

# The Future of Hegelian Metaphysics

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**Abstract:** With the recent suspicion of metaphysics it is easy to be embarrassed by Hegel's suggestion that his *Logic* is also a metaphysics. In this paper I want to argue that his conception of metaphysics is still highly relevant, and suggest some ways it could be developed further. I start by suggesting how Hegel justifies his claim, and why that justification still retains a measure of plausibility. Then I turn to a discussion of what we mean by cause, and how Hegel's analyses of necessity, cause and reciprocity transform this concept in ways which are relevant to current developments in science.

**Keywords:** Logic, Metaphysics, Cause, Necessity, Reciprocity

I  
In his *Encyclopaedia Logic* Hegel observes that his "Logic coincides with metaphysics, with the science of things grasped in thought that used to be taken to express the essentialities of things."<sup>1</sup> For all that the logic is the system of pure thought, these thoughts are not the empty categories of Kant's transcendental philosophy, but the *Logic* "contains *thought in so far as this thought is equally the fact* (or object [Miller]) *as it is in itself; or the fact* (or object) *in itself* insofar as this *is equally pure thought*."<sup>2</sup> The term translated by di Giovanni as "fact" and by Miller as "object" is the notorious *Sache selbst*. Whatever else might be involved by his use of this term, Hegel is evidently saying that the thoughts analyzed in the *Science of Logic* are not simply thoughts but capture what is essential about what Kant calls things in themselves.

What is not often noticed is that this claim of the identity of thought and *Sache* comes just after two paragraphs in which Hegel has stressed that the *Logic* presupposes the *Phenomenology of Spirit*. Hegel says that the concept of a philosophical science emerges from his earlier work, and sets the context within which the logic develops. For it is in the *Phenomenology* that "the first immediate opposition" of consciousness and its object is gradually transcended as we "traverse all the forms of the relationship of consciousness to the object."<sup>3</sup>

It is worth considering how that opposition of consciousness and object, which is represented in both Kant's appeal to transcendental analysis and Nietzsche's scepticism about what humans call truth, has been overcome. Hegel sets the stage in the Introduction to the *Phenomenology*. Rather than starting out from a preconceived idea

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<sup>1</sup>Hegel 1991, §24, p. 56.

<sup>2</sup>Hegel 2010, p. 29; Hegel 1969, p. 49. Italics in the original.

<sup>3</sup>Hegel 2010, p. 28.

of what knowledge is, he suggests, it is better to allow consciousness to formulate its own claims. Any such claim to knowledge will involve both a certainty, and a claim to truth. In other words, it spells out in some detail what kinds of effects that might conceivably have practical bearings would result from putting it into practice. The belief in this claim is then advanced with the calm certainty that truth will emerge as expected. When those conceptual expectations prove to be wrong through an experienced encounter with reality, that certainty is shattered. In the aftermath a revised self-certain belief has to be formulated that incorporates what still survives from the previous claim together with what has been learned from its failure. Here we have a process of confident belief, an encounter with reality that shows the belief lacks truth, and a new, more comprehensive belief. By continually reworking the conceptual expectations articulated in its beliefs, consciousness learns from experience.

I have formulated that dynamic in terms of belief and conceivable effects in order to evoke an echo of C.S. Peirce. In his essay, "The fixation of belief" Peirce points out that the only reliable way of fixing belief involves assuming that there is an independent Reality that will frustrate and disprove inadequate beliefs; and in its sequel "How to get our ideas clear" he defines a clear idea as one in which we work out what kinds of "effects that might conceivably have practical bearings, we conceive the object of our conception to have."<sup>4</sup> What Hegel is outlining in his introduction is essentially a version of Peirce's pragmatism -- a process whereby consciousness formulates a claim to knowledge that works out its conceivable practical implications, discovers that in fact key expectations are flawed, and retreats to develop the next step in its quest for knowledge. It is not surprising that the first title for the *Phenomenology* was "Science of the Experience of Consciousness."<sup>5</sup>

