

SKEPTICISM CONCERNING CAUSALITY: AN EVOLUTIONARY EPISTEMOLOGICAL PERSPECTIVE

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ABSTRACT: According to Hume, determinations of necessary causal connection are without empirical warrant, but, as he maintains, the concept of causality *qua* necessary connection is indispensable to human beings, having survival value for them, a claim which points to the biological significance of this concept. In contrast to Hume, Kant argues that the causal principle *qua* necessary connection belongs to the *a priori* conceptual framework by which rational beings constitute their experience and render the world intelligible. In “Kant’s Doctrine of the *A Priori* in Light of Contemporary Biology” (1941 / 1962) evolutionary epistemologist Konrad Lorenz sought to adapt Kant’s philosophy to contemporary biology by arguing that the *a priori* concepts of the understanding can be interpreted as comprising a biologically inherited framework, yet one that is provisional and in flux. Such an evolutionary interpretation of both Hume and Kant’s perspectives of the lacuna concerning causality brings the ideas of these thinkers closer together. Kant himself used suggestive analogies between the major epistemological positions concerning the origin of the *a priori* concepts of the understanding and the major biological theories of his time concerning the generation and development of organisms. Nevertheless, Kant would probably be reluctant to embrace such an evolutionarily-oriented conception of the categories, given his descriptions of them as self-thought, *a priori* first principles having a purely intellectual origin, belonging as a very condition for the possibility of the experience of rational beings in general, and as neither the product of a process of development, nor subject to one. This paper shows how Hegel’s emphasis on the dialectical progression of the logical Concept (*Begriff*) can help to ground Lorenz’s evolutionary neo-Kantianism. Toward the end of the paper, I discuss the evolutionary relevance of skepticism and critical thinking in this process via the notion of “Intellectual Selection.”

KEYWORDS: Evolutionary Epistemology; Hume; Skepticism; Causality *qua* Necessary Connection; Kant; *A Priori* Concepts of the Understanding; Lorenz; Evolutionary Neo-Kantianism; Hegel; The Dialectical Progression of the Logical Concept (*Begriff*); The Absolute Idea; Intellectual Selection.

INTRODUCTION

Spurred largely by the explosion of new research in philosophy of biology over the last twenty years, a current trend of scholarship in Continental philosophy is to re-evaluate or to recast the claims of major thinkers in light of evolutionary theory.¹ Thus far, a good deal of the scholarly work has focused on the impact of Darwin on post-Darwinian Continental philosophers like Nietzsche. Nietzsche recognized the colossal implications of Darwin's theory of natural selection, as well as other developments of his time, for metaphysics, epistemology, and ethics, which proved that reason is not God-given, but rather a product of the evolutionary process. At the same time, Nietzsche was critical of Darwin's emphasis on mere survivability. Instead, we ought to affirm the will-to-power, namely, the will to dominate the environment, other creatures, and to have an increase in power. While overall, Nietzsche himself developed a quasi-Lamarckian standpoint, in surveying the history of Continental philosophy, it can be said that the articulation of the theory of natural selection in *The Origin of Species* (1859) was a necessary condition for Nietzsche's proclamation of the death of God, his emphasis on the will-to-power, and the existentialists' confrontation with meaninglessness, nothingness, anxiety, and absurdity. To be sure, in *The Phenomenon of Life* (1966), Hans Jonas claims that

Nietzsche's nihilism and his attempt to overcome it are demonstrably connected with the impact of Darwinism. The will to power seemed the only alternative left if the original essence of man had evaporated in the transitoriness and whimsicality of the evolutionary process.²

Consistent with this trend in Continental philosophy, yet differing from it, in this paper, I examine the connection of pre-Darwinian philosophers to evolutionary theory. Here, I provide an evolutionary "spin" on Kant and Hegel's respective responses to Hume's skepticism concerning causality *qua* necessary connection, via the evolutionary epistemology of Konrad Lorenz. In so doing, I intend to shed light on the role of skepticism in the evolution of the conceptual structures by which rational beings constitute their experience. First, I describe Hume's lacuna concerning causality, recognizing the contemporary debates over his "final position." As he argues, there is no empirical warrant for the necessary connection between things or events that is assumed in any determination of causal relations, and, for him, asserting that one thing causes another involves a *habit* of thought, namely, a habitual

¹ See Jonas 1966; Dennett 1995; Critchley 2001; Moore 2002; Richardson 2004; Johnson 2010; Mader 2010; Markham 2010.

² Jonas, Hans, *The Phenomenon of Life: Toward a Philosophical Biology*, Evanston, IL, Northwestern University Press, 1966, p. 47.

conjoining of phenomena together, namely, those which we have previously experienced as accompanying one another. While Hume seeks to demonstrate that determinations of necessary causal connection are without empirical warrant, he indicates that the concept of causality is an important one for human beings in that it enables them to function successfully in their everyday lives, and it has survival value, a claim that can be said to point to its biological and evolutionary significance.

Second, I outline some of the central tenets of Kant's respective response to Hume's skepticism concerning the causal principle. Kant attempts to overcome Hume's skepticism by giving an account of how causality is an *a priori* concept of the understanding, namely, it is part of the necessary conceptual frame through which rational beings constitute their experience actively. And in the *Critique of Pure Reason*, Kant employs suggestive analogies between the major epistemological perspectives in relation to the origin of the categories (i.e. rationalism, empiricism, and transcendental idealism) to the biological theories of his time (i.e. preformation, *generatio aequivoca*, and epigenesis) concerning the generation and development of organisms. Accordingly, twentieth century evolutionary epistemologist, Konrad Lorenz, argues that, together, the *a priori* concepts of the understanding, including the notions of substance and of causality, provide an enduring, biologically hardwired, and inheritable framework by which human beings *qua* rational beings, constitute their experience in our contemporary epoch. But, in contrast to the Kantian notion that the *a priori* categories are fixed, and apply equally and uniformly to all rational beings, Lorenz suggests that they should be seen as provisional in nature, and that from an evolutionary standpoint, human beings can change their habits and their biologically innate structures of thinking over time. While Lorenz does little to mitigate the apparent inconsistencies between Kant's emphases that the categories are fixed, self-thought, and having a purely intellectual origin in the understanding, such an evolutionary interpretation of the problem concerning causality brings the epistemologies of Hume and Kant closer together.

Third, by outlining how Hegel responds to Hume's skepticism of causality by showing how the dialectic pervades the notions of substance, causality, as well as the process of thinking by which determinations of necessary causal connections are made and are articulated, I demonstrate that Hegel's system of Absolute Idealism can help to deal with the inconsistencies between Kant's stance on the nature of the categories, and the Lorenzian interpretation, in order to ground Lorenz's evolutionary Kantianism. Since Hegel's emphasis on the dialectical progression of the logical Concept (*Begriff*) can account for the breaking up of habits and for creative novelty, as merged with Lorenz's neo-Kantian evolutionary epistemology, it can ground the

notion that the conceptual framework, by which rational organisms constitute their experience, is not fixed, but rather, evolves, and is subject to a process of development.

Fourth, I describe how the skeptical moment that belongs to the logical Concept (*Begriff*) is the “moving soul,”³ and/or the efficient cause, in the ongoing process of thinking by which the conceptual structures of rational beings are generated and crystallize in the understanding in our contemporary evolutionary epoch. And I discuss the evolutionary implications of critical thinking and skepticism in testing the mettle of ideas, concepts, theories, and values, via the notion of “intellectual selection.”

I. THE HUMEAN LACUNA CONCERNING DETERMINATIONS OF CAUSAL CONNECTION

In *A Treatise of Human Nature* (1739) and in *Enquiries Concerning Human Understanding* (1748), David Hume (1711-1776) examines the natures of causality and induction from an empiricist perspective. Hume’s empiricism revolves around the basic thesis that direct observation, as in immediate sensory perception, is to be taken as the primary criterion of judgment in respect to determinations regarding what is or is not actual. In general, for him, ideas are copies, conceptual reproductions, or re-enactments of impressions of sensation. That is to say, all of the ideas in our minds have their origin in sensory experience. Even the ideas we have of pegasi, centaurs, and other fictitious entities are composites that are derived from objects that we have experienced, for example, bird’s wings and horses, human torsos and the legs, manes, and rumps of horses. Correspondingly, Hume’s empiricist test of the meaningfulness of any idea or concept involves asking the question, “from what impression is it derived?” And if we cannot readily identify the impression from which the idea issues forth, then either it does not refer to anything that is actual and is being imposed onto the real, or it is potentially meaningless. With this test, Hume attempted to challenge all forms of explanation on the basis of supersensuous metaphysics. His arguments were largely aimed against philosophers such as Plato and Descartes, who held that at least some of the ideas that we have in our minds are innate, namely, implanted by God in our minds prior to our births. With his empiricist test, Hume can be said to have dispatched the claims made by various spiritualists that the real is determined by the mind and/or by God.

³ Hegel, Georg Wilhelm Friedrich, *The Encyclopedia Logic*, trans. T. F. Geraets, W. A. Suchting, and H.S. Harris, Indianapolis: Hackett, 1931 / 1991, §81, p. 128.

As is well known, Hume invokes his empiricist test when he considers the concept of causality. The central problem that Hume identifies, which leads to his skepticism concerning causality, is that the necessary connection that is assumed, which links any putative cause to an effect, is not given to perception. In other words, there is nothing that one could point to in experience that is representative of the necessary force or power that is implied in determinations of causal relations. While Hume searches for the impression from which the idea of the necessary connection is derived, he finds that “*all our distinct perceptions are distinct existences, and ... the mind never perceives any real connexion among distinct existences.*”⁴ In addition, he writes that “when we look about us toward external objects ... we are never able, in a single instance, to discover any power or necessary connexion, any quality which *binds the effect to the cause, and renders the one an infallible consequence of the other.*”⁵ And without this tangible evidence of the power, force, or object behind the causal relation, he concludes that determinations of causal connection *qua* necessary connection stem from sources beyond perception, and they may involve the imposition of unfounded metaphysical concepts onto the real. Hence, the notion of causality *qua* necessary connection fails the empiricist test and it is potentially inadmissible as a valid concept. Given the failure of the concept of causality *qua* necessary connection of this empiricist test, he asks two central questions. First, why do we assume that the specific phenomena we call effects follow *necessarily* from particular phenomena we call causes? Second, why do we customarily consider it *necessary* that everything that has a beginning has a cause, as in the principle of sufficient reason?⁶

In relation to the first question, Hume’s own explanation of how it is that we make determinations of causal connection is that it stems from a *habitual* or customary conjoining of two or more distinct things or events together, based upon a perceived regularity of accompaniment of like objects. We employ the term “cause” after we perceive in a plurality of instances involving like objects, one thing following from another, and on that basis, expect a uniform accompaniment in respect to similar things in the future. He states, “after a repetition of similar instances” of one phenomenon accompanying another, for example, instances of thunder accompanying lightning, or of smoke accompanying fire, “the mind is carried by *habit*, upon the appearance of one event, to expect its usual attendant and to believe that it

⁴ Hume, David, *A Treatise of Human Nature*, eds. D. F. Norton and M. J. Norton, New York, Oxford University Press, 1739-1740 / 2000, Appendix 21, p. 400.

