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Hegel's Deduction Of Matter: And The Untenability of The Big-Bang Theory

by **Dr. Ken Foldes**

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... Hegel's philosophy is today more important and ought to become more topical than it has ever been. The reason is that contemporary physicists have come to the conclusion that the physical world is a *single seamless and indivisible whole*, in which every entity, every event, and every process is inseparably connected with every other. The convergence of evidence upon this conclusion comes from a great variety of sources and is most impressive.[1]

This recent observation of Errol E. Harris reflecting the changing perspective of contemporary science testifies to the timely importance of Hegel's *Philosophy of Nature* and to the imperative need for a serious study of the same. Inspired by this new holistic vision of the universe scientists and philosophers will doubtless be directing their efforts towards discovering the unique manner of the *interconnection* of the various features of the "seamless whole" that is Nature. In view of the fact that Hegel is one of the few scientist-philosophers of the past that have provided such a systematic, holistic account of the universe, many minds working on this momentous project will surely be drawn to Hegel for assistance and light.

This paper seeks to make a contribution in this direction by attempting to illuminate Hegel's deduction of Matter, i.e. his answer to the question, what is the *necessity* of matter, what is its true essence. This attempt will involve explicating the first five categories of the *Philosophy of Nature* and their dialectical interrelationships, namely: space, time, place, motion, and matter - something which, to my knowledge, has not been done in any but a synoptic and superficial fashion (e.g., by Findlay, Taylor, and Stace). After the deduction-exposition, its results will be used to show the untenableness of the Big-Bang cosmological theory - further evidence of the *Philosophy of Nature's* relevance for today. Our procedure will be to first clarify the concepts and interconnections between space and time and then the three forms of their union, namely, the unity of space and time which is place, that which is motion and, lastly, that which is matter.

First we need to say something about the necessity of space and why the Philosophy or Science of Nature must begin with the same. Briefly, the Idea in the *Science of Logic*, existing exclusively in the medium of *pure thought*, i.e. unextendedness, is aware both of itself *and* the

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negative of itself. That is to say, it knows its limit and is thus the impulse or necessity to “sacrifice itself” (cf. *Phenomenology*, Baillie 806), to empty itself into, fill out or display itself in, its Other, i.e. to become the Idea “outside-of-itself.” In this way, it will exist not merely in Thought but in and as Thought’s opposite, viz., Extension, as well. The Idea as expressing its complete self in the medium of Extension or self-externality - is called Nature (cf. *Science of Logic*, Miller 843). Further, since this *negation* of the logical (thought) Idea is a negation of itself, of the Idea, Nature must express *all* the determinations of the logical Idea. This circumstance provides the key for the understanding of Nature and its various forms. These forms, moreover, can be said to be one and all forms of self-externality, the prime characteristic of Nature. With the overcoming of Nature’s last form of externality (i.e. with the death of the animal organism, cf. *Enc.* §§375-376), Nature is *aufgehoben* - we have stepped over into the bright world of Spirit.

Thus, the beginning is made with the most pure, abstract, mediationless, first form of self-externality, space. Because we are in the sphere of Nature which answers to Being in the Logic, the dialectic of its moments will be that of a “transition” - of for example, space *into* time - rather than a “reflective correlation” or a “development” (cf. *Enc.* §161). The principle of advance, of the critical “interconnection” between the moments, is that of contradiction and onesidedness leading to self-negation and transition into the opposite moment. According to Hegel’s theory, moreover, the main Principle governing Nature and its diverse forms and processes is precisely the overcoming or sublating of its *externality* (*Ausserlichkeit*, *Auseinandersein*, *Aussersichsein*), or the **interiorization** of Nature, the becoming of *being-for-itself*, subjectivity or Spirit. The goal of the *Philosophy of Nature* is the insight into the nullity and untruth of externality and matter, the knowledge that Nature’s being and self-subsistence is only a show, that Spirit in the end *is* all in all, i.e. absolutely free and self-determined.[2]

The Concepts Of Space And Time

At the very beginning of the *Philosophy of Nature* Hegel provides the following incisive account of the concept of Space:

§254

The first or immediate determination of Nature is *Space*: the abstract *universality of Nature’s self-externality*, self-externality’s mediationless indifference. It is a wholly ideal *side-by-sideness* because it is self-externality; and it is absolutely *continuous*, because this asunderness [*Aussereinander*] is still quite *abstract*, and contains no specific difference within itself. (Miller 28)

Our purpose is to understand how, starting from space, we necessarily arrive at matter. According to the above text, space is the first form of the externality of Nature, of the Idea’s or Concept’s being-outside-itself. The primary characteristic of space can be said to be *indifference* (*Gleichgultigkeit*) - that of time, as will be seen, *difference* - its secondary features being those of infinity, uninterruptedness, and continuity. The indifference of space lies in the fact that all of its parts fall outside one another and are mutually indifferent in the sense that each part does not yet constitute a limit or *negation* for the other parts. This is so because there is no essential *difference* between any two of its parts, between any two Here’s; they have the same constitution and are thus indistinguishable. This also yields the *continuity* of space, its noninterruptedness. Also of note is the fact that space exhibits a thoroughly *ideal* side-by-sideness (*Nebeneinander*) and not a *real* one, which latter would involve an *exclusion* or *negation* of one part of space by another, i.e. by one which was filled by matter.