This work, then, traces the way conceptual formulations are constantly corrected by the given facts of experience in a long and on-going process, becoming ever more effective in predicting what will in fact occur when we put a confident knowledge claim into practice. When we come to its final chapter on "Absolute Knowing" we find that what it describes is little more than the general structure of that process. From the beautiful soul consciousness has learned that when one acts on the

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<sup>4</sup> C.S. Peirce, "The Fixation of Belief" and "How to Get our Ideas Clear" 1931-35, 1958, vol. 5, §§ 384 and 402. There is no evidence that Peirce ever read the *Phenomenology*. The Harvard Libraries, however, hold a copy of the second edition of the *Encyclopaedia of the Philosophical Sciences* of 1827 with Peirce's book plate. This edition preceded the posthumous edition of the *Werke* which included material from Hegel's lectures as additions.

<sup>5</sup> Robert Stern develops this reading in Stern 2009, pp. 218ff. Other readings of the *Phenomenology* that incorporate pragmatic themes can be found in Flay 1984, Collins 2013, and Westphal 2015.

distilled essence of what one knows one discovers that the results are not always what one expects, and one then incorporates that discovery into one's accumulated knowledge; and from revealed religion it has heard that this is the ultimate rhythm of the universe, where the divine essence acts to create a world, discovers the result is not what it expected, and then initiates a pattern in which original design is integrated with the way the world actually is, and where the believer has discovered in the dark night of the soul that there is no truth out there, but that truth lies in the dynamic flux of existence where concepts are always subject to revision. The concept of pure science which is presupposed by the *Science of Logic* is, then, nothing other than this process of learning from experience. Thought has moved from a number of confident affirmations of fixed belief, to a dynamic process that continually incorporates what it learns from its practical failures. Not only has thought been modified by what it has learned from experience, but the act of conceiving has incorporated the open dynamic by which the wisdom achieved from cumulative experience is constantly revised by thought's interaction with the world of reality. Because the logic emerges from and continues to implement this experiential process, it can be confident that its concepts are no longer pure a priori categories of transcendental thought, but metaphysical principles that are implicit in the universe.

In taking this approach, Hegel has abandoned Kant's rigorous distinction between appearances and things in themselves, but at the same time he has incorporated Kant's insight that knowledge involves integrating intuitions and concepts. On the one hand, as Robert Pippin has pointed out, for Hegel there are no pure intuitions, where the intellect is radically passive, but all intuitions are moulded by thought.<sup>6</sup> On the other hand, useful concepts are not purely a priori, but have been formulated to take account of the way earlier conceptual formulations have failed when applied to the world of experience. It is because he has provided a more dynamic understanding of the way concepts and intuitions interact that Hegel can then proceed to implement Kant's project of a "future metaphysics".<sup>7</sup>

If this analysis is correct, there are implications about the strategy one should adopt if one wants to do metaphysics in a Hegelian way. The concepts he is analyzing are not peculiar to him, but are the result of the cumulative experience of western culture, epitomized by the variety of claims explored in the *Phenomenology*. The analysis itself simply

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<sup>6</sup> Pippin 1989, Chapter 2.

<sup>7</sup> Consider the title for his *Prolegomena to any Future Metaphysics*. For a more detailed justification of this interpretation of Hegel's metaphysical project, see Burbidge 2014a.

attempts to lay out in detail what is implicitly embedded within those thoughts. So a Hegelian metaphysics would take some of the fundamental concepts with which, as the result of our cumulative experience, we organize our understanding of the world and examine what they entail: to what extent does our actual experience fit and to what extent does it disconfirm what they articulate. And it would then proceed to reconstruct its conceptual framework in light of any disconfirming evidence that experience has provided.