⁵ Hume, David, *Enquiries Concerning Human Understanding and Concerning Principles of Morals*, eds. L. A. Selby-Bigge and P. H. Nidditch, New York, Oxford University Press, 1777 / 1975, H50, p. 63, my emphasis.

⁶ Beck (1978) refers to the principles underlying these two central questions as “same-cause-same-effect” and “every-event-some-cause” respectively (see p. 120).

will exist.”⁷ For Hume, our sense of causality develops out of our recollection of repeated experiences of similar occasions in which the things or events involved accompanied one another, one thing, in general, having exhibited a temporal priority over the other. But from the position of an unmitigated Humean skepticism, due to the fact that there is nothing available to perception that is representative of the necessary connection that is implied in the determination that one thing caused another, we are not justified in suggesting to ourselves that the former is the cause *qua* necessary connection of the latter, or in making the leap from an experienced regularity of accompaniment between like As and like Bs, in a finite set of instances, to a necessary claim about all events of the same type. From this last point, for Hume, determinations of causal connection are based in a precarious faith that future occurrences will be uniform with past ones, a faith that cannot be justified on the basis of empirical verification.

In relation to the second question regarding the principle of sufficient reason, from what has been said about the previous two questions, if we cannot answer the first and second question and/or justify the causal principle *qua* necessary connection empirically in a single case, then the principle is sunk.⁸ And even if we could justify the causal principle *qua* necessary connection as applying universally to finite human experience, an unmitigated empiricist would still object to the leap required to the conclusion that it could apply to all events throughout all regions of the cosmos, for all time.⁹

⁷ *Enquiries*, H59, p. 75, my emphasis.

⁸ Another question emerging from Hume’s discussions, which also serves to sink the second is: what does it even mean to say that one thing is “like” another thing, such that we could classify particular phenomena as being either causes or effects in the first place? For Hume, there are no adequate criteria for suggesting that one thing is like another, save the resemblance that they have in terms of their accidents. Why do we consider the phenomena we ordinarily call lightning and thunder that we experienced while on a vacation in the tropics three years ago to be the same type of phenomena that we experienced while in our beds during a storm in the middle of the night? It seems to be a habit our nature to do so, but does the class of As truly contain only identical substances? Part of Hume’s response will be to attack the whole notion of a substance, suggesting that their concept must be reformed from unities of matter and form to “bundles of accidents.”

⁹ Hume later employs his skeptical conclusions in *Dialogues Concerning Natural Religion* (1779), placing them in the mouth of Philo, although due to the dialogical form of this work, here we cannot necessarily assume that they represent the views of Hume himself. Philo argues against Cleanthes’ employment of the notion that everything has a cause in his argument for the existence of God. Philo suggests that, providing we do agree that the notion of causation is a valid concept, considering the massiveness of the universe, the finitude of human beings, and the limits of their experience, he cannot know if the principle of sufficient reason applies throughout the cosmos. Philo’s complaint about the Cosmological Argument is that the principle of sufficient reason is invoked when tracing the finite sequence of events back through time to arrive at the Prime Mover who created the universe, but then the principle suddenly gets

Traditionally, Hume has been interpreted as defending a complete disbelief in the concept of causality *qua* necessary connection on the basis that it is not empirically justified, namely, it is an abstraction or an inflation of a perceived regularity of accompaniment between like As and Bs, which goes beyond the empirical evidence.¹⁰ Conceived of as an unmitigated skeptic, Hume is interpreted as suggesting that causality *qua* necessary connection is a habitual abstraction in which human beings go beyond what is warranted in terms of experience, and impose the concoctions of their imaginations onto the real, sophisticatedly calling it knowledge. Nevertheless, elsewhere, Hume maintains that if a person was to embrace a complete skepticism and to maintain a complete disbelief in concepts such as causality *qua* necessary connection, then one could not possibly be functional in life and/or one would perish from ignorance about the dangerous realities of the world. For example, without some sense of the causal principle *qua* necessary connection, one would have no reason not to throw oneself off of an apartment balcony, or to pick up a rock and drop it on his or her head, or to do things that would subject ourselves or others to harm or death without first seeing a model. Given that the concept of causality *qua* necessary connection overlaps with survivability in this way, the concept of causality is an indispensable one, having much utility for human beings. Furthermore, in the respective sections “Of the Reason of Animals” in the *Treatise* and in the *Enquires*, Hume suggests that sometimes even non-human animals “for their own preservation, and the propagation of their species”¹¹ discover regularities of accompaniment via experience, and modify their behavior accordingly.¹²

kicked away when it comes to accounting for the existence of the Designer. Philo also dispatches Cleanthes’ “weak analogy” of comparing a rational architect who is the purported efficient cause of a house with an Intelligent Designer who is said to be responsible for creating the universe. On both accounts, Philo is aimed at a critique of Cleanthes’ anthropocentrism and anthropomorphism, as well as of the notion that like effects prove like causes, as in our first question above (see Parts II, IV, V, and IX of the *Dialogues* especially).

¹⁰ However, in the last thirty years of scholarship, traditional interpretations of Hume as an unmitigated skeptic, as for example represented by Popkin (1980), have been placed in question by “New Humeans” like Wright (1983) and Strawson (1989) (see Read and Richman, 2007).

¹¹ Hume, David, *A Treatise of Human Nature*, Volume 1, eds. D. F. Norton and M. J. Norton, Oxford University Press, 1739-1740 / 2007, p. 119.

¹² This claim is corroborated by James Mark Baldwin (1894; 1902), as well as by Konrad Lorenz (1963; 1965). In the *Treatise*, Hume writes,

we must make a distinction between those actions of animals, which are of a vulgar nature, and seem to be on a level with their common capacities, and those more extraordinary instances of sagacity, which they sometimes discover for their own preservation, and the propagation of their species. A dog, that avoids fire and precipices, that shuns strangers, and caresses his master, affords us an instance of the first kind. A

bird, that chooses with such care and nicety the place and materials of her nest, and sits upon her eggs for a due time, and in suitable season, with all the precaution that a chemist is capable of in the most delicate projection, furnishes us with a lively instance of the second.

As to the former, I assert they proceeded from a reasoning that is not in itself different, nor founded on different principles, from that which appears in human nature. It is necessary in the first place, that there be some impression immediately present to their memory or senses in order to be the foundation of their judgment. From the tone of voice the dog infers his master's anger, and foresees his own punishment. From a certain sensation affecting his smell, he judges his game not to be far distant from him. ... Secondly, the inference he draws from the present impression is built on experience, and on his observation of the conjunction of objects in past instances. As you vary this experience, he varies his reasoning. Make a beating follow upon one sign or motion for some time, and afterwards upon another; and he will successively draw different conclusions, according to his most recent experience. ...

Beasts certainly never perceive any real connection among objects. It is therefore by experience they infer one from another. They can never by any arguments form a general conclusion, that those objects, of which they have had no experience resemble those of which they have. It is therefore by means of custom alone, that experience operates upon them. All this was sufficiently evident with respect to man. But with respect to beasts there cannot be the least suspicion of mistake (*Ibid.*, pp. 119-120, my emphasis).

In the *Enquiries*, Hume states,

First, it seems evident, that animals as well as men learn many things from experience, and infer, that the same events will always follow from the same causes. By this principle they become acquainted with the more obvious properties of external objects, and gradually, from their birth, treasure up a knowledge of the nature of fire, water, earth, stones, heights, depths, etc..., and of the effects which result from their operation. The ignorance and inexperience of the young are plainly distinguishable from the cunning and sagacity of the old, who have learned, by long observation, to avoid what hurt them, and to pursue what gave ease or pleasure. A horse, that has been accustomed to the field, becomes acquainted with the proper height which he can leap, and will never attempt what exceeds his force and ability. An old greyhound will trust the more fatiguing part of the chase to the younger, and will place himself so as to meet the hare in her doubles; nor are the conjectures, which he forms on this occasion, founded in any thing but his observation and experience.

This is still more evident from the effects of discipline and education on animals, who by the proper application of rewards and punishments, may be taught any course of action, the most contrary to their natural instincts and propensities. Is it not experience, which renders a dog apprehensive of pain, when you menace him, or life up the whip to beat him? Is it not even experience, which makes him answer to his name, and infer, from such an arbitrary sound, that you mean him rather than any of his fellows, and intend to

call him, when you pronounce it in a certain manner, and with a certain tone and accent?

In all these cases, we may observe, that the animal infers some fact beyond what immediately strikes his senses; and that this inference is altogether founded on past experience, while the creature expects from the present object the same consequences, which it has always found in its observation to result from similar objects.

Secondly, it is impossible, that this inference of the animal can be founded on any process of argument or reasoning, by which he concludes, that like events must follow like objects, and that the course of nature will always be regular in its operations. For if there be in reality any arguments of this nature, they surely lie too abstruse for the observation of such imperfect understandings; since it may well employ the utmost care and attention of a philosophic genius to discover and observe them. Animals, therefore, are not guided in these inferences by reasoning: Neither are children: Neither are the generality of mankind, in their ordinary actions and conclusions: Neither are philosophers themselves, who, in all the active parts of life, are, in the main, the same with the vulgar, and are governed by the same maxims. Nature must have provided some other principle, of more ready, and more general use and application; nor can an operation of such immense consequence in life, as that of inferring effects from causes, be trusted to the uncertain process of reasoning and argumentation. Were this doubtful with regard to men, it seems to admit of no question with regard to the brute creation; and the conclusion being once firmly established in the one, we have a strong presumption, from all the rules of analogy, that it ought to be universally admitted, without any exception or reserve. It is custom alone, which engages animals, from every object, that strikes their senses, to infer its usual attendant, and carries their imagination, from the appearance of the one, to conceive the other, in that particular manner, which we denominate belief. No other explication can be given of this operation, in all the higher, as well as lower classes of sensitive beings, which fall under our notice an observation.

