hume and Berkeley, Blake here points to the basis of geometric lines in sense, not mathematic calculation. Geometry is indeed, as Plato described his own attempt to tease out the virtual space of the Receptacle, an illicit, "bastard kind of reasoning."[27] Descartes's opponents frequently objected it is impossible to imagine a point not situated in a space occupied by that point. Accordingly, in Blake's design, the difference between the equilateral triangle formed by the upright physical divider and the triangle Newton draws within his diagram calls attention to the diagram's perspectival foreshortening. Blake was likely familiar with research showing the "sphere" of human vision to be a function of the roundness of the eyes themselves, as Reid explained in his realist "geometry of visibles" (examined in the next chapter). No matter how it is geometrized, visual perspective remains an organic experience. As Blake stressed, scientific instruments such as "The Microscope" and "Telescope" can assist the eye but only as prostheses whose data needs to be seen, judged, and interpreted in its turn (*M* 29:17–18; E 127). In fact, Roger Joseph Boscovich had already imagined a non-Newtonian calculus based on curves rather than straight lines:

> A straight line seems to our human mind to be the simplest of all lines . . . But really all lines that are continuous & of uniform nature are just as simple as one another. Another kind of mind

> which might form an equally clear mental perception of some property of any one of these curves, as we do the congruence of a straight line, might believe these curves to be the simplest of all & from that property of these curves build up the elements of a far different geometry, referring all other curves to that one, just as we compare them with a straight line. Indeed, these minds, if they noticed & formed an extremely clear perception of some property of, say, the parabola, would not seek, as our geometricians do, to rectify the parabola; they would endeavour, if one may use the words, to *parabolify a straight line*.[28]

Boscovich's alertness to the possibility of "another kind of mind" reflects his appreciation of geometry's dependence upon appearances. In Blake's print, Newton can be seen as attempting, precisely, to "*parabolify a straight line*" by means of projected "conic sections" formed by the intersection of a plane with a cone.[29] One is not surprised that Niels Bohr and Werner Heisenberg both celebrated Boscovich's importance for the curved spaces of relativity and subatomic particle physics.[30] By extending Plato's barely real Receptacle into a curved four-dimensional space-time, Blake, and later Einstein and Bohr, approached closer to the non-Euclidean cosmogenesis Plato had pursued in *Timaeus*.

What therefore sets Blake apart from his contemporaries is his much more far-reaching and systematic investigation of non-Euclidean geometry, the ground of his most startling insights into the temporal nature of space and matter. Thomas Young never succeeded in changing the prevailing corpuscular view but, beginning in 1801, his experimental single- and then double-slit demonstrations of interference effects indicating light to be a wave, like sound, helped to dematerialize Newton's absolute space and laid a basis for Faraday's early field theory.[31] The post-Newtonian redefinition of "that calld Body" (*MHH* 4; E 34) formed part of the Enlightenment's broader reconception of a panoply of received ideas such as God, Heaven and Hell, "Earth," man, "globes of attraction" including the human eye (*BU* 3:36; E 71), and even substance itself.

The aether would live on for another century until Einstein finally exploded it with his special relativity paper of 1905, but already in Blake's time its days were numbered. Based on Boscovich's mathematics, there were mounting efforts to supplement Newton's contact mechanics with a theory of field conceived increasingly in electromagnetic terms. Accordingly, Blake's print depicts Newton from an implicitly revolutionary historicist viewpoint, similarly to Joseph Priestley in his *History and Present State of Electricity* when he says of an esteemed predecessor: “Though we know much more than he did, we, at the same time, know how much more is unknown better than he could.”[32] In concluding his book with a series of “Queries and Hints” in imitation of Newton’s Queries at the end of the *Opticks*, Priestley goes so far as to remark that, to future electricians “in a more advanced state of the science,” many of his ideas “will probably appear idle, frivolous, or extravagant ones. . . . But if this chapter be a means of . . . accelerating the progress of electrical knowledge, I am very willing that it should, ever after, stand as a monument of my present ignorance.” Indeed, obsolescence is an unavoidable entailment of Newton’s famous remark to his rival Robert Hooke that if he saw further, it was by standing on the shoulders of giants. Far from being naïvely “Whiggish,” the age’s Baconian confidence that great discoveries lay to hand spawned an appreciation of the contingent nature of present knowledge in relation to past and future times that was fully as sophisticated as the Academy’s recent new historicism. Look again at Blake’s print. Insofar as it portrays a classical hero, does it not carry a tragic hint that Newton is fated to be superseded by his very success, not just despite the concentrated intensity of his gaze but because it is so narrowly focused?