However, although indifference is the essence of space, *difference* none the less is contained in its Concept. This is because space is the *Concept in itself* (cf. §255) and thus must exhibit the differences of the same within itself. It does so in two respects. First, as the three dimensions, - the quantitative and indifferent respect which is lacking in negation or determination since there is no essential difference between the dimensions. Secondly, as point, line, and plane (or surface), - the qualitative respect which involves *negation*, primarily as the “point,” which is the first merely “formal” negation of space.

The moments of indifference and difference exhaust the concept of space. The question now is: why does space negate itself and become time? The answer to this is provided in §257:

Negativity, as point relates itself to space, in which it develops its determinations as line and plane; but in the sphere of self-externality, negativity is equally *for itself* and so are its determinations; but, at the same time, these are posited in the sphere of self-externality, and negativity, in so doing, appears as indifferent to the inert side-by-sideness of space. Negativity, thus posited for itself, is *Time*. (Miller 33)

In essence, Hegel is indicating that space, being at once indifference *and* difference, contains a defect and contradiction which causes it to alter itself, i.e. it contains “negation” within itself, but one which is unable to actualize itself through a true sublation of the moments of space. The element of negation or difference *equally* belonging to space must receive its due, must be set free and allowed to be *for itself*.

Therefore, space itself and of necessity gives rise to time, which is then the negativity or difference within itself but now as existing for itself and on its own account. As Hegel says, “time is precisely the existence of this perpetual self-sublation” or negation of space and its moments (Miller 34). That is, with time’s relentless advance from the present moment (which space inhabits) to the past, all the parts of space, *ad infinitum*, undergo negation. Hence, time is the truth of space. What is important to grasp is the fact of the *interdependence* of space and time, i.e. that their independence and non-relatedness is illusory. Time, then, can only be understood as the *self-negation* of space. Moreover, in the form of time, the point (i.e. negation of space) is no longer merely formal but *actual*; space has ceased to be “indifference,” it is now difference or negativity actualized.

The concept of Time, according to Hegel, is that of *Becoming*. Time is “Becoming directly intuited” (§258). Further, the Becoming which time is, is a “unity,” i.e. a unity of the moments of time, of the negative form of Nature’s self-externality. These moments are time’s dimensions, viz. present, future, and past (§259), whose unity is the individuality (*Einzelheit*) of the present or Now. The Now, Hegel says, “is only this vanishing of its being into nothing [i.e. into the past] and of nothing [i.e. the future] into its being.” This signifies that the Now, the unity of Becoming, contains the twin process of coming-to-be and passing away, of the future *becoming* present and the present *becoming* past. The present unifies, and is the middle-term joining, the two extremes. Time, in this way, reveals itself as a “negative unity” of self-externality, i.e. a unity which contains negation or difference within itself.

Moreover, it can be said that Nature is not able to exhibit the *being* of past and future – which only exist for the subject (e.g. in remembrance and expectation) - but only the being of the present or Now. Nonetheless, we are told that “the past and future of time as *being* in Nature, are space, for space is negated time” (§259). Thus, the true

concept of time, as the negation of space as indifference, is that of *negativity which is for itself*, i.e. Becoming.

The First Identity Of Space And Time: Place

The question that now arises is: why does time, or time and space together, become place? Also, why do space and time have to unite or come together at all? The answer is contained in the following:

§260

Space is within itself the contradiction of indifferent asunderness and differenceless continuity, the pure negativity of itself, and the *transition, first of all, into time*. Similarly, time is the immediate *collapse* into indifference, into undifferentiated asunderness or *space*, because its opposed moments which are held together in unity, immediately sublate themselves. In this way, the *negative* determination in space, the *exclusive* point, no longer only implicitly [in itself] conforms to the Concept, but is *posited* and *concrete* within itself, through the total negativity which is time; the point, as thus concrete is *Place*. (Miller 40)

In essence, space as inherently contradictory (as indifference and difference at once) is its transition into time, while time is similarly a transition or “falling together” into space. But now in what sense is time essentially a transition, and thus reversion, into indifference or space? It is this, in the sense that time’s “opposed moments [past, future, present] which are held together ... in unity [in the unity of the Now, or of Becoming], *immediately sublate themselves*.” This means, apparently, that the opposed moments, as existing in a unity, are really *no longer opposed or distinguishable* from one another - they have become *indifferent* to one another, an indifference which is identical with that of space. The point of the transition-collapse of space and time into each other, then, seems to be that their unity or identity is thereby indicated.