This is not simply a form of the practice of the empirical sciences, in which a proposed theory is tested by developing critical experiments. For the concepts in question are those presupposed when formulating those very theories: concepts like “individual”, “cause”, “law”, “actual”, and “possible”. And the testing is much more tentative, since these fundamental concepts determine what we take seriously as evidence, what we dismiss as irrelevant, and how we formulate our theories. So the process involves reformulating the way we understand the world. It is a genuinely reflective, philosophical enterprise. At the same time, it needs to be sensitive to what the empirical sciences have actually discovered about the way the world operates. Proposals for revision should not legislate what is reliable data, but rather expose what is implicit in the processes and relations discovered.

The expansion of our knowledge about the natural world breaks apart the neat pattern that Hegel’s system adopts. It is not simply that physics has split the atom – what was supposed to be the ultimate indivisible unit of reality -- into a myriad of components, and that geology and biology have given nature a history. Thought itself has drawn more refined distinctions and discovered more intricate interrelationships. Hegel’s logic appears to trace a single sequential story. For all that he varies that sequence quite considerably as he moves through the various editions of the *Science of Logic* and the *Encyclopaedia*, each version traces a single path, suggesting that there is but one story to tell. But when one enters into the logic and thinks through the various concepts, one can see connections that could easily move in other directions.

What I propose to do in the rest of this paper is suggest what a contemporary Hegelian metaphysics might look like. I shall do so by drawing heavily on analyses that Hegel himself develops, but I shall not be following his particular pathway. I start from the concept of cause as it is understood in the contemporary world, and then suggest how a reflective discipline that takes account of experience might produce a slightly different, but more effective conceptual framework.

The contemporary concept of cause reflects the influence of David Hume and Immanuel Kant. For all that Hume traces our belief in causal necessity to customary habits of the mind derived from the repetition of similar events, he does not question the reliability of that belief. Necessary connection between cause and effect is a cornerstone of his whole philosophy, based as it is on an attempt to transfer a Newtonian approach to science to the world of human affairs. And it finds expression in his confident assertion that: “It is universally allowed, that matter, in all its operations, is actuated by a necessary force, and that every natural effect is so precisely determined by the energy of its cause, that no other effect, in such particular circumstances, could possibly have resulted from it.”<sup>8</sup>

Kant, bothered by the discrepancy between Hume’s deterministic claims and the weakness of his justification for our belief in them, traces our belief in cause to the structure of the conditional judgment, *if A then B*, which asserts a necessary connection between antecedent and consequent. Kant claims that it is this conceptual model that determines the way we organize our understanding of phenomena according to causal patterns. We distinguish between a casual temporal sequence and a necessary causal one by the fact that the latter happens according to a rule justified by sufficient reasons.

For both philosophers what characterizes a cause is the necessary connection between cause and effect, so that there is a forward-moving inevitability in the way the world emerges out of the past and moves on toward the future.

This conception of causal necessity has provided the implicit standard for our contemporary conception of cause. To be sure, we are ready to admit that we use the word “cause” for influences that could have been otherwise, or where a condition does not inevitably lead to its regular consequence. While the smallpox virus causes smallpox, we can frustrate the supposed necessity by vaccinating with cowpox viruses. We are reminded by Hume’s caveat “in such particular circumstances” that a causal link can always be affected by attendant conditions and circumstances. But, convinced that a forward-moving necessity is implied, we then attribute such a necessity to the accumulation of the appropriate attendant circumstances – not only to the fact that they all have been assembled at the same time, but also to the fact that they have occurred in the proper temporal order and spatial relationships to trigger

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<sup>8</sup>Hume 1993, p. 54.

the resulting effect.

The belief in a forward-moving causal necessity, then, is a metaphysical assumption of our world, an assumption that has seldom been subjected to critical examination. Once we acknowledge its structural role, functioning as a preordained Kantian category, we can begin to examine its justification to see whether that belief is in fact inescapable. Approaching Hegel from this perspective, we find that, in his *Science of Logic*, he provides a number of critical comments that place that belief into question. He does so in his analysis of necessity, in his analysis of cause, and in his analysis of reciprocity.