But though animals learn many parts of their knowledge from observation, there are also many parts of it, which they derive from the original hand of nature; which much exceed the share of capacity they possess on ordinary occasions; and in which they improve, little or nothing, by the longest practice and experience. These we denominate Instincts, and are so apt to admire as something very extraordinary, and inexplicable by all the disquisitions of human understanding. But our wonder will, perhaps, cease or diminish, when we consider, that the experimental reasoning itself, which we possess in common with beasts, and on which the whole conduct of life depends, is nothing but a species of instinct or mechanical power, that acts in us unknown to ourselves; and in its chief operations, is not directed by any such relations or comparisons of ideas, as are the proper objects of our intellectual faculties. Though the instinct be different, yet still it is an instinct, which teaches a man to avoid the fire; as much as that, which teaches a bird, with such exactness, the art of incubation, and the whole economy and order of its nursery (H83-85, pp. 105-108).

While articulating a profound skepticism of causality, a Hume of a more “mitigated”¹³ variety is believed in today by a multitude of scholars, although debates continue to take place in relation to the nature of this “final position.”¹⁴ While being skeptical about the origin of the concept of causality and engaging in critical inquiry in relation to how it is to be understood, it is clear that Hume does not allow himself to slide into excessive skepticism. For him, determining that there is a causal connection between one thing and another is “a certain [habitual] instinct of our nature,” which may indeed be fallible, but at the same time, he holds that the radical skeptic of causality “must acknowledge, if he will acknowledge anything, *that all human life must perish, were his principles universally and steadily to prevail.*”¹⁵ It must be emphasized that this statement is directed toward Pyrrhonian or Ancient skepticism, which employs the equipollence method to promote a suspension of judgment about any truth claim whatsoever, in order to arrive at a state of unperturbedness (*ataraxia*). According to Hume, such a radically skeptical position would lead to passivity, quietude, and/or a total lethargy, which would not be conducive to survivability of the individuals holding to it.¹⁶ Nevertheless, in providing a profound critique of the concept of causality *qua* necessary connection, yet at the same time warning us against “excessive”¹⁷ skepticism in relation to the notion of causality *qua* necessary connection, Hume can be interpreted here as pointing out the survival value of having a keen sense of the causal principle, and the threat to life that may accompany a complete disbelief in causality. Construed in light of contemporary evolutionary biology, one can read Hume here to be alluding to the practical and biological significances of having a keen sense of the causal principle and of maintaining a belief in it, even though, for him, the necessary connection between putative causes and putative

¹³ *Enquiries*, H129, p. 161.

¹⁴ The question of Hume’s final position, namely, whether or not he can be described as a mitigated or an unmitigated skeptic is one of the chief contentions in “The New Hume Debates” which continue to rage in scholarly circles over Hume’s stance on causality, induction, and morality (see Popkin 1980; Strawson 1989; Winkler 1991; Dicker 1998; Levy 2000; Read and Richman 2000; O’Brien and Bailey 2006, Millican and Beebe 2007, Millican 2009).

Interestingly, in relation to Hume’s final position in relation to causality, in *Process and Reality: Corrected Edition*, New York, The Free Press, 1929 / 1978, Alfred North Whitehead wrote that it “is a great mistake to attribute to Hume any disbelief in the importance of the notion of ‘cause and effect.’ Throughout the Treatise he steadily affirms its fundamental importance” (p. 133).

¹⁵ *Enquiries*, H128, pp. 159-160.

¹⁶ Hume states that “all discourse, all action would immediately cease; and men remain in total lethargy, till the necessities of nature, unsatisfied, put an end to his their miserable existence” (Ibid., p. 160). Hume further makes the claim that “in common life, we reason every moment concerning fact and existence, and cannot possibly subsist, without continually employing this species of argument” (Ibid., H126, p. 158).

¹⁷ Ibid., H128, p. 159.

effects that is typically assumed in terms of the meaning of causality is not empirically warranted.¹⁸

On the whole, it is my suggestion that Hume's overall position is neither constituted by an unmitigated nor a mitigated skepticism. Rather, his "final position" involves a critical scrutiny of the pretense to necessity and universality that is embedded in determinations of causal connection from his empiricist perspective. For Hume, determinations of causal connection have their basis in perceiving a regularity of accompaniment between like As and Bs, and are built up through induction, the necessity and universality of such connections being a habitual extrapolation of the evidence and hence, an abstraction of the mind that is imposed upon the real. Yet, at the same time, Hume emphasizes the indispensability and the survival value of holding a natural belief in causality *qua* necessary connection, and in guiding our actions by way of this principle. It is also to be noted that Hume does not seem to push for the need of a complete reformulation of the meaning of the concept, namely, to reduce it to the mere designation of a perceived regularity of accompaniment. In sum, from a Humean point of view, it is biologically indispensable for rational beings to stamp the perceived regularity of accompaniment of like As and Bs with the character of causality *qua* necessary connection, regardless of the lack of an empirical warrant involved. From this perspective, the real Hume would neither be the New Hume nor the Old one¹⁹, but as will be alluded to in subsequent sections of this paper,

¹⁸ To further solidify the biological significance of the concept of causality, Richman in the introduction to *The New Hume Debate* (2006) points out that

one reason to think that the natural beliefs are true is that they are so terribly useful in helping us to find our way safely about the world. This role of natural beliefs as necessary guides to action is hinted at in several spots in the *Treatise*:

Did impressions alone influence the will, we should every moment of our lives be subject to the greatest calamities; because, tho' we foresaw their approach, we should not be provided by nature with any principle of action, which might impel us to avoid them (T119).

Sometimes we require for our survival that our ideas be as potent an influence as our immediate sense experience (which comes in the form of what Hume calls impressions). It is for this reason, Hume claims in the passage quoted, that we have natural mechanisms by which we form beliefs. The resulting beliefs guide us to avoid 'calamities' and are in this way necessary guides of action. The usefulness of our natural beliefs certainly gives them a sort of pragmatic justification, if not also justification of an empirical sort (p. 8).

A "naturalistic" and/or "biological" interpretation of Hume's philosophy has been advanced by Smith (1905; 1941 / 2005) and Stroud (1977), although one must be careful when interpreting what is meant by the term "naturalistic" in Smith's work (see Agassi 1986).

¹⁹ My evolutionary reading of Hume's position, while non-New Humean seems to avoid the pitfalls of what Strawson in Read and Richman (2006) identifies as the catastrophic error of the "standard view": of conflating the following distinct claims:

(E) All we can ever know of causation is regular succession

it is one that could be interpreted to be consistent with contemporary evolutionary theory, as well as with Kant's defense of causality *qua* necessary connection as an *a priori* category belonging to the very natures of rational beings.

II. KANT'S RESPONSE TO HUME'S SKEPTICISM CONCERNING CAUSALITY IN THE *PROLEGOMENA*

In the *Prolegomena to Any Future Metaphysics* (1783), Immanuel Kant (1724-1804) relates, in quite an intense manner, how it was Hume's skeptical "attack on metaphysics," as exemplified by the latter's critical analysis of causality, a "highly prized" concept that is "indispensable to humanity," that awakened him from his "dogmatic slumber" and motivated him to develop a reformed metaphysics that would be able to withstand such skepticism.²⁰ Kant expresses that it was Hume who was "the sagacious man whom [he] had to thank"²¹ for posing the philosophical challenge that stirred in him a passionate motivation to defend reason. This passionate motivation is also evident in Kant's remark that "as premature and erroneous as [Hume's] conclusion was, nevertheless it was at least founded on inquiry, and this inquiry was of sufficient value, that the best minds of his time might have come together to solve ... the problem."²² Given the force of these comments, as well as his charge that Hume "gave way entirely to skepticism,"²³ it seems clear that Kant was intent on "resolving" the Hume's lacuna, construed as an unmitigated skepticism of causality, regardless of whether or not this reading is indeed accurate.²⁴ What seems clear is that Kant was interested in arriving at the most comprehensive solution to the Humean problem, recognizing it as an issue having to do with "the entire faculty of reason,"²⁵ and not merely of a limited portion thereof. This comprehensive solution involved the overall project of identifying all "the sources of synthetic *a priori* cognition,"²⁶ causality *qua* necessary connection being but one *a priori* category, among an interconnected many,

(O) All that causation actually is, in the objects, is regular succession (see pp. 33-34).

²⁰ Kant, Immanuel, *Prolegomena to Any Future Metaphysics*, ed. G. Hatfield, New York, Cambridge University Press, 1783 / 1997, 4:257-261, pp. 7, 11, 11, 10.

²¹ *Ibid.*, 4:260, p. 10.

²² *Ibid.*, 4:258, p. 8.

²³ Kant, Immanuel, *Critique of Pure Reason*, trans. and eds. P. Guyer and A. W. Wood, New York, Cambridge University Press, 1781 / 1998, p. 226. Kant also states that Hume "deposited his ship on the beach (of skepticism) for safekeeping, where it could then lie and rot" (*Prolegomena*, 4:262, p. 12) and that he "is perhaps the most ingenious of all skeptics" (*Critique*, A764/B792, p. 656).

²⁴ Although one scholar claims that Kant did not even have the intention of refuting Hume's skepticism outright (see Watkins 2005, pp. 381-385).

²⁵ *Prolegomena*, 4:261, p. 11.

²⁶ *Critique of Pure Reason*, A204/B249, p. 313.

and hence, his system as a whole comprises his complete response to Hume and must be taken into account.