Although the parallel is not perfect, the relations between space, time, and place can be compared with those between being, nothing, and becoming of the first logical triad. Just as being and nothing show a natural affinity by passing over into one another, thus confessing their inner identity, merging into a single category, Becoming, so space and time exhibit a like affinity and thus an inner identity which expresses itself firstly in the form of place, as a unity which contains space and time as moments. Even though it is not perfectly obvious how time passes over into space, it seems clear that it is the issuance of place from the unity of both that is at issue here. Indeed, Hegel says that the “*negative* determination in space, the *exclusive* point” when unified or infected with the “total negativity which is time” yields precisely an exclusive point which is both posited and concrete. The concrete point is none other than *place*.

Thus the concept of place is to be the unity of space and time, containing these as its moments. Place contains space in the form of Here, and time in the form of Now. Further, place contains the moment of “*exclusivity*” or “*negation*,” i.e. of incipient individuality or being-for-itself - the final goal of Nature - in that any given place as *this* place is exclusive of and incompatible with all other places. Concretely, to be this place is *not* to be that place. This is what Hegel means by saying that in place, the *negation* which the point in space is, now exists concretely and actually. It is also important to grasp that space alone cannot constitute or determine a place. The exclusivity of place demands true negation which time alone can provide. Space’s universal

indifference makes it impossible to demarcate one portion of space from another.

The Second Identity Of Space And Time: Motion

In the critical §261, Hegel presents his deductions of both motion and matter, determinations which issue immediately from the contradiction inherent in place:

Place, as this *posited* identity of space and time is equally, at first, the posited *contradiction* which space and time are each in themselves. Place is spatial, and therefore indifferent, *individuality*; and it is this only as a *spatial Now*, as time, so that place is immediately indifferent towards itself as *this* place, is external to itself, the negation of itself, and is *another place*. This *vanishing* and *self-regeneration* of space in time and of time in space, a process in which time posits itself spatially as *place*, but in which place, too, as indifferent spatiality, is immediately posited as *temporal*: this is *Motion*. This becoming, however, is itself just as much the collapse within itself of its contradiction, the *immediately identical* and *existent* unity of both, namely, *Matter*. (Miller 41)

We shall first focus on the deduction or necessity of Motion, i.e. the transition from place to motion. To review: the dialectic began with space and time. These, owing to the contradiction within them or their one-sidedness, have collapsed or come together as place, the truth and ground of the two first forms of self-externality. It may seem *prima facie* that place should be free of contradiction since in some sense place is the resolution of the contradictions in space and time. However Hegel informs us to the contrary. The contradictions only *implicit* in space and time are now *posited* in place, and therefore place is immediately characterized as “the posited contradiction which space and time are each in themselves.” Because contradiction is the principle of all change and movement, and that of dialectical advance, the transition from place to motion will be effected by the contradiction inherent in place.

We must ask, what is the precise nature of this critical contradiction? Why must place change its place or seek another place (what is the essence of motion)? The answer lies in the following. Place is spatial indifferent *individuality*, i.e. it is a portion of space, a whole enclosed space, which is an individual space as exclusive of, or shutting-out, other spaces; it is *itself* and no other space. Moreover, a spatial quantum can only be this, have this property, in virtue of time, of its time-component, i.e. because it is a *spatial Now*.

Thus, place as individuated involves both space *and* time. This being so, Hegel goes on to say, “its place is immediately indifferent towards itself as *this* place, is external to itself, the negation of itself, and is *another place*.” This can be construed as follows. Even though a given place is individuated and exclusive in virtue of its spatial and temporal components, its constitution remains such that it is really indistinguishable from any other place. Not only itself but every place is a “this place.” This is the reason why it is compelled to change its place. That is, the place immediately adjacent to it, on the other side of its enclosing boundary, is exactly the *same* as itself! Hence it is *already* outside of itself, “external to itself,” as Hegel states. Thus, in changing its place, in seeking its other, it is really only seeking *itself*. From a different perspective, there is no more reason for it to remain than *not* to remain where it is. Hence, place is the “negation of itself,” its transition into “another place” - and this other place likewise a transition or advance to another place, and so on *ad infinitum*.

This perpetual alteration of place *is precisely what motion is*. And since place must of necessity change its place, since motion must thus be *eternal*, Hegel is in full agreement with Aristotle's teaching, which also holds motion to be without beginning or end. Thus, the contradiction involved in place concerns the fact that although its essence is to be *not indifferent*, i.e. to be a this particular place, exclusive of others, it is equally *indifferent*, i.e. the same as all others. Indeed, its true essence is to be *universal place*, which is identical with motion. This natural dialectic of place and deduction of motion can be clarified by reference to the Logic's dialectic of the finite. *Dasein* (determinate being), as a something, stands opposed to an other, which, as a limit, renders it finite. However, with the realization that the something and other are identically constituted, i.e. that the other is also a "something," and regards the first something as likewise "other" to itself, the first something "passes over" or has already passed over into its other. Thus, with the limit removed, the finite has become infinite (cf. eternal motion). The law implicit here is perhaps that, whenever there are two entities or determinations identically constituted, there is *necessarily* a passage of one into the other.