First, his analysis of necessity. Hegel distinguishes three forms of necessity. *Formal* necessity starts from the fact that a particular event could have happened otherwise, and is thus contingent. Once it has happened, however, it cannot be otherwise and so is necessary. *Real* necessity emerges from a discussion of real possibility, in which enough contributing conditions come together to make some effect necessary. Once that set of conditions becomes sufficient, they cease to be conditions, however, for the effect has already become actual. The move from conditions to result is *really* necessary. At the same time, however, it remains a contingent matter whether enough appropriate conditions emerge to produce the necessary result. So even real necessity is bedevilled with contingency.

One turns to his discussion of *absolute* necessity expecting that Hegel will articulate a thorough-going forward-moving necessity. But that does not seem to be the implications of the dense and difficult final section of his chapter on Actuality. We can identify three steps in his argument. In the first place, real necessity has a determinate structure in which contingent conditions coalesce to produce a necessary result. While, as determinate, it is something actual, it is also inherently necessary. So Hegel calls its actuality *absolute actuality* because it cannot be otherwise. In the second place, this actuality is absolute simply because it is nothing more than its own inherent necessity that makes it possible; so it is radically contingent, and so a bare possibility.<sup>9</sup> But because the only other possibility would be nothing at all, it can be called *absolute possibility*. So the relation of real necessity when considered as an integrated unity is itself contingent, even as it incorporates into its meaning the contingency that affects the way its conditions come together.

Third, Hegel explores the complex picture that has emerged.

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<sup>9</sup>Consider Leibniz's question: Why is there something rather than nothing?

The absolute actuality that emerges from real necessity is radically contingent, which means it lacks any grounding or justification. At the same time it is formed by an internal dynamic in which conditions coalesce to generate real necessities even though those conditions are themselves contingent on the circumstances through which they became actual. In other words, this internal dynamic is the ground which generates comprehensive or absolute actuality. We have an actuality that at the same time lacks a ground and yet is grounded -- an actuality which simply is (a being), yet its being results from the complicated relation between conditions and their necessary consequences which constitutes its essence. Looking at the total picture we see a complex reciprocal activity in which actuality shifts into possibility and contingency shifts into necessity, just as possibility and necessity shift back to actuality and contingency. These double transitions collapse (or sublimate themselves) into a new immediate concept that includes all the details of the interaction. That immediate thought Hegel calls *absolute necessity*.

So absolute necessity does not involve a strict forward-moving inevitability, but a constant shifting back and forth from real necessity to contingency, from pure possibility to pure actuality. It is absolutely necessary that contingencies result in relative necessity, and that necessities produce and presuppose contingencies. If this analysis holds, then the claim of causal determinism that causes generate a strict forward-moving necessity is misguided.

We now turn to Hegel's discussion of cause. It develops in three stages. In the first place, when we consider causes simply on their own, abstracted from any context, we think of them as moving directly into their effect. Once an effect happens, the cause ceases being causal, and the effect ceases being a result. In effect, the causal dynamic and the resultant effect are simply the same thing from two different perspectives. This, says Hegel, is what we usually mean when we talk about causal necessity.

Secondly, once we apply this formal pattern to some content the relationship becomes more complicated. For whatever acts as cause and whatever experiences the effect also have other characteristics that continue even as the change occurs. At the same time the dynamic that constitutes the causal process is transferred from one to the other, while retaining its identity. A specific causal sequence can thus continue to exercise its causal efficacy so that the effect becomes a cause in its turn, and so on in an infinite progress. Similarly the cause was itself activated by some prior cause in a sequence that repeats itself into an infinite regress.