Several factors mitigate any analysis of Kant's response to Hume. First, both Hume and Kant are investigating a certain modern, and perhaps highly scientific and technologically grounded conception of causality, whereas the term's linguistic meaning has evolved to some extent in relation to time and place. In the 1954 essay, "The Question Concerning Technology," Martin Heidegger claims that our modern conception of causality emerged and evolved from the Greek notion of *aition*, from the Aristotelian fourfold (formal, material, efficient, and final), and from the Latin *causa*. While traditionally, according to Heidegger, it had the connotation of "that to which something is indebted," "responsibility," and/or "to occasion ... within [a] bringing-forth," today the notion implies "bringing about and effecting"²⁷ with an emphasis on instrumentality and on efficient causation. While we should always remain vigilant as to the veracity of Heidegger's etymologies, the point that the very meaning of the term causality has evolved still holds.

Second, while both Hume and Kant are concerned with causality *qua* necessary connection, their basic models of causality and the conceptual frameworks within which they are operating (e.g. their understanding of the notions of substance and event) are different. Thus, any putative Kantian solution to Hume's lacuna will not correspond exactly to the demands of Humean skepticism. Third, it is widely held that Kant did not read Hume's *Treatise* and that due to linguistic and interpretive complications, he could not have read Hume's *Enquiries* soundly.²⁸ His understanding of Hume's lacuna concerning causality was through the lens offered by secondary scholarship, for example, the 1772 German translation of James Beattie's *Essay on the Nature and Immutability of Truth*.²⁹ Nevertheless, Kant is careful to recognize in the *Prolegomena* that Hume never placed into question the claim that the concept of causality is "highly prized" by and "indispensable to humanity."³⁰ Kant simply

²⁷ Heidegger, Martin, 'The Question Concerning Technology,' in *Basic Writings*, New York, Harper San Francisco, 1954 / 1977, pp. 290-293.

²⁸ See Hegel 1805-06 / 1983; Beck 1978; Allison 1983; Dicker 2004.

²⁹ See Beck 1978, pp. 111-120.

³⁰ *Prolegomena*, 4:261, p. 11. Kant states that Hume's discussion

was only about the origin of this concept, not about its indispensability in use," and that his "question was not, whether the concept of cause is right, useful, and, with respect to all cognition of nature indispensable, for this Hume had never put in doubt; it was rather whether it is thought through reason a priori, and in this way has an inner truth independent of all experience, and therefore also a much more widely extended use which is not limited merely to objects of experience (Ibid., 4:258-259, p. 9).

disagrees with the completeness of Hume's explanation of its origin and meaning via the notion of the perceived regularity of accompaniment between like As and Bs, as well as with the latter's skeptical conclusions about the notion of causality *qua* necessary connection.

Fourth, during the various phases of his philosophical career, Kant offered several responses to Hume, each of which may overlap, but are different.³¹ It is a common conception that Kant's central response to Hume is to be found in the section "Second Analogy: Principle of Temporal Sequence According to the Law of Causality" in the *Critique of Pure Reason* (1781). However, one important point to raise here is that Kant does not mention the Humean lacuna concerning causality in this passage, and it appears that he is only indirectly focused on aspects of its central problematic. Bayne (2004) warns that "it is important not to regard the Second Analogy as the be-all and end-all with regard to Kant's views on causation," that many scholars are in disagreement about the adequacy of the arguments in this section, and that "the Second Analogy alone cannot stand as a complete answer to Hume on the causal principle."³² That said, according to Bayne, Kant believes that he is providing a "sound refutation of Hume's skepticism concerning the causal principle."³³ Accordingly, as De Pierris and Friedman (2008) make clear, "Kant famously attempted to 'answer' what he took to be Hume's skeptical view of causality, most explicitly in the *Prolegomena to Any Future Metaphysics*,"³⁴ rather than in the Second Analogy. For the purposes of length, in the main portion of this paper at least, I shall center my analysis on Kant's treatment of the Humean lacuna in the *Prolegomena*, which can be said to offer Kant's most mature articulation of his solution to it, although I will refer to the Second Analogy in the process.³⁵

³¹ See Beck 1978; Watkins 2005.

³² Bayne, Steven, *Kant on Causation: On the Five Routes to the Principle of Causation*, New York, S.U.N.Y. Press, 2004, pp. xiii, 2.

³³ *Ibid.*, p. 27.

³⁴ De Pierris, Graciela and Friedman, Michael, 'Kant and Hume on Causality,' *Stanford Encyclopedia of Philosophy*, 2008: <http://plato.stanford.edu/entries/kant-hume-causality/>, p. 1.

³⁵ For sturdy synopses of the Second Analogy, see Beck (1978), especially pp. 111-164; Friedman (1992); Longueness (1998), especially pp. 356-375; and Watkins (2005).

In the Second Analogy, Kant makes a series of interconnected points. His first point is to emphasize that causality *qua* necessary connection is a condition for the possibility of experience. His argument for this claim involves the premises that "the conditions of the possibility of experience in general are at the same time conditions of the possibility of objects of experience" (*Critique of Pure Reason*, A158/B197, p. 283) and that the experience of any object (an appearance) involves a cognition of a thing's successive alterations in terms of its state through time.

Second, he analyzes the meaning of what amounts to the Humean view of causality, having its basis in a perceived regularity of accompaniment of like As and Bs, namely, that the latter derives from the factors

To some extent in the *Prolegomena*, Kant sides with Hume in defending the critical ability of empiricism to dispatch the claims of supersensuous metaphysicians, and he

of: contiguity in space and time, resemblance, and repetition. Kant thinks that the understanding is already at work in being able to judge that such a regularity of succession between A and B is occurring, since the notions of time and substance are already implicit in such a judgment, and substances, for Kant, being the subjects of causal power.

Third, Kant makes a distinction between subjective succession, by which he means a succession of perceptions of a thing, and objective succession, by which he means perceptions of succession. Objective succession, for him indicates an irreversible alteration in a thing in temporal sequence, which in turn, determines the order of succession of the subjective perceptions, and is therefore, to be subsumed under the rubric of cause and effect. As such, for Kant “the principle of causal relation in the sequence of appearances is valid for all objects of experience (under the conditions of succession), since it is itself the ground of the possibility of such an experience” (Ibid., A202/B247, p. 312). To drive home his point, Kant uses the example of a person seeing a ship floating down a river and passing through distinct points A, B, C, D, E, F, etc... in the water. In perceiving the movement of the ship through the distinct points, a person connects the separate perceptions together, each position of the ship succeeding the previous one in a temporal and irreversible sequence, and prescribes to it the character of being the self-same substance (the ship). The order of the succession of alterations to the ship’s position is in the object itself, rather than being an unordered succession of a multiplicity of perceptions (e.g. of the potentially reversible perception of roof of a house followed by the perception of its foundation, leading to a cognition of the house, the sequence depending on the perceiving subject and not on the house). Causality qua necessary connection is about objective succession, in which the succession is irreversible and determines the order of the subjective perceptions, rather than merely unordered subjective succession, in which the succession is reversible.

Fourth, Kant claims that the cognition of a perceived regularity of succession in relation to the state of the substances involves the connection of state A and state B in a hypothetical judgment, namely, in a conditional statement, in which the temporal priority of A and B determines which state is to be placed in the antecedent slot (i.e. the preceding substance) and which is to be placed in the consequent slot (i.e. the resulting substance). Regardless of the appearance of simultaneity, one is always an instant prior to the other. For Kant, determinations of causality qua necessary connection involve the judgment that A precedes B, but B cannot precede A in time. The irreversibility in terms of the succession in the order of time dictates which state of substance is cause and which state of substance is effect, conforming to a rule that is prescribed to experience.

Fifth, Kant suggests that “the principle of sufficient reason [every event has a cause] is the ground of possible experience, namely the objective cognition of appearances with regard to their relation in the successive series of time” (Ibid., A201/B246, p. 311, my addition), the judgment “every event has a cause,” by which he means every alteration of substance has a cause, being an example of a synthetic a priori judgment. That said, Hume’s critiques of the principle of sufficient reason in Book I section III of the *Treatise* on the basis of not being able to justify the inductive leap required to solidify such a principle, and again in the *Dialogues Concerning Natural Religion* (1761 / 1779) are to be revisited here (as Kant does later in the *Prolegomena*). In addition, one must here also recollect Hume’s critique of substances in Book I section VI of the *Treatise* and elsewhere. In any case, given that in the Second Analogy Kant make a series of interconnected points, important as they may be toward a comprehensive solution of the Humean lacuna, his solution is by no means made explicit (especially in relation to the key issues of necessity and universality), and it is no wonder that, as Bayne (2004) describes, many scholars are in disagreement regarding the issue of whether Kant truly provides an adequate answer to Hume in this section.

agrees with Hume's statement that it is through inductive reasoning that human beings detect a regularity of succession between like As and Bs. However, Kant maintains that the concept of causality is not reducible to that of a perceived regularity of accompaniment between like As and Bs and a habit of considering them conjoined. Rather, Kant defends that causality is the concept of causality *qua* necessary connection. And, for him, causality *qua* necessary connection is an *a priori* concept of the understanding that, in conjunction with the notions of substance and community, is part of the *a priori* framework that renders a rational being's experience of an object possible. In accounting for how a person makes a determination that two things are necessarily connected, Kant postulates that, at first, a person detects a regularity of succession, namely, an "order" of occurrence between like As and Bs—a finite number of cases in which an A appears to precede a B, and not one experience of the reverse sequence (i.e. of a B preceding an A). As Kant describes in the Second Analogy, the cognition of an "order" underlying the sequence by which a substance changes its state (such as the succession in position of a ship flowing downstream; or the succession of alterations wax undergoes as it turns into a liquid form when heated), the one state preceding the other irreversibly in time, determines the order of the flow of perceptions in the experiencing subject. The irreversibility and determinedness (and Kant would add "necessary") in terms of the order of the connection of subjective perceptions, which belongs to experience in general, is exemplified by the fact that it is precisely distinguishable from the potential reversibility, undeterminedness, and/or disorderedness of perceptions that a person might subjectively synthesize together in cognizing a static object like a house.³⁶

Returning to the account provided in the *Prolegomena*, a person detects that there is a regularity in terms of the temporal *order*³⁷ of two phenomena, for example, having experienced lightning preceding thunder, but never experienced the reverse in relation to like As and Bs. Here, consciousness makes a determination about the rule of relation that is behind this order, employing conditional logic in the form of a

³⁶ Beck (1978) writes,

Kant's answer is that any sequence which is taken to represent an objective change of states of affairs, or an event, must be taken as a necessary sequence, and that the concept of a necessary sequence is the concept of causation. Without possessing the concept of causation we could not distinguish between objective events and subjective sequences, and therefore the concept of a causal connection between objective events cannot arise from observation of them, but rather must be presupposed in recognizing them" (p. 129).