Hegel goes on to further characterize this self-initiated alteration of place as a process in which "time posits itself spatially as *place*, but in which place, too, as indifferent spatiality, is immediately posited as *temporal*." What this indicates is that the concept of motion is precisely to be the unity and inseparability of space and time, that is to say, in every change of place time passes into space, and space into time. This is exemplified by "velocity" or the quantity of motion, which is interpreted in terms of distance, i.e. *space*, traversed in relation to *time* elapsed.

In the Zusatz to §261, Hegel defines motion also in terms of *duration*. Motion is in essence the same as duration in the sense that every place occupied or to be occupied is exactly the same in constitution, i.e. there is really only *one* place. This is the *universal* place, that which "remains unchanged through all the changes [i.e. the same through all the particulars]" (Miller 43). Hence, motion is fundamentally the same as duration.

In this Zusatz Hegel also makes the remarkable observation that in circular motion, *motion extinguishes itself*, i.e. reveals that motion's truth is to be non-motion or rest (in effect, to contain its opposite in itself). This is because in such motion, the place that is yet to be reached is *one and the same* as that just vacated. Moreover, in circular motion the moments of time, Hegel tells us, are suspended, or abolished, in that Now, Before, and After all coincide at the point of departure and return. Indeed, he adds, the truth of time is precisely that "the goal is not the future but the past" (Miller 43). In view of this it can also be said that the solar system - the universal system of perfectly free motion - is "not going anywhere," is not really in motion, it is in a state of perfect repose.

The Third Identity Of Space And Time: Matter

We now arrive at our destination, Hegel's account of what matter is and why matter is. The difficulty which first meets us is that the deduction is lodged in a single sentence, which is far from transparent. He writes:

This *vanishing* and *self-regeneration*, of space in time and of time in space ... is *Motion*. This becoming, however, is itself just as much the collapse [*Zusammenfallen*] within itself of its contradiction, the *immediately identical* and *existent* unity of both, namely, *Matter*. (Miller 41)

The text appears to say that the becoming or process which place gives rise to, viz. of space into time and vice versa, necessarily has two

forms. That is, the (second and third) identity of space and time exists not only as *motion*, but also as *matter*. The critical question is, why must this becoming or identity exist in a “two-fold” form, particularly as matter? The text itself does not seem to provide the answer. It simply says, “this becoming is itself *just as much* the collapse within itself,” etc., it does not give the reason for the “just as much.”

Leaving this unanswered for the moment, let us continue our interrogation of the sentence. It seems to say that the “contradiction” inherent in place, rather inherent in motion (in “this becoming”) exists not only as motion, i.e. in the form of a *process*, but equally as matter, i.e. in the form of a *quiescence* or a stable *identity*. Thus, space and time are said to collapse or “fall together” into one, i.e. into the “*immediately identical existent unity of both (die unmittelbar identische daseiende Einheit beider)*, namely, *Matter*.” The concept of matter, then, is to be the identical existent unity of space and time. Since Hegel underscores “existent” or “*daseiende*,” perhaps it can be said that matter differs from motion in that matter is an “existent” (*daseiende*) unity of space and time, while motion is not, is a unity of both which is *not* immediately existent in the sense that it exists as “process” or “movement.” What is also important to see is that matter as such is or contains a *contradiction*.

Turning to our main question concerning the *necessity* of matter, the most obvious answer to it, one Hegel himself gives in the Zusatz, is that *matter is logically entailed by motion*. That is, there cannot be motion without “something which moves.” Thus, given the fact that there must necessarily be motion - it is the demonstrated result of the dialectic of place - it follows that there necessarily must also be matter or the movable. This, it seems, is as far as we can get given the above text.

However, in view of the fact that the categories of the Logic undergird the real sciences and therefore provide the key for the proper interpretation of all natural and spiritual phenomena (cf. §254, zus.), perhaps the overall dialectic of being, nothing, becoming and Dasein can help us to clarify the matter. As we know, being and nothing pass over immediately into one another thus showing their truth to be becoming - becoming containing being and nothing within itself as its moments. But now becoming is found to issue or resolve itself into Dasein, i.e. into a stable and quiescent form of becoming; Dasein, moreover, containing in itself being and nothing in the forms of reality and negation and something and other. In a similar manner, space and time pass over into first, a *processive* unity, viz. motion, and then a *quiescent* unity, viz. matter. Hence, it can be said that becoming is to motion as Dasein is to matter.