Third, when we look closely at the relation between cause and effect we find a more intricate relation. The cause is active, driving towards the production of an effect; whatever receives that impetus is passive, lying inert until the cause introduces its novelties. But were that passive recipient not there, the cause itself would be impotent and passive, waiting for some opportunity to act. So one could regard the introduction of the supposedly passive recipient as an active initiative that turns the potential cause into an actual cause. What we have is a form of reciprocity -- an action and reaction where each entity acts on the other, and each responds to what the other introduces. From this perspective the causal chain is not a linear sequence, but a series of consecutive circles in which what emerges is a network of mutual implications. One can then consider those situations where the chain does not simply move on to other entities, but develops a complex *modus vivendi* between the two interacting agents. The action of one stimulates a reaction from the other which in turn triggers a new response in the first. They develop a reciprocal pattern in which each transfers its activity over to the other and each receives and adapts that activity in terms of its own distinctive character. We have once again a form of double transition, of passing over from one to another and back again.<sup>10</sup>

Hegel has thus set the stage for the move to a consideration of reciprocity. While Kant had recognized reciprocal interaction among the organs of an organism, he nonetheless maintained that, ultimately, everything would be explainable in terms of mechanical causation, with its linear movement through time.<sup>11</sup> In contrast, by developing the concept of reciprocity out of the interaction between the initiating and the ostensibly passive conditions, Hegel claims that linear mechanical causation is only an abstraction, and it is reciprocity that captures the essential concept of causality. "In *reciprocity* the mechanism [of finite causality] is sublated."<sup>12</sup>

In addition, reciprocity articulates the structure of real necessity, for the determinate conditions of that necessity now turn out to be substantial agents ("*free actualities*" he adds with emphasis) that act on each other. That interactive dynamic, in which substantial conditions

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10It is worth noting that, by the time Hegel revised both the *Science of Logic* and the *Encyclopaedia*, he introduced in the text of their second editions comments that stressed the critical importance of such double transitions. Indeed, I have suggested elsewhere that, once a double transition becomes stabilized it collapses into a new kind of integrated unity, and that it is this transition that Hegel dignifies with the name "sublation". (Burbidge, forthcoming)

11See Kant 1951, §65, p. 218-222.

12Hegel 2010, p. 407 of *Gesammelte Werke* pagination.

determine the nature of real necessity is a process of self-determination. So reciprocity not only captures the essential character of causality, but it also incorporates the absolute necessity that integrates real necessity with contingency and freedom.

When one has a full reciprocity, then, one has a complex that incorporates all of its components into a single comprehensive pattern, something that could be called a *universal*. It has the *particular* characteristics of the specific dynamic involved, and the total complex collapses into an integrated *singular*. This enables Hegel to make the transition to the next Book of the *Logic* on concepts. For *universal*, *particular*, and *singular* are the basic components of concepts and conceiving. In other words, the concept of reciprocity articulates explicitly the critical process of conceptual thought that has emerged time and again throughout the earlier discussions in the *Science of Logic*. The reciprocity or double transition of coming to be and passing away collapses into the immediacy of *Dasein* (or determinate being); the double transition of finite and infinite beyond collapses into being for self; the double transitions of condition and conditioned, of ground and grounded collapse into existence. Since double transitions have spelled out those critical transitions that result in new stages within the logic of objectivity, the concept of reciprocity, by making them the focus of attention, enables the transition to thinking about thought itself or the "concept".

When we look closely at Hegel's analysis of the concept of cause, then, we find interesting implications. The structure of reciprocal causality develops a pattern that continually reconstitutes itself even as each component transfers its energy to the other. This continuing dynamic develops a life of its own, which can become in its turn an agent in other causal processes. The activity of this complex agent, however, is no longer a simple matter of forward-moving causal necessity, for it is made possible only through the action of the initial interacting components, and only through the specific pattern of reciprocal transition that they develop. For all that these constituent elements have been collapsed into a new integrated unity they nonetheless mediate and enable its higher-level functioning.