³⁷ Due to the fact that effects can be simultaneous with their causes, in the Second Analogy, Kant makes an associated distinction between the order of time, and the course of time.

hypothetical judgment³⁸, in which the first appearance (i.e. seeing lightning) is constituted as the antecedent and the second appearance (i.e. hearing thunder), the consequent. In other words, for instance, there is a determination that “if I see the flash of lightning, then I will hear thunder,” the former being sufficient for the latter and the latter being necessary for the former. While the two appearances (i.e. lightning and thunder) are here connected together in consciousness via a conditional judgment, Kant notes that a determination of causality *qua* necessary connection is still not yet in play, because the judgment in question is still regarded as a hypothetical, provisional, and/or a subjective rule. It does not yet have the full form of necessity and of universality. But due to the fact that the provisional, subjective rule is just that: *a rule*, which stems from *an order* that belongs to the phenomena themselves and which determines the order of perceptions in the experiencing subject, Kant suggests that the kernels of necessity and of universality are already implicit in it. Nevertheless, in order for the hypothetical judgment to become a determination of causality *qua* necessary connection, the conditional relation must be regarded as necessarily and universally valid, as in the judgment, “lightning is the cause of thunder.” In this way, Kant affirms that the concept of causality is to be distinguished from the Humean notion of the perceived regularity of accompaniment between like As and Bs, precisely by the appeal to the necessity and universality of the connection between like As and Bs, that is to say, as a law that governs experience, rather than merely as an empirical rule. However, for Kant, the empirical rule is not somehow to be divorced from the causal law, at which consciousness aims. Rather, the arrival at the causal law presupposes the empirical rule in which experience is consulted, but the empirical rule is subordinate to the causal law, and both, according to Kant, can be said to require the application of the *a priori* concepts issuing from the understanding to experience for their derivation. Overall, Kant seems to suggest that *an experience of an order* as represented by the empirical rule gives rise to *an ordering of experience* as represented by the causal law, which is then prescribed to experience. Here, one must be careful in respect to the multiple meanings of the word “order” (*Ordnung*).³⁹ In relation to *an ordering of experience*, Kant holds that the prescription of a

³⁸ However, here we must realize that conditionality and causality are not the same things.

³⁹ Here, we might ask whether Kant is exploiting the multiple meanings of the word “order” (*Ordnung*), allowing him to shift his reasoning from the notions of “succession” (*Sukzession*) or “sequence” (*Folge*) to that of a “rule” (*Regel*). To be sure, the notion of “the order of something” may be defined in more than one sense, namely, as: 1.) the sequence or pattern in which something happens or is arranged, and/or 2.) something operating under the guidance of a rule or law. The expression “pecking order” blurs the distinction between these two meanings.

causal law, which assumes necessity and universality, to experience, pertains to appearances, and cannot be said to be descriptive of how things are in-themselves.

At this point one may ask whether or not Kant gets anywhere beyond Hume in coming up with his purported “complete solution”⁴⁰ to the Humean lacuna. It is perhaps the case that Kant is here merely recasting Hume’s own analysis, the latter not only setting up the problem but also providing the “*possible locus of its solution*.”⁴¹ Kant’s “solution” does not seem to offer a purely empirical proof of the claim to necessity and universality that is implied by way of the determination of the causal relation. Of course, that is precisely what Hume would have him do, but the Kantian line of reasoning, we must remember, is simply to show that “although all our cognition commences with experience, ... it does not on that account all arise from experience.”⁴² The capacity to cognize a regularity of accompaniment between like As and Bs, and to represent their order of succession in the form of a hypothetical judgment demonstrates, for Kant, that the *a priori* categories of the understanding (including the concept of necessity) are already in play in the empirical rule. While Kant’s account may be correct as to the sequence of thinking a person goes through when they in fact make determinations of necessary causal connection, one may still question how the provisional empirical rule that was derived from a finite set of experiences comes legitimately to be “regarded as a [causal] law,”⁴³ namely, judged to hold necessarily and universally. In other words, one might still ask how is a causal law *qua* necessary connection, which is of course, based upon an empirical rule, justified?

An empirical proof via induction is precisely what Hume’s skepticism seemingly demands, but Kant’s answer does not provide a comprehensive one. Kant simply does not make explicit how necessity and universality already belong to the empirical rule beyond his postulation that an objective order of succession determines the subjective order of perceptions that are synthesized in the cognition of the object(s) involved. And he does not take up the question of whether the detection of an order of succession is something that depends upon prior experience. While Kant does hold that “the agreement of cognition with the object is truth,”⁴⁴ he merely repeats the standard line of his transcendental idealism that the concepts (i.e. causality, substance) and laws (i.e. the causal law) in question make our experience intelligible are not

⁴⁰ *Prolegomena*, §30, 4:261, p. 66.

⁴¹ Longuenesse, Beatrice, *Kant and the Capacity to Judge: Sensibility and Discursivity in the Transcendental Analytic of the Critique of Pure Reason*, trans. C. T. Wolfe, Princeton, Princeton University Press, 2000, p. 356.

⁴² *Critique of Pure Reason*, A1/B1, p. 136.

⁴³ *Prolegomena*, §29, 4:312, p. 65.

⁴⁴ *Critique of Pure Reason*, A58/B82, p. 197.

derived from experience, but that “experience is derived from them,” which is “a completely reversed type of connection that never occurred to *Hume*.”⁴⁵ And from a neo-Humean perspective, the question of whether we in fact ought to prescribe causal laws, formulated via synthetic *a priori* judgments, to phenomena on this basis of this account goes largely unanswered.

Practically speaking, it can be suggested that regardless of whether or not the concept of causality *qua* necessary connection is an abstraction from a perception of a regularity of successive accompaniment of like As and Bs, only an assumed *a priori* concept of causality *qua* necessary connection can be responsible for a person having an awareness of the whole mass of intuitions pertaining to particular and differentiated instantiations of causal efficacy that he/she confronts in his/her experience and which guides his/her behavior: for example, that fire causes smoke; fire causes heat; lightning causes thunder; a rock thrown causes a glass window to break; wind causes one’s hat to blow off; a flash causes a person to blink; turning the tap causes the water to flow; drinking caffeinated coffee causes one to be more mentally alert; eating a certain berry, mushroom, or plant causes sickness; and so forth. From a Kantian perspective, causal efficacy underlies human experience and one does not have to learn this principle anew in respect to each successive instance. Instead, in practice, one guides one’s actions in conformity to *a priori* rules and principles that are prescribed to nature. Someone with an adequate sense of the causal principle understands very well, prior to experience, what, in his or her environment, has the potential to impact upon him or her, even in respect to situations he or she has never encountered before, and judges and acts accordingly, so, for example, as to prevent harm to him- or herself and/or to others.

Human survival depends upon making determinations of necessary causal connection and on guiding their behavior accordingly. For example, the average person knows very well prior to experience, for instance, not to pick up and drop a medium-sized rock on his or her head, since that would result in severe injury or perhaps even death, pointing to the practical indispensability of this concept. At the same time, most people are not survival experts and if they were lost in the wild, they would have a great deficiency in knowing which type of berry, mushroom, or plant is safe for human consumption and which will make them sick, unless of course they had access to books or to the internet that provide such information. Regardless of whether or not the concept of causality *qua* necessary connection can simply be seen as an abstraction that is derived from the mind’s habit of conjoining objects of experience that have exhibited a regularity of successive accompaniment, and

⁴⁵ *Prolegomena*, §30, 4:313, p. 66.

regardless of our capacity to distinguish between correlations between like As and Bs and necessary causal connections in accordance with various epistemological criteria (e.g. strength of the association, consistency, specificity, temporal relationship, etc...),⁴⁶ human survival, as well as action and moral conduct depend on guiding our actions via causal laws. And in abstraction of whether the concept of causality *qua* necessary connection is empirically warranted, it is a persistent aspect of the conceptual organ by which rational beings actively constitute their experience.

In the *Prolegomena*, Kant relates how, in challenging Hume's empiricist principle and in arriving at his "complete solution"⁴⁷ to Hume's skeptical lacuna, he found that causality is one of several concepts that are not derived from experience, but which are *a priori*, namely, arising from the pure understanding. According to Kant, such concepts are a fixed part of the conceptual apparatus that rational beings are endowed with by their very natures, together comprising the conceptual framework by which they constitute their experience. For Kant, such *a priori* concepts of the understanding, among which he also finds the notions of substance and community, are not innate or implanted in us by God prior to our existence, and they do not belong to any supersensuous realm of existence that is disconnected from experience. On the contrary, for Kant, the concepts of the understanding are derived independently from experience, but always concern experience and objects of possible experience. Kant restricts their use "to experience only." As he writes, they are "founded solely in the relation of the understanding to experience" and they "have no meaning at all if they should depart from objects of experience."⁴⁸ Here, it must be noted that Kant is not embracing verification empiricism or meaning empiricism in relation to the categories. He is merely suggesting that the employment of the categories is not to be disconnected from objects of possible experience, but that they provide for their very form. The categories serve "only to spell out appearances,"⁴⁹ rather than being referable to how things are in-themselves (*noumena*).

Rational beings, for Kant, do not merely experience the world passively, but are active in constituting it, the *a priori* concepts of the understanding, synthesized together along with the forms of sensibility (i.e. space and time), being inalienable from the process by which they render their experience intelligible (i.e. ordering it). Rather, in Kant's view, the *a priori* concepts of the understanding, with which rational beings are endowed by their very natures, are brought to the table of experience, and enable them to make sense of it in the particular manner that they do. But at the same

⁴⁶ For example, see Hill (1965).

⁴⁷ *Prolegomena*, §30, A:313, p. 66.

⁴⁸ *Ibid.*

⁴⁹ *Ibid.*, §30, A:312, p. 66.

time, the *a priori* conceptual framework that rational beings are endowed with both determines and limits how they can experience it. Given that the *a priori* concepts of the understanding belong to the very make-up of rational beings, rational beings are unable to step outside of themselves to experience something purely, namely, without reference to their *a priori* conceptual framework. As such, for Kant, rational beings are limited to a knowledge of appearances (*phenomena*), being unable to penetrate things as they are in-themselves (*noumena*).