Perhaps the superimposition of the logical onto the natural categories, or their juxtaposition, pursued to the fullest extent, will yield the explanation we are seeking. The fact that Hegel terms matter the “existent-*daseiende* unity” of space and time seems to lend plausibility to this approach. Therefore, we can say that the reason for matter’s existence is two-fold. First, matter exists simply because motion exists, i.e. there cannot be motion without matter. Secondly, it is necessary for the identity of space and time to exist not only in the form of “process,” i.e. as motion, but as well in that of a “quiescent, existent identity,” i.e. as matter - this necessity being grounded in the dynamic of the logical Idea, Nature being one of the two modes of the Idea’s existence or appearance.

The first answer to the question, what is matter, then, is that matter is “the identity of space and time.” Hegel next proceeds to a further characterization of it. He writes:

Both these determinations [Being-for-another and Being-

for-itself] belong to matter precisely because it is the *identity* of space and time, of immediate *asunderness* and of *negativity* or *self-subsistent* individuality (*für sich* seienden Einzelheit). (Miller 41)

Thus matter is the identity of Being-for-itself and Being-for-another as well. Matter's Being-for-another derives from its spatial component or immediate asunderness, its having its parts outside one another. Its Being-for-itself, on the other hand, stems from its temporal aspect, i.e. its negativity and exclusive individuality. Further, its properties of compositeness, impenetrability, and visibility for example, can all be traced back to space and time (cp. the Logic's "being and nothing"). As Hegel remarks:

What is called the filling of Space and Time, the palpable and tangible, what offers resistance and what, in its being-for-other, is also for-itself, all this is attained simply in the unity of Space and Time. (§261, zus., Miller 44)

At §262, the two moments constituting the *contradiction* which matter is are further determined as "attraction" and "repulsion," their unity being none other than *gravity*, which reveals itself as the true concept of matter:

Through the moment of its negativity, of its abstract *separation into parts* [*Vereinzelung*], matter holds itself asunder in opposition to its self-identity; this is the *repulsion* of matter. But since these different parts are one and the same, matter is no less essentially the negative unity of this sundered being-for-self and is therefore continuous; this is its *attraction*. Matter is inseparably both and is the negative unity of these two moments, individuality. But this individuality as still *distinguished* from the *immediate* asunderness of matter and consequently *not yet posited* as *material*, is an *ideal* individuality, a *centre* [*Mittelpunkt*]: *gravity*. (Miller 44)

What is important here, is Hegel's claim that Kant, as well as the physicists of Hegel's and our day, all err in regarding attraction and repulsion as "forces" that are *independent* of matter and act on it from outside, rather than as elements constituting the very being of matter itself (of course Schelling also deserves credit for this important discovery). Matter is precisely the *unity* of attraction and repulsion, i.e. matter *is* gravity.

The *repulsion* pertaining to matter derives from its time-component or negativity, whose further function of individuation (*Vereinzelung*) holds the parts of matter outside one another. Moreover, it is in virtue of repulsion that matter "posits its reality" and actually "fills space" (Miller 46, zus.). Matter's *attraction*, on the other hand, is rooted in its space-component or its indifference and continuity, owing to the intrinsic sameness of its parts. Thus matter is this existing contradiction of being outside of itself, repulsion, and being as well in a state of unity and continuity, i.e. attraction. -- A perfect example of identity-in-difference, of unity-in-opposition (cf. Heraclitus' fragments).

The nature of these two moments also receives clarification through the Logic's dialectic of the Many and the One. The One, as an exclusive Being-for-self, repels itself from itself, giving rise to the Many. This is the moment of repulsion, the holding apart of the parts of matter. However, at the same time, the parts or Ones held apart are exactly the same, each is a One or there is really only a single One present. This yields the moment of attraction, the continuity and sublation of the plurality of ones. Further, matter, as the negative *unity* of repulsion and attraction,

reduces to or as its truth as an *individuality* or *singularity*, one however which is an “ideal” individuality, a middle-point or center of matter, namely *gravity*. Thus gravity is revealed to be simply the togetherness or union of these two opposed moments of matter.

Hegel further cautions that gravity is not to be confused with attraction. The latter is responsible only for the *continuity* which matter exhibits, while gravity is preeminently that which reduces both attraction and repulsion, continuity and self-external being (discreteness), to individuality or subjectivity (the first stirrings of the Concept *for itself*). Gravity, what is the essence of matter, in its reduction of these two moments to individuality, also thereby characterizes itself as a *striving* (*Streben*) to reach the center (*Mittelpunkt*). Hegel now states that the two essential determinations of matter are precisely 1) this striving to reach the center, gravity *per se*, and 2) the fact that this center, what is very important, *lies outside matter* (is immaterial - hence, spiritual?).

Two things follow from this: first, that matter is essentially *heavy*, qua a striving to reach its center (it is “dissatisfied with itself”). Hence, heaviness or weight cannot be separated from matter. Secondly, and most significantly, the fact that matter’s essence is a striving to reach its center as a point which lies *outside* of itself is an open admission that matter is in truth a nullity or unresolved contradiction. That is, its being or self-subsistence is an illusion or fraud. It is such because in seeking its center, matter seeks the annihilation of itself: if all the parts of matter were to attain the center, their goal, matter *per se* would *vanish* and be no more. As Hegel notes, “the unity of gravity is only an Ought (*Sollen*), a longing (*Sehnsucht*), the most unhappy *nisus* to which matter is eternally condemned. . . . If matter attained what it seeks in gravity, it would melt into a single point [compare the Big-Bang theory, see below]” (Miller 46, *zus.*).