### III

Since Hegel's post-Kantian metaphysics requires that concepts formulated by the intellect be integrated with intuitions emerging from experience, we cannot move directly from an Hegelian analysis of concepts to making metaphysical claims. We need to take into account

empirical evidence that makes it plausible to reconstitute our explanatory concepts along Hegelian lines. With this in mind, I shall outline two relatively recent developments in science.

The first concerns weather forecasting. Scientists have developed a complex structure for gathering data which not only covers the surface of the earth but obtains measurements from atmospheric heights and oceanic depths. That data is then subjected to complex mathematical analysis. The mathematics used is called chaos theory. That discipline emerged from the attempt to establish what happens when more than two objects act on each other. And it produced a sequence of consequences in which no regular pattern emerges, even though everything follows necessarily from the given premises. When Edward Lorenz used the mathematics of chaos theory to develop models for predicting weather patterns he discovered that varying, by even a miniscule decimal point, the initial conditions he put into the calculation he obtained widely diverse results. For all that the use of the mathematics of chaos produced better predictions of what would happen with the weather over the immediate future than the previous reliance on the experiential knowledge of meteorologists, it was nonetheless dependent on the contingency of the data put into the equations. Over time the imprecision of the data collected and the interference of contingent conditions cause the accuracy of the forecasts to gradually disintegrate.<sup>13</sup>

What we have is a structure of necessity, articulated in the mathematics of chaos used in the calculations, that is radically affected by the contingency of the initial conditions and of interfering circumstances. This sounds very much like the pattern of real necessity Hegel has analyzed.

The second development concerns reciprocal interactions that are central to the functioning of the natural world. For some time biologists have known of a dynamic, called symbiosis, in which two organisms interact with mutual benefit, and then develop a relatively permanent association that has a distinctive life of its own. Lichens, for example, are not simple organisms, but are the combination of an alga and a fungus each of which benefits from, and contributes to, the functioning of the other.<sup>14</sup>

Equally interesting examples come from what is now called the Standard Model of particle physics. Not only is the atom, which started out as the ultimate indivisible particle of matter, a system of

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<sup>13</sup>This discussion is based on Lorenz 1993 and Edwards 2010.

<sup>14</sup>Recently evidence has emerged that there is a third, bacterial, agent involved in the interaction.

reciprocal interaction between electrons and nucleus; but the protons and neutrons that make up that nucleus are themselves highly complex. Protons and neutrons are made up of particles of mass, called quarks, each of which has several characteristics: the direction of spin (which can generate an electrical charge) can be either up or down; and each quark has one of three alternative properties, designated by the terms “red”, “green” and “blue”. (Both “spin” and “colour” are metaphors, not accurate descriptions.) The quarks are organized in such a way that the neutrons have no electrical charge, while the protons have a positive charge; and both neutrons and protons are “white”, that is, each has red, green and blue quarks. That is not all; for the force that holds the quarks together is the strongest force in nature, called the strong nuclear force (which, unlike gravity and the electromagnetic force, increases as the distance between the particles increases). This binding force is made up of particles of energy (which have no mass) called gluons. There are eight kinds of gluons reflecting the properties of the quarks that are to be bound together: +red/-blue; +red/-green; +blue/-red; +blue/-green; +green/-red; +green/-blue; as well as two which bind together quarks of the same colour but with different spins. In other words, this small part of the Standard Model reveals a very complex picture where quarks within a proton or neutron reciprocally interact in quite determinate ways, depending on their distinctive characteristics. The result is larger, more complex particles which make up the nucleus of an atom. A very complicated interplay of reciprocal interactions would seem to characterize the causal processes of matter at this basic level.<sup>15</sup>

In other words, contemporary science offers evidence that fits within Hegel's metaphysical scheme.

#### IV

We are now at the point where we can draw some implications for our contemporary concept of cause – implications that are essentially metaphysical, since they affect the conceptual framework within which we interpret the way the world functions.