One of the major questions Kant asks in the *Critique of Pure Reason* and in the *Prolegomena* is: how are *a priori* synthetic judgments possible? This question is also a key aspect of Kant's critical response to Hume's empiricist test. Kant credits Hume as the philosopher who came closest to articulating this question and to understanding the full implications of his skepticism for metaphysics, but charges that he

still did not conceive of it anywhere near determinately enough and in its universality, but rather stopped with the synthetic proposition of the proposition of the connection of the effect with its cause (*Principium causalitatis*), believing himself to have brought out that such an *a priori* proposition is entirely impossible.⁵⁰

From a Kantian position, one may question how Hume knows that “every idea is deriv'd from preceding impressions,”⁵¹ which can be construed as an example of an synthetic *a priori* judgment involving a determination of a necessary causal connection that, on the latter's account, postulated as an unmitigated skepticism, would be impossible to verify empirically. This proposition, going beyond the possibility of empirical verification, would have been repudiated by Hume if he had, as Kant indicates, understood the full ramifications of his own skepticism.⁵² In addition, Kant would suggest that the unmitigated Hume cannot explain why rational beings guide their experience by determinations of necessary causal connection which involve synthetic *a priori* judgments to begin with.

From a Kantian perspective, it may also be asked whether Hume conflated an “is” with an “ought” (i.e. committed his own is / ought fallacy) in defending his empiricism, namely, respect to the statement that every idea is derived from preceding impressions. Furthermore, it may be charged that Hume's account of the origins of our ideas via impressions of sensation and impressions of reflection is logically self-reflexive in that it presupposes causality *qua* necessary connection. These

⁵⁰ *Critique of Pure Reason*, A10/B19-20, p. 146.

⁵¹ Hume, David, *A Treatise of Human Nature*, Volume 1, eds. D. F. Norton and M. J. Norton, Oxford University Press, 1739-1740 / 2007, p. 10.

⁵² As someone like Karl Popper (1959) would suggest, it is unfalsifiable and therefore, potentially meaningless.

points demonstrate, from a Kantian viewpoint, that Hume himself is unable to somehow describe the principles underlying our experience of the world without reference to the *a priori* concepts of the understanding. To be sure, from the Kantian perspective, it is “through [the concepts of the understanding] alone [that] cognition, and determination of an object, [is] possible.”⁵³ Some further critical epistemological questions that are not addressed in either Hume and Kant’s discussions are: beyond their indispensability and/or their practical usefulness in rendering our experience intelligible and in preventing harm to ourselves and to others, even while “synthetic *a priori* judgments are contained as principles in all theoretical sciences of reason,”⁵⁴ of what validity are *a priori* synthetic judgments as a whole? Does their use need to be amplified or limited, given epistemological standards of truth? Possible answers from Hume to these questions seem to get lost in his discussions of whether or not to adopt excessive skepticism, the Kantian suggestion being that Hume did not realize the full implications of his attacks on the categories. Even further, we might ask the questions: what is the biological significance of synthetic *a priori* judgments? Do creatures that guide their actions in concert with them have a survival advantage in the struggle for existence?

In sum, according to Kant, determinations of causal connection between one kind of thing and another do issue, in part, from inductively enumerated perceived regularities of accompaniment, as Hume had held, and hence there is an *a posteriori* aspect to their derivation, but they are grounded in the *a priori* principle of causality *qua* necessary connection. Thus, on the whole, for Kant, determinations of necessary causal connections, are the result of a subtle mixture, in the constitution of experience, on the one hand, of the perception of things and contingent events, and, on the other, the conceptual structures that issue from the understanding, where neither side can be divorced from the other. As Friedman (1992) puts it in his essay “Causal Laws and Natural Science,”

particular causal laws, for Kant, have a peculiar kind of mixed status: They result from a combination of inductively observed regularities or uniformities with the *a priori* concept [and principle] of causality. Insofar as particular causal laws merely record observed regularities they are contingent and *a posteriori*; insofar as they subsume such regularities under the *a priori* principle of causality, however, they are necessary—and even, in a sense, *a priori*.⁵⁵

⁵³ *Critique of Pure Reason*, A310/B367, p. 394.

⁵⁴ *Ibid.*, A10/B14, p. 143.

⁵⁵ Friedman, Michael, ‘Causal Laws and the Foundations of Natural Science,’ in *The Cambridge Companion to Kant*, ed. P. Guyer, New York, Cambridge University Press, 1992, p. 174.

In this way, overall, Kant supports an intermediate position in relation to causality between the strictly empirical and the purely *a priori*, a middle way he describes as operating in “between the [rationalist] dogmatism that Hume fought and the skepticism he wanted to establish in contrast to it.”⁵⁶

The evolutionary interpretation that will be discussed in the next sections of this paper suggests that Hume and Kant’s respective positions are not entirely in conflict. Both provide important pieces of the puzzle of a more comprehensive understanding of the nature of the Humean lacuna and of the *a priori* categories. While Hume is correct to point out that human beings have a curious habit of stamping perceived regularities of accompaniment between like As and Bs with the character of causality *qua* necessary connection, a concept that does not have an empirical warrant but rather is indispensable for survival, Kant maintains that rational beings do possess an *a priori* concept of causality *qua* necessary connection, which renders their particular manner of experiencing the world possible. However, as will be shown in the next section of this paper, Kant’s account of the origin of the categories is incomplete, although he himself points in the direction of biology to provide further answers, albeit in a loose and analogous way. Later, in outlining Hegel’s response to Hume’s skepticism concerning causality, I shall refer to another strand of Kant’s arguments against Hume’s epistemological assumptions.

III. KANT’S ANALOGIES BETWEEN THE MAJOR EPISTEMOLOGICAL STANCES AND THE BIOLOGICAL THEORIES OF HIS TIME IN HIS ACCOUNT OF THE ORIGIN OF THE CATEGORIES

Kant was quite familiar with the biology of his time. An underlying theme in the second half of the *Critique of the Power of Judgment* (1790) was to deal with the associated ramifications of the Humean problems of induction, causality, and necessity to teleological explanation and to the classification of organisms in nature. Although in *The Critique of the Power of Judgment*, Kant rejected evolutionary explanations⁵⁷ and he may have been “anxious” or “frightened” by the rudimentary evolutionary theories of his day⁵⁸, later in his *Anthropology* (1798), he made several interesting speculations about biological evolution that proved generally to be correct, including the notion that

⁵⁶ *Prolegomena*, §58, A:360, p. 114, my addition.

⁵⁷ Kant, Immanuel, *Critique of the Power of Judgment*, ed. and trans. P. Guyer and E. Matthews, New York, Cambridge University Press, 1790 / 2000, 5:418-420, 5:423, pp. 288, 291-292.

⁵⁸ See Zammito, John, *Kant, Herder, and the Birth of Anthropology*, Chicago: University of Chicago Press, 2002, p. 306.

organisms may have come from a single ancestral source.⁵⁹ Interestingly, he also wondered whether an orangutan or a chimpanzee might eventually evolve “the organs for walking, for handling objects, and for speaking, until it had the structural features of a human being, whose interior would contain an organ for the use of the understanding and would gradually develop through social culture.”⁶⁰ However, here, since I am concerned to explore the evolutionary epistemological significance of Kant’s response to Hume’s lacuna concerning causality *qua* necessary connection, I will concentrate my analysis on Kant’s employment of several analogies in the *Critique of Pure Reason* to the biological theories of his time in explaining his perspective on the origin of the *a priori* categories.

In the “Transcendental Deduction of the Pure Concepts of the Understanding,” Kant deduces the necessity of the categories of pure reason on the basis that they are what make the experience of rational beings possible, and only concern such experience. He states, “we cannot think any object except through categories; we cannot cognize any object that is thought except through intuitions that correspond to those concepts.”⁶¹ The categories, for Kant, are “self-thought (*selbstgedacht*) *a priori* first principles of our cognition,”⁶² which arise “from the understanding,”⁶³ the understanding being “their birthplace.”⁶⁴ Elsewhere, in the “Transcendental Dialectic,” he describes the *a priori* concepts of the understanding as being “individual” and “unalterable,” as well as “unconditioned” and “absolute,” by which he means “internally necessary” and “valid in every relation ... without restriction.”⁶⁵ Given the strength of his expression here in relating the self-groundedness of the categories in the understanding, the reader is most probably, still curious as to their origin. Of course, for Kant, the categories neither have an “empirical origin,”⁶⁶ as Hume would claim, nor are they innate, or implanted in us prior to our births, as in Cartesian rationalism. Rather, according to Kant, they emerge autonomously and are “grounded in the nature of human reason.”⁶⁷

In defending his position, Kant employs suggestive analogies in which he compares the major epistemological positions in relation to the origin of the categories

⁵⁹ *Critique of the Power of Judgment*, 5:418, p. 287.

⁶⁰ Fenves, Peter, *Late Kant: Towards Another Law of the Earth*, New York, Routledge, 2003, quoting Kant’s *Anthropology*, 7:328, p. 159.

⁶¹ *Critique of Pure Reason*, B165, p. 264.

⁶² *Ibid.*, B167, p. 265.

⁶³ *Prolegomena*, 4:260, p. 10.

⁶⁴ *Critique of Pure Reason*, A66/B92, p. 202.

⁶⁵ *Ibid.*, A321-327/B378-385, pp. 397-402.

⁶⁶ *Ibid.*, B167, p. 264.

⁶⁷ *Ibid.*, A323/B380, p. 400.