Indeed, Blake’s confounding of cause and effect in “Newton”—and everywhere in his poetry through a vast array of puns, ambiguous prepositions, dangling modifiers, associative rather than grammatical punctuation, two-way syntax, and recursive subnarratives, an array which far transcends the conventionalized performativity of social speech acts—can be seen to anticipate relativity’s replacement of Newtonian mechanics with a more phenomenal and descriptivistic kind of science epitomized, notoriously, by Heisenberg’s uncertainty principle. This holds that the observer is included in the scene of observation because the act of measuring not only disturbs what is measured (as anthropologists and psychologists were already beginning to suspect) but even defines it since measuring always occurs within a wider, indefinite set of interrelationships whose ongoing flow of information it arrests at the local level. Two tiny particles or “minute particulars” at the limit of observability are so deeply embedded in their local areas of space-time that they don’t really exist as objects in a field; thus, there is no metric backdrop by which to compare them. (As has been noted, Heisenberg’s empirical term, *unschärfe*, blurry, is much more apt than Bohr’s public relabeling of the principle as sheer epistemological “uncertainty.”) Through the resulting process of approximation, observers “become what they behold” (*J* 39:32; E 187); in Enlightened ideological terms, we are structurally implicated in "the system." But this gorgonic principle doesn't just imply a criticism of Newton in relation to the objects of his science. It holds true of Blake himself looking back at Newton across a century, and viewers today looking at *Newton* across another. From a 2023 standpoint, we can say Blake's color print critiques Newton's reduction of time to space, in disregard of the unified space-time of events that included him as a historically limited observer and contributor to Bacon's overarching program of scientific progress.

So, the present study differs from Ault's *Visionary Physics* in offering a less binary, more interinvolved, yin-yang or Blakean-Contrary view of the relation of Eternity to three-dimensional existence. Ault's position rests on the claim, "Blake's Eternity is constructed in such a way that the concept of measurement as we have characterized it [i.e., as Newtonian and Euclidean] could never come into existence." Lacking any "standard unit" or metric, "an 'Eternal' would never be concerned with comparing the 'lengths' of any two objects, since length would be dependent on his own perception."[33] Or as Blake puts it, "Every thing in Eternity shines by its own internal light" (*M* 10:16; E 104). Says Ault, it is the imposition of "some additional uniform limiting conditions" on individual perception that produces "the emergence of an 'external' world peopled by 'objects' whose existence is independent of the individual" (129). Thus, "Blake's Eternals could never derive the idea of rigid bodies fixed in space" (128).

Granted, Eternity as portrayed at *Jerusalem*'s close is nonmetric in the quasi-Kantian or Coleridgean sense of being the infinite, universal, absolute space of all imaginable spaces—not a place, object, or thing but the very condition for imagining things. It constitutes the antecedent realm of continuous topological shapeshifting that supplies the basis of the various turnings inside-out and outside-in within three-dimensional space that pervade Blake's work. More than Kant, whose writings he evidently didn't know, Blake's Eternity is close kin to the indefinite, all-but-unperceivable Receptacle in Plato's *Timaeus*. Yet Plato's Receptacle is only the ground of creation. It isn't, itself, anything created. So, one struggles to see how the utopian, uncreated no-place of Aultian Blake's Eternity could be habitable even by "Eternals"—unless, of course, they are simply nonhuman.

After all, when Blake's Eternals do look back at the Newtonian Urizen in *The Book of Urizen* and *Milton*, they perceive to their horror just the same fixed and outward world as Ault insists it is impossible for them to imagine. In other words, what Eternity's unrestricted, nonextensive becoming becomes, in Blake's cosmogenesis, is a place standing in some definite relation to Urizen's arrested world of measurable, externalized, substantial being. Thereby, Los and the other Eternals in *The Book of Urizen* become what they behold. Walling themselves off from Urizen, they establish a fearful symmetry that eventually turns Eternity into the traditional otherworldly Heaven. Causality is shown to be a two-way street, as distance and isolation generate perversely sturdy forms of relationship.[34] After all, Urizen doesn't somehow cease to be Eternal—an impossibility. His fall "out of" Eternity therefore establishes causal connection with the other unfallen Eternals no matter what they do. Consequently, Eternity, too, begins to acquire extension relatively to his geometric universe. The reader reflects that physical reality must have involved, from the outset, some causal interlocking of the Contraries, being and becoming. In Blake's cosmology—which I'll later characterize as Platonic-realist, like Whitehead's—the very form of fallenness exists in Eternity even before its instantiation on earth. Urizen allows us to discover it and, thence, ourselves. Blake's myth thus occupies a middle ground between "discovery" and "invention." Call it, revelation. Relativistic laws of nature exist independent of the observer, but their mathematics remains descriptive and acausal ("kinematic") until they are imagined and translated into earthly sense.