The first implication we can draw is that causes, while initiating and influencing what happens, do not entail any universal forward moving necessity. What Hegel calls real necessity recognizes that, once enough conditions are present, a result will inevitably have to happen; but that does not entail that the assembling of all those conditions in precisely the right order is itself rigorously necessary. It is affected by contingency.

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<sup>15</sup>This discussion is based on Susskind 2008 and Baggott 2012.

And while we might entertain the thought of some kind of absolute necessity, that necessity turns out not to be a governing inevitability that structures the universe, but rather the fact that contingencies both emerge and contribute to necessary sequences.

This means, in the second place, that in any causal sequence effects are adulterated and affected by other factors – complicating circumstances and other causal sequences so that a causal move does not get transmitted directly from one to another, but becomes simply one conditioning factor among many in determining what ensues. What has been called “mechanical cause”, taking as its model what happens when balls interact on a billiard table, does not do justice to the way causes actually function in the real world. Rather conditions act on, and react to, each other in the course of producing an effect. This transforms our understanding of rigorous causal necessity, and complicates the belief in causal regularity.

This leads, however, to the third important implication from Hegel's analysis. For it suggests the way regularity can emerge, even within this chaotic maelstrom. If it is possible for causal agents to interact reciprocally, they may develop a tendency to reinforce those features that are mutually beneficial and reduce the influence of those that complicate the picture. Reciprocal interaction, then, encourages a form of regularity and thrives on it, opening up an arena for habitual processes and actions that exert their influence when circumstances are appropriate. From this perspective, the regularity that is enshrined in our language of natural law is not basic to the functioning of the universe, but emerges from the dynamic of reciprocal interaction.

There is, in addition, a fourth implication. For this analysis of cause can explain how properties emerge as entities become more complex; and shows that such emergent properties cannot simply be reduced to the basic functioning of the elementary parts. For all that the indivisibility of atoms has been abandoned, we are still prone to adopt its other reductionist assumption, that everything can be explained simply by drilling down to the most basic constituents, whether they be electrons, quarks or strings. But more complex organisms are not simply the aggregate sum of the actions of their components. They are determined just as much by the distinctive way those components interact; and that interaction introduces forms of shared action that neither component can do on its own. For each is affected and altered by the activity of the others; and that interactive dynamic, while establishing some kind of continuing *modus vivendi*, adapts to new contingent conditions that surface in the environment. The result of the interaction is a new integrated entity that freely determines itself as an agent, interacting

with other entities at a more sophisticated level of complexity. Functions that emerge from reciprocal causality, then, cannot be reproduced by simply activating the elementary components in isolation. The unified dynamic develops a distinctive character that manifests novel properties.

This analysis rehabilitates in a strange way the philosophy of Aristotle. It has become conventional wisdom that the discovery of the importance of mechanical causes in the seventeenth century put paid to the Aristotelian analysis of cause. But what we have just described is a structure of complex cause in which the initial components that enter a reciprocal interaction with their innate modes of operation serve as the material condition, the distinctive pattern that develops within that interaction becomes the formal condition; and the resulting entity that can now independently function on its own is an agent or initiating cause. While we have not identified anything that could be called a final cause or purpose, were it possible to identify complex integrated objects that have the ability to respond to causal interference from their environment by either appropriating what is presented into their own operation or reconstituting themselves in response to damaging incursions, we would have agents that are exercising what looks like the purpose of self reproduction and enhancement.<sup>16</sup>

What I have been attempting to do in this paper is to suggest how, by exploring in detail arguments Hegel puts forward in his *Science of Logic*, we can develop resources that enable a critical examination of some metaphysical assumptions of our modern world. Not only that, but it can suggest alternative models that could well do more justice to the way the world actually functions.

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<sup>16</sup>I have explored the metaphysical implications of this conceptual model in Burbidge 2014b.

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Volume 4 /  
Issue 1