(i.e. rationalism, empiricism, transcendental idealism) to the various biological hypotheses of his time concerning the generation and the development of organisms. Kant first associates unmitigated Humean empiricism with the mechanistic theory of *generatio aequivoca*, meaning the belief in the spontaneous generation of organisms, especially the lowliest of organisms, from material nature, for example, flies and maggots from the presence of a carcass or of rotting meat, and worms and slugs from the presence of moist soil. Here, Kant means to compare Hume's tracing of all of our ideas, including the concepts of the understanding, back to prior impressions of sensation, with *generatio aequivoca*, thereby insinuating their lowly status as ultimately conditioned by sensation and derived from experience and/or that they result from "the mere confluence of aggregated concepts."⁶⁸

Second, Kant associates his own transcendental idealism, involving the view that the categories emerge autonomously as part of the nature of rational mind, and make experience possible, with that of *epigenesis*. The notion of epigenesis has a very different meaning than a key word today: *epigenetics*,⁶⁹ being the study of a layer of biological connections, which "sits atop the genome" regulating gene expression, but that can be affected by behavior and environment.⁷⁰ In Kant's time, epigenesis stood for the hypothesis that the embryo, in contrast to the view of *preformationism*, does not simply resemble an adult of its species and grow, but undergoes successive differentiation in developmental stages toward adulthood. Epigenesis involves the notion that the organism develops by being propelled by an autonomous and "immanent self-

⁶⁸ Ibid., A835/B863, p. 692.

⁶⁹ Bard (2008) accounts for the origin of the word epigenetics as follows: "Epigenetics is actually a portmanteau term and a conflation of epigenesis—the belief that development is the gradual process of taking a simple egg and allowing complexity to develop (contrasting with preformationism, the idea that development is just the expansion of structures already present in the fertilized egg)—and genetics, the study of the laws of heredity" ("Waddington's Legacy to Developmental Theoretical Biology," *Biological Theory*, vol. 3, no. 3, p. 191).

⁷⁰ Conrad Hal Waddington's coining of the term 'epigenetics' took into account aspects of both 'preformationism' and 'epigenesis', synthesizing them together. To be sure, Waddington wrote, "we know that a fertilized egg contains some preformed elements—namely, the genes and a certain number of different regions of cytoplasm—and we know that during development these interact in epigenetic processes to produce final adult characters and features that are not individually represented in the egg. We see, therefore, that both preformation and epigenesis are involved in embryological development" (*Principles and Problems of Development and Differentiation*, New York, Collier Macmillan Ltd., 1966, p. 15).

Contemporary research in epigenetics places into question the view of the genome as somehow being partitioned off from the environment, a perspective held by the proponents of the Modern Synthesis in their doctrine of "hard inheritance." The doctrine of "hard inheritance" was aimed at purging the theories of "the inheritance of acquired characters," "soft inheritance," and Lamarckism from mainstream biology (see Mayr, Ernst, *The Evolutionary Synthesis: Perspectives on the Unification of Biology*, Cambridge, MA, Harvard University Press, 1980, pp. 4-6, 15-17).

creating force,” for example, a vital “will for self-preservation in nature.”⁷¹ Under epigenesis, the fertilized egg is said to contain “a small number of elements and ... during development these react together to produce the much larger number of adult features that were not represented before”⁷², thereby producing something new. Furthermore, epigenesis involves “successive organ formation from parental generative matter under the guidance of a formative force,”⁷³ which provides a point of comparison to the status of the Kantian categories as unconditioned and as self-thought.

Third, Kant asks the reader to imagine a middle position between empiricism and his transcendental idealism, in which it is proposed that the *a priori* categories neither have their origins in experience, nor are self-thought, but instead are subjective predispositions for thinking implanted in us by God, and which somehow correspond to the laws of nature. To some extent this middle course is akin to Cartesian rationalism in its appeal to God-given innate ideas (although Descartes had a mechanical view of the organism, governed by the laws of physics). Kant compares this middle position with the theory of preformation, a speculation belonging to William Harvey (1578-1657) and Charles Bonnet (1729-1793) that took on various formulations. Preformation is generally the idea that the organism’s form precedes its development, thereby involving a denial of the formative power of nature in respect to the organism. In other words, preformationism involves the claim that “all characters of the adult organism are present in the fertilized egg and only need[] to unfold or grow.”⁷⁴ Preformationists held that the embryo was already an adult in miniature form, and merely depended on its parents and on its environment to provide the essential nutriment to allow it to develop. It was speculated that the male’s semen provided for its first nourishment. At the same time, preformation involved the view that the embryo has been put into existence directly by the hand of God, each member of each species sharing its form with other members, being given at the creation of the world.⁷⁵

Employing these analogies, on the one hand, Kant argues against the Hume / *generatio aequivoca* connection by suggesting that

⁷¹ Müller-Sievers, Helmut, *Self-Generation: Biology, Philosophy, and Literature Around 1800*, Stanford, CA, Stanford University Press, 1997, pp. 45, 61.

⁷² Van Speybroeck, Linda, ‘From Epigenesis to Epigenetics: The Case of C. H. Waddington,’ *Annals of the New York Academy of Science*, vol. 981, 2002, p. 67.

⁷³ Müller-Sievers, *Self-Generation: Biology, Philosophy, and Literature Around 1800*, p. 48.

⁷⁴ Van Speybroeck, ‘From Epigenesis to Epigenetics: The Case of C. H. Waddington,’ p. 67.

⁷⁵ For more on preformation, see Bowler (1982), especially 60-62.

our skeptic ... held this augmentation of concepts out of themselves and the parthenogenesis, so to speak, of our understanding (together with reason), without impregnation by experience, to be impossible; thus he held all of its supposedly *a priori* principles to be merely imagined, and found that they are nothing but a custom arising from experience and its laws, thus are merely empirical, i.e., intrinsically contingent rules, to which we ascribe a supposed necessity and universality.⁷⁶

Certainly, Kant would never agree to empiricism's aim "to explain the higher mental forms and faculties by composition of the lower sense experiences."⁷⁷ The comparison of Kant's own position / epigenesis with the empiricist / *generatio aequivoca* connection also serves to present the distinction between automatons and organisms. In describing epigenesis later in the *Critique of the Power of Judgment*, he writes,

an organized being is thus not a mere machine, for that has only a motive power, while the organized being possesses in itself a formative power, and indeed one that it communicates to the matter, which does not have it (it organizes the latter): thus it has a self-propagating formative power, which cannot be explained through the capacity for movement alone (that is, mechanism).⁷⁸

On the other hand, while for most of his career, Kant had been a preformationist, following from the work of Caspar Friedrich Wolff's (1733-1794) *Theoria Generationis* (1759) and Johan Friedrich Blumenbach's (1752-1840) *Institutiones Physiologicae* (1787), Kant only gradually came to articulate the superiority of the theory of epigenesis over that of preformation. In the *Critique of the Power of Judgment*, he attempts to provide evidence that supports the former,⁷⁹ but it must be noted that Kant's defense of epigenesis was of a considerably weak form, when compared with Herder's, and later Schelling's versions of the theory. According to one commentator, Kant was never "entirely comfortable with the idea" and was hostile to it up until 1787, which makes his analogies here confusing for interpreters.⁸⁰ To make things even more puzzling, Kant had sought initially to make the connection between his transcendental philosophy and preformationism, rather than with epigenesis, in order to make the case that the *a priori* categories were pre-given in the understanding, but revised it in

⁷⁶ *Critique of Pure Reason*, A765/B793, p. 656.

⁷⁷ Bowne, Borden Parker, *Kant and Spencer: A Critical Exposition*, Port Washington, NY, Kennikat Press, Inc., 1967, p. 390.

⁷⁸ *Critique of the Power of Judgment*, 5:374, p. 246.

⁷⁹ See *Critique of the Power of Judgment*, 5:423-424, pp. 291-293.

⁸⁰ Zammito, John, 'Kant's Persistent Ambivalence Toward Epigenesis, 1764-1790,' in Huneman, Philippe, (ed.), *Understanding Purpose: Kant and the Philosophy of Biology*, North American Kant Society Studies in Philosophy, vol. 8, Rochester, NY, University of Rochester Press, 2007, pp. 51-52.

the 1787 version of the first *Critique*.⁸¹ As such, perhaps the best way of conceiving Kant's analogy between epigenesis and his transcendental philosophy, is of a "weak" epigenesis, namely, one that really implies a version of preformationism, namely, a system of "generic preformationism" in which the process of differentiation that an individual (viewed as a product rather than as an educt) undergoes takes place in the context of a preformed genus.⁸² This the case, due to the fact that in the third *Critique*, Kant describes that epigenesis "can also be called the system of generic preformation, since the productive capacity of the progenitor is still preformed in accordance with the internally purposive predispositions that were imparted to its stock, and thus the specific form was pre-formed *virtualiter*."⁸³ Cast in this light, Kant's analogy would seem to point to the complexity of his own epistemological standpoint of transcendental idealism, in its relationship with rationalism, as well as pointing to some sort of 'epigenesis' or individualized process of development in relation to the categories, within the context of being 'preformed' as a rational being.

Returning to the "Transcendental Deduction," Kant finds that the analogy between rationalism and preformation, conceived of as a middle course between the empiricist view that experience makes the categories possible and his own position that the concepts of the understanding make experience possible, would involve a conception of the categories as innate subjective predispositions or habits of thought pre-programmed in us by our Creator, and agreeing exactly with the laws of nature, running alongside experience, that He created. Against such a middle position, Kant argues that the categories "would lack the necessity that is essential to their concept."⁸⁴ To clarify this point, he writes that the concept of cause, for example,

which asserts the necessity of a consequent under a presupposed condition, would be false if it rested only on a subjective necessity, arbitrarily implanted in us, of combining certain empirical representations according to such a rule of relation. I would not be able to say that the effect is combined with the cause in the object (i.e., necessarily), but only that I am so constituted that I cannot think of this representation otherwise than as so connected.⁸⁵

⁸¹ *Ibid.*, pp. 57-58.

⁸² This is basically the thesis of Fisher, Mark, 'Kant's Explanatory Natural History: Generation and Classification of Organisms in Kant's Natural Philosophy,' in Huneman, Philippe, (ed.), *Understanding Purpose: Kant and the Philosophy of Biology*, North American Kant Society Studies in Philosophy, vol. 8, Rochester, NY, University of Rochester Press, 2007, pp. 101-121.

⁸³ *Critique of the Power of Judgment*, 5:423, p. 291.

⁸⁴ *Critique of Pure Reason*, B168, p. 265.