On the one hand, then, I want to agree with Ault when he insists, *à la* Henri Bergson, "*the rise of temporal succession is the response of Eternal energy to the intrusion of Urizenic spatialization into the causally independent interaction of Contraries in Eternity*" (173; his italics). Ault's claim seems based on an analogy to the way relativity theory conceives of events outside the light paths between two different light cones as constituting an "absolute elsewhere": a set of world lines unknown to occupants within those two light cones, barring arrival of some other event able to provide linkage—as, for instance, Milton's return in *Milton* to "this earth of vegetation on which now I write" (*M* 14:41; E 109), namely "1804" (*M* pl. i; E 95), activates in the living Blake poet the alienated potential of his dead precursor's utopian Christian vision. Aultian Blake's Eternity represents "elsewhere," and the Urizenic "intrusion" brings the independent Contraries down to a warring marriage of heaven and hell on earth, where *Milton*'s divine comedy finally takes place.[35]

On the other hand, the either-or opposition Ault draws between Newton's three-dimensional geometry and Blake's ostensibly nondimensional, noncausal, symbolical Eternity seems, itself, a "Newtonian" abstraction from Eternity's underlying energetic becoming, which in Blake's myth is what sustains calcified three-dimensional existence in the first place. Paradoxically, Ault makes Eternity into the same kind of unimaginable idealization as

Hume's *Dialogues concerning Natural Religion* (1779) satirizes in the character Demea, whose Calvinism premises a deity so remote as to constitute a kind of vanishing point of relevancy. Though the existence of orthodoxy's omnipotent God is never disproved in the *Dialogues*, he is seen to amount to nothing in real human terms. Conversely, the purpose of Priestley's equally rationalist *Disquisitions Relating to Matter and Spirit* (1777)—an important early influence on Blake as we'll see—is to *defend* Scripture and divine revelation against the "modern" Cartesian view of spirit as an immaterial substance without extension like Demea's all-transcendent God. According to the Cartesian view, says Priestley, "it is even improper to say that an immaterial being *exists in space*, or that it *resides* in one place more than in another; for, properly speaking, it is *no where*."[36] When orthodox dualists speak of "the omnipresence of the Deity, . . . they mean his power of *acting every where*, though he exists *no where*": the metaphysical form of Newton's gravitational force at a distance, which however is also the form of Aultian Blake's immaterial Eternity. Priestley goes on to point out "that if nothing but immaterial substances, or pure intelligences, had existed, the very idea of *place*, or *space* could not have occurred to us" (56). Recall Ault's claim that Blake's Eternals "could never derive the idea of rigid bodies fixed in space" (128), and you can see the appeal for Blake of Priestley's paradoxical "immateriality of matter." Priestley promised a dynamic idea of body as occupying three-dimensional space not as substance, whether solid or nonextended, but as a psychophysiological process wherein heaven's immaterial space extends down or "falls" to earth and becomes available to human sense (namely, via the Blakean space-time Vortex, as I later try to demonstrate). In contrast to Enlightened Cartesians, Priestley claimed "the vulgar [his democratic term for ancient Christians unfettered by Church doctrine] who consider *spirit* as a *thin aerial substance*," would regard "the modern idea of a proper *immaterial being* . . . to be only a *negation of properties*, though disguised under the positive appellation of *spirit*" (73). The fact that Hume and Priestley alike regarded the Cartesian idea of immaterial, unextended spirit as empty, Hume arguing the point in favor of atheism or at least agnosticism, and Priestley in favor of natural religion which Blake equally rejected, shows how urgently Blake needed to develop an alternative conception.

But it took an Einsteinian revolution for the physical implications of Blake's perspective to snap into focus. It might be objected that the "geometry" of my title is misleading and should be replaced by "cosmology," the usual term in Blake criticism. I prefer "geometry" precisely because it defamiliarizes

Blake's cosmology, which wasn't given to him via the authority of Einstein and others but had to be built up with difficulty from insights and perceptions that appear incoherent—"bastard"—from a Euclidean perspective. Through the lens of what came later, we can understand what Blake thought was at stake and why it aligned so awkwardly with the Newtonian physics of the day. Partly, too, my aim is to appreciate how old Newtonian debates over the nature of matter, time, motion, and change implied four-dimensional interpretations of space long before their explicit development. What Blake like Einstein grasped is that all these concepts are abstracted for purposes of measurement from the extensive, "thick," partially sensible relations existing between events. Relations between the abstractions themselves are therefore essentially analogical. Indeed, analogy, as it was beginning to be understood in the early nineteenth century through research in chemistry and electricity, included not only relations between different physical phenomena but also the relations of those phenomena to their visual representations. According to Andrea Henderson, with the rise of field theory, analogy as "a generally applicable principle of equivalence . . . facilitated a rapprochement between a reality understood as fundamentally comprised of consistent formal features and representations of that reality."[37] Arguably, it isn't only Newtonianism Blake parodies in *Newton* and other noticeably flat designs but pictorialism and its supposed direct correspondence with a mechanical universe of solid matter in space whose underlying force, gravity, nevertheless remained notoriously uncharacterized except in nonsensible mathematical terms. But even if "expanded sense perception" was suppressed by Newtonian science, there still were ways to foster it through visualizations based in field theory's powerful abstractive analogies and heightened awareness of relationality.