Therefore, it is not the *center* which is immanent in matter, but rather matter’s *striving* to reach the same. Once more, matter is nothing but a *striving*, a striving to sublimate itself. Indeed, matter declares itself to be a perfect manifestation in the sphere of externality of the Concept, i.e. of the unity of opposites; in this case of attraction and repulsion, discreteness and continuity, being-for-itself and being-for-another, space and time. Matter as Gravity, its truth, will go on in the sphere of Physics (Essence) to display its ideal qualities as correlations of “reflection,” and then in the sphere of Organics (the Concept) to undergo further interiorization till it will emerge at last as consciousness and Spirit, the truth and ground of externality and Nature as a whole, that is, of Matter and all its protean forms.

In passing we should note that although William Maker’s and Richard Winfield’s treatments of the Philosophy of Nature are in many respects quite excellent and they are indeed correct in taking it to be Hegel’s position that nature is not reducible (the “same or similar”) to thought—a view they dub “metaphysical idealism”—nature being the “other” of the logical Idea (or the “self-externality of categorial totality”), Maker and Winfield fail to understand that and how the Logic or the Concept is the key both to understanding nature and its processes and to constructing a “philosophy of nature.” That is, they fail to see that the universal or thought is the essence, inner side and truth of natural phenomena, and that the universal and nature’s universals are really determinations of the I itself - what alone makes a *knowledge* of nature (= the “other” of knowledge or thought) possible.[3]

Summary of Hegel’s Deduction of Matter

We began with Space or sheer indifference, the first mode of Nature’s being outside itself, as pure Quantity existing *externally* (not still shut-up in pure thought), an infinite plurality and continuity of Here’s tolerating no

real interruption, limitation or negation, although containing negation in a formal sense in the moment of the *point*. Space, in order to give its moment of negation or difference its due, then posits itself as Time, i.e. as total negativity (an image of $I = I$), negation or difference existing *for itself*. Time, however, immediately reverts into space and indifference, seeing that the difference of time becomes sublated in the proud unity of the Now. We then bore witness to time's becoming space and space becoming time, a movement or "play" whose first resolution was the unity of the two opposites, of the Here and Now, as Place, the point *concrete*. Place, owing to its indifference towards itself, was the transition to another place, and thus to Motion, the second form of the unity of Space and Time. Motion led necessarily to Matter, first, as a necessary condition of motion and, secondly, because the contradiction of space and time must exist both as process (motion) and as quiescence (matter), this having its justification in the logical Idea, in the dialectic of Becoming and Dasein. Matter, as the *quiescent, existent* contradiction and unity of space and time, then further determined itself as the unity of Repulsion and Attraction, of discreteness and continuity, that is to say, as Gravity, as the striving to reach a center that it can never reach: - Matter's confession of its own intrinsic nothingness and nonself-subsistence.

The Untenability Of The Big Bang Theory

We will now apply these reflections to the theory of the "Big Bang." According to this theory, widely accepted as the true account of the origin of the universe, because of the alleged recession of the galaxies from one another, as evidenced by the so-called "red-shift" phenomenon, the conclusion seems logical that at one time in the distant past all the matter and space comprising the universe must have been in a state of infinite contraction. From this original condition, also known as the "cosmic singularity," it is hypothesized that a "big-bang" occurred, as a result of which the concentrated matter and energy began to expand, distributing itself into galaxy-clusters which continue to this day their process of separation and expansion. In the words of William J. Kaufmann, a noted physicist at San Diego State University:

The universe has been expanding for billions of years. Going back in time, we realize there must have been a point in the ancient past when all the matter in the universe was concentrated in a state of infinite density. Presumably some sort of colossal explosion occurred to start the expansion of the universe. This expansion, commonly called the Big Bang, marks the creation of the universe.[4] The theory also holds that it is not matter or the galaxies that are expanding but only the space between the galaxies.

Assuming that Hegel's deductions in the Philosophy of Nature are correct, the Big Bang theory can be discredited in two ways. *First*: The Big Bang theory claims that the space between the galaxies has been "increasing" over the past 20 billion years, and therefore that at the beginning of the expansion process there must have been no space at all between galaxies, i.e. all space and matter was concentrated into a single point or singularity. In any case, the theory holds that space is necessarily *finite* or bounded rather than infinite or unbounded. According to §254, however, space of necessity is *infinite* and eternally such. There Hegel states:

[Space] is therefore absolutely continuous; the point, the being-for-self, is consequently rather the *negation* of space, a negation which is posited *in* space. This also settles the question of the infinitude of space (§100, Remark).

Space is infinite because the only thing that can serve to limit space

and make it finite is the *point*, which is the negation or limit of space in that it has no extension or is non-spatial. Therefore, the limit is no true limit, the negation no real negation. That is, there is space on either side of the limit. Hence, space cannot be limited or finite – let alone abrogated, i.e. during “Planck time,” which the Big Bang seems to imply. Space is necessarily and eternally *infinite*, and also therefore not at all subject to “expansion” or “contraction.”

Second: The Big Bang also holds that it is a fact that at one time (and perhaps again) all the matter in the universe “was concentrated in a state of *infinite density*.” However, according to the Philosophy of Nature, not only is matter – that which fills, and necessarily fills, space – eternal, but “*repulsion*, no less than attraction, is an *essential* moment of matter.” That is to say, according to §262, “matter is inseparably both [repulsion and attraction] and is the negative unity of these two moments, individuality.” Therefore, this being the case, it is absolutely impossible for all the matter in the universe to condense (or have condensed) into a single point or singularity, or to become “infinitely dense.” This would be tantamount to matter’s complete yielding to attraction, which would require and presuppose the cancellation of the moment of repulsion, which is impossible as repulsion is an essential element of the concept of Matter. (I will forgo commenting on the meaninglessness of the expression, “infinite density.”)

NOTES

[1] Harris, Errol. E., *The Spirit of Hegel* (New Jersey: Humanities Press, 1993), p. vii.

[2] Errol Harris's work in this field is exceptional. However I disagree with him on the question of Hegel's alleged “realism” with regard to the Philosophy of Nature. Harris says on page 10 of *The Spirit of Hegel* that Nature has a “material, self-external existence, which can never be thought or explained away.” Au contraire, Hegel is an absolute idealist. In the end, Nature vanishes (cf., *Enc.* §381); Nature's moments have being only during and in the course of their separate study in the dialectic progression of nature. Here are just a sampling of Hegel's key texts: (*Enc.* §160 zus.) “The general standpoint of the Concept is indeed that of *Absolute Idealism* ... *everything* which in other forms of consciousness counts as something that *is* ... as *independent*, is known within the Concept simply as an *ideal* moment”; (*Enc.* §247 zus.) “Nature's essential characteristic is to be the Idea in the form of otherness, and this implies that the *being* of Nature is essentially *ideality*, or that, as only *relative*, Nature is related essentially to a First [viz. Spirit]”; (*Enc.* §389 zus. Miller 32-33) “Since, then, everything material is overcome by the action of spirit implicit in nature, this triumph being consummated in the substance of soul, the latter emerges as the *ideality* of *everything* material, as *all* immateriality, so that everything called matter ... is known to have *no independence* relatively to spirit/mind”; (*Enc.* § 96 zus.) “The concept of *ideality* expressly consists in its being the *truth* of reality, or in other words, reality posited as what it is in-itself proves itself to be ideality... We must trace nature back to ‘reality’ ... and spirit to ‘ideality’.”

[3] Indeed Maker and Winfield are still unable to show how thought (=the Philosophy of Nature) is able to “be about,” “refer to” or comprehend what is non-thought. See R. Winfield's *Freedom and Modernity* (Albany: SUNY Press, 1991), 45-49; and “Space, Time and Matter: Conceiving Nature Without Foundations” in *Hegel and the Philosophy of Nature*, ed. S. Houlgate (Albany: SUNY Press, 1998) esp. 52-54. And see W. Maker's “The Very Idea of the Idea of Nature, or Why Hegel is not an Idealist” also in *Hegel and the Philosophy of Nature*, esp.5-12. See for

example §246 zus. of *Hegel's Philosophy of Nature*, tr. A.V. Miller (Oxford: Oxford University Press, 1970) 7-13, a text which Maker in particular seems to misconstrue. Hegel writes, for example: "The difficulty arising from the one-sided assumption of the *theoretical* consciousness, that natural objects confront us as permanent and impenetrable objects, is directly negated by the *practical* approach which acts on the absolutely idealistic belief that individual things are nothing in themselves (9) ... In grasping this inner side [of Nature] the one-sidedness of the theoretical and practical approaches is *transcended*, and at the same time each side receives its due. The former contains a *universal* without determinateness, the latter an individuality without a universal; the knowledge-that-comprehends is the middle term in which *universality* does not remain on *this* side, in *me*, over against the individuality of the objects: on the contrary ... it does not encroach upon their independence or interfere with their free self-determination (12)... Since *the inner being of Nature is none other than the universal*, then in our thoughts of this inner being we are at home with ourselves... *The I in its essence is the Concept*, which is equal to itself and *pervades all things*, and which ... is the *universal* which returns into itself (13)." Maker is only able to sustain his reading – which holds that the inner being of nature is *not* the universal, thought, or the Concept - by ignoring the passages I have just quoted; see his treatment of the text in his article "The Very Idea of the Idea of Nature, or Why Hegel is not an Idealist" on pages 6-7. Also see *Enc. § 20* zus. (T.F. Geraets 50): "It will be seen in the Logic that this is just what thought and the universal are: that thought is *itself and its other*, that it overgrasps its other and that *nothing escapes it*"; and *Enc. § 24* zus.2 (T.F. Geraets 58): "Thus the concern of those other sciences [the Philosophy of Nature and the Philosophy of Spirit] is *only to recognize the logical forms in the shapes of nature and spirit*, shapes that are only a particular mode of expression of the forms of pure thinking."

Of course the main error in their account stems from their strange opinion that Hegel's Logic is not an *ontology*. As a result they are forced to engage in unintelligible acrobatics, conceptual twisting and turning, in order to explain how the "gap" between thought and nonthought (nature) can be bridged. They overlook the simple fact that Hegel's "Concept" is not just "mere thought" and "subjective" but is also "being" and "objective," hence has the power to penetrate and cognize any object or other, and for the precise reason that it *is* the essence and being of every object. That Hegel's Logic is not an ontology is contraindicated by many of Hegel's texts. For example in the *Science of Logic* Hegel states that: the result of the Phenomenology of Spirit is that "*Being is known to be the pure Concept, and the pure Concept to be the true Being* (Miller 60, italics added)," and "... the *Concept is everything ... it is soul and substance ... the substantiality of things ...* [the method's or Concept's] supreme or sole *drive* is to find and cognize itself *by means of itself in everything* (Miller 826ff)." Indeed, the "*self-knowing Concept*" is itself "the Absolute, both subjective *and objective* (last italics added)"; and "...the Concept that *knows itself and everything as Concept* (839, italics added)." Also extremely important, and what perhaps indicates most clearly Maker and Winfield's error, is the key text on page 827 which distinguishes the Hegelian, "speculative," i.e., *ontological* way of knowing from the non-speculative. Here is an excerpt from the text (which should be carefully studied in its entirety): "In the [non-speculative] syllogism the subject is one extreme and the object the other, and the former by means of its method unites with the latter, but in doing so it does not *unite with itself*. The extremes remain diverse because subject, method, and object are not posited as *the one identical Concept* [Hegel's italics]. ...[T]he Concept is the middle term only because *it has equally the significance of the objective* (last italics added)."

[4] Kaufmann, III, William J., *Discovering the Universe* (New York: W.H. Freeman and Company, 1990), p. 375. It can be said that in general the

deficiency of the empirical or “positive” sciences, e.g. physics, biology and chemistry, is as follows. (1) They stand in need of a principle (viz. the Concept) capable of elevating them into a *single* System of Science, which will thereby give coherence to the vast multiplicity of their *externally* related generalizations. (2) They do not as yet recognize the necessity for sublating the Subject/Object, Concept/Being distinction, the absolute prerequisite of True Science and what alone can render their Discourse *objective* and *true*. At the present time their investigations are conducted exclusively from the standpoint of the natural unscientific consciousness with all its attendant limitations - cf. the *Phenomenology's* Preface: “The standpoint taken up by natural consciousness, that of knowing about objective things as opposed to itself, and about itself as opposed to them, is for Science the very opposite of its own standpoint” (Baillie 87). Further, (Philosophical) Science alone can adjudicate which of the empirical sciences generalizations and “findings” are to be incorporated into the One System of Science. The empirical sciences, as Hegel states e.g. in *Natural Law* (Knox 118), aim to assert what is *real, necessary, and objective*, however only Philosophy or the Concept can determine this. (3) They are unable to *deduce* or demonstrate the *necessity* of the objects and determinations of their respective disciplines. This is because they try to understand a mode or determination of the Idea in *isolation* from the Whole. True scientific cognition and explanation consists in showing a specific determination's *mediation* (antecedent and consequent) and place in the Whole, proof of mediation being equivalent to proof of necessity or deduction of the determination at issue. (4) They fail to realize the inadequacy of number, the unit and *quantitative determination* in general as an explanatory principle for natural and spiritual phenomena. (5) Their *Universal* is abstract, i.e. it does not of and from itself produce its Particulars (qua specific differences and individuals) or “particularize” itself. (6) They commence with given empirical data (*not* with the Concept) and *then* advance to Thought, to the Universal and Law and thus, qua based on the empirical and bereft of all necessity and universality, never rise above the level of Doxa or opinion; all of their results, further, are tentative and subject to ceaseless revision as a new instance always has the power to overturn them. Lastly (7) they are presently without the Insight (though there are signs this is changing) that the Science of Nature is in reality the cognition of God (the Absolute Idea), i.e., “in His immediate existence” and under the attribute of Extension (cf., *Enc.* §376 zus., and Schelling's remark in *The Critical Journal*, in di Giovanni & Harris's *From Kant to Hegel* 378), an insight which alone is capable of giving inextinguishable vitality and thematic unity to their manifold inquiries.

List Of Principal Texts Used

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