⁸⁵ *Ibid.*

Kant maintains that in order to arrive at the synthesis of the perceptual and conceptual that renders the experience of objects possible, the categories must be viewed necessary and universal features of human reason which always concern such objects of experience. Otherwise, for example, particular determinations of causal connection, for Kant, could be chalked up to the particular way that the individual has been constituted or organized by God, rather than pointing to anything really connected with the objects themselves. In this case, “all of our insight through the supposed objective validity [would be] nothing but sheer illusion,” leading thereby to a thorough epistemic subjectivism, which is “precisely what the skeptic wishes most.”⁸⁶

As has been described through these analogies between the various epistemological positions and the various biological theories of his time, Kant’s overall position concerning the origin of the categories involves placing into doubt the views of rationalism: that they are innate, namely, implanted into us by God prior to our existence, and empiricism: that they are merely derived from experience. Rather, for him, they have arisen in the understanding as part of the very nature of rational beings, having a purely intellectual origin. It is clear that Kant is employing the biological theories in a loose and analogous way here in accounting for the origin of the categories. Coinciding with the overall theme of this paper, however, Kant’s appeal to biology, and more precisely, to epigenesis, which places emphasis on developmental processes, here, in providing a plausible answer to the question of the origin of the transcendental ideas may be more than just suggestive. If so, his speculations could perhaps be considered as a narrowing of the gap between his transcendental idealism and Hume’s naturalism, as indicated above. Nevertheless, it must be emphasized that on such a key issue as the question of the origin of the transcendental ideas, his reliance on an imprecise argument by analogy, which involves passing references and loaded comparisons, points to a critical explanatory gap in Kant’s transcendental idealist philosophy, namely, one that can only be filled in to some extent by contemporary evolutionary theory. Kant would undoubtedly be reluctant to pursue this line of inquiry further because it would involve an attempt to gain knowledge of the thing-in-itself. However, his claims that the categories emerge autonomously in the rational natures of human beings, and are absolute in the senses of “internally necessary” and “valid in every relation,” are highly questionable. This is especially the case from the purview of contemporary biology in which organic attainments are to be seen as products of evolutionary processes.

⁸⁶ Ibid.

Certainly given Nietzsche's observation that, in light of Darwinian evolutionary theory, reason itself is to be viewed as a by-product of the evolutionary process, the will-to-truth for him being reducible to the will-to-power, one would do well to suggest that something like the Kantian *a priori* categories do exist, including the concept of causality *qua* necessary connection, but of a much fuzzier variety. They might best be conceived of as exceptionally enduring, biologically indispensable concepts that: 1.) have their origins in the evolutionary past; 2.) have been selected for over eons of evolutionary time, much like any other advantageous phenotypic trait; 3.) are not assimilated equally in the natures of all human beings; 4.) emerge as a result of processes of development and undergo processes of refinement; and 5.) continue to be subject to biological and intellectual processes of selection. Such a view of the categories was, in general, held by twentieth century evolutionary psychologist, Konrad Lorenz (1903-1989), in his 1941 essay "Kant's Doctrine of the *A Priori* in the light of Contemporary Biology." However, Lorenz did little to mitigate the apparent inconsistency between Kant's *a priori* categories as fixed, self-thought, and having a purely intellectual origin, and the exigencies of the biological view, namely, that the categories evolve and are subject to a process of development. I turn now to an examination of Lorenz's evolutionary neo-Kantian conception of the *a priori* categories.

IV. KONRAD LORENZ'S EVOLUTIONARY NEO-KANTIANISM AND THE BIOLOGICAL INTERPRETATION OF THE *A PRIORI* CATEGORIES

In the essay, "Kant's Doctrine of the *A Priori* in the Light of Contemporary Biology," twentieth century evolutionary epistemologist, Konrad Lorenz argues that Kant's *a priori* categories, including the notion of causality, can be interpreted in the light of evolutionary biology. For him, they may be considered evolutionarily hardwired conceptual structures belonging to the very make-ups of rational organisms. Lorenz describes the Kantian *a priori* categories and forms of intuition as "inherited working hypotheses which have shown their mettle in dealing with the physical world"⁸⁷ and in the struggle for existence, in an analogous manner to Darwin's claim in *The Origin of Species* (1859) that advantageous morphological characteristics help organisms to survive in the natural world. According to Lorenz, these conceptual structures are to be seen as the products of adaptation and evolution. They are indispensable ideas, memes, and/or "good tricks,"⁸⁸ that have emerged as indispensable habits of thought.

⁸⁷ Ruse, Michael, (ed.), *Philosophy After Darwin: Classic and Contemporary Readings*, New Jersey, Princeton University Press, 2009, p. 224.

⁸⁸ Dennett, Daniel, *Darwin's Dangerous Idea*, New York, Simon & Schuster, 1995, p. 77.

Such habits have been selected for in the biological sense and have been “genetically assimilated,” since they assist human beings in the struggle for existence, helping them to adapt to their environment. Lorenz holds that the Kantian *a priori* categories are biologically inherited,⁸⁹ yet are provisional, namely, they are not simply to be seen as fixed structures belonging uniformly and equally to all rational beings, as is seemingly maintained by Kant. Rather, they are modifiable. That said, one must recall that for Kant, empirical cognitive judgments are revisable, and in the *Prolegomena*, Kant describes how human reason is “keen on building” and “that more than once it has erected a tower” it “has afterwards torn it down again in order to see how well constituted its foundation may have been,”⁹⁰ which perhaps indicates that the conceptual structures belonging to rational beings are not completely fixed and final. In any case, Lorenz views the Kantian *a priori* categories, and especially the notion of causality *qua* necessary connection, in the light of evolutionary biology, which can help to provide a more comprehensive understanding both of the lacuna Hume drew attention to and the nature of such categories. Lorenz holds that, as an intrinsic part of the reasoning faculty of the human species, they are enduring products of the evolutionary process, having been selected for over the course of evolutionary history. But in contrast to the Kantian notion that all rational beings possess the concept of causality *qua* necessary connection equally and in a fixed manner, Lorenz’s evolutionary view leaves implies that there are gradations as to how much individual human beings have this principle instilled in them. Although the predisposition to infer that one thing necessarily follows from another is widespread among human beings, giving evidence for its biologically innate status within them, great diversity among human beings exists in relation to their grasp of the causal principle, as is maintained by Hume in the *Enquiries*.⁹¹ And not only do differences exist among

⁸⁹ Lorenz writes “one familiar with the innate modes of reaction of subhuman organisms can readily hypothesize that the *a priori* is due to hereditary differentiations of the central nervous system which have become characteristic of the species, producing hereditary dispositions to think in certain forms” (‘Kant’s Doctrine of the A Priori in the Light of Contemporary Biology,’ (1941 / 1962) in *Philosophy After Darwin: Classic and Contemporary Readings*, ed. M. Ruse, New Jersey, Princeton University Press, 2009, p. 231).

⁹⁰ *Prolegomena*, 4:256, p. 6.

⁹¹ Hume accounts for such diversity as follows:

since all reasonings concerning facts or causes is derived merely from custom, it may be asked how it happens, that men so much surpass animals in reasoning, and one man so much surpasses another? Has not the same custom the same influence on all?

We shall here endeavour briefly to explain the great difference in human understandings: After which the reason of the difference between men and animals will easily be comprehended.

human beings in terms of the keenness of their grasp of the causal principle, but it is applied irregularly, different people applying it to differing sets of particulars based upon their own experience, even when it is seemingly unwarranted.⁹²

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1. When we have lived any time, and have been accustomed to the uniformity of nature, we acquire a general habit, by which we transfer the known to the unknown, and conceive the latter to resemble the former. By means of this general habitual principle, we regard even one experiment as the foundation of reasoning, and expect a similar event with some degree of certainty, where the experiment has been made accurately, and free from all foreign circumstances. It is therefore considered as a matter of great importance to observe the consequences of things; and as one man may very much surpass another in attention and memory and observation, this will make a very great difference in their reasoning.
 2. Where there is a complication of causes to produce any effect, one mind may be much larger than another, and better able to comprehend the whole system of objects, and to infer justly their consequences.
 3. One man is able to carry on a chain of consequences to a greater length than another.
 4. Few men can think long without running into a confusion of ideas, and mistaking one for another; and there are various degrees of this infirmity.
 5. The circumstance, on which the effect depends, is frequently involved in other circumstances, which are foreign and extrinsic. The separation of it often requires great attention, accuracy, and subtilty.
 6. The forming of general maxims from particular observation is a very nice operation; and nothing is more usual, from haste or a narrowness of mind, which sees not on all sides, than to commit mistakes in this particular.
 7. We reason from analogies, the man, who has the greater experience or the greater promptitude of suggesting analogies, will be the better reasoner.
 8. Byasses from prejudice, education, passion, party, etc... hang more upon one mind than another.
 9. After we have acquired a confidence in human testimony, books and conversation enlarge much more the sphere of one man's experience and thought than those of another.

It would be easy to discover many other circumstances that make a difference in the understandings of men" (*Enquiries*, H84, p. 107).

Stemming from what has been discussed in this paper, we might also include genetic endowment to Hume's list.

⁹² For example, a person may have experienced a number of traumatic situations in their childhood involving vicious dogs may be fearful of all dogs in adulthood, expecting the next encounter to be uniform with previous ones and hence, developing the habit of deliberately avoiding them altogether, while another person may have experienced similar situations in their childhood, but are a loving dog-owner in adulthood. In the former case, the habit of expecting that the next dog encountered will also seek to bite them has crystallized and hardened, as has the belief that all dogs are vicious based only upon

In painting the general picture of Lorenz's evolutionary neo-Kantian perspective, a loose comparison can be made between a human being having a weak sense of the causal principle and color blindness, in terms of their ramifications for survival in the wild. In the evolutionary past, those human beings and/or their ancestors who were color blind might have had a harder time than the non-color blind in discovering which fruits and foodstuffs were ripe and which were rotten, and they may have had a higher chance of eating the latter, and, as such, might be more susceptible to disease, sickness, and death. As such, being able to see a range of colors is an advantage in the struggle for existence. Of course, as we know today, the human eye does not have the capacity to see the range of colors that many bird species can see. Human beings are trichromates, their retinas containing three types of color receptors, whereas many bird species are tetrachromates, their retinas containing four. Analogously, for Lorenz,

our categories and forms of perception, fixed prior to individual experience, are adapted to the external world for exactly the same reasons as the hoof of the horse is already adapted to the ground of the steppe before the horse is born and the fin of the fish is adapted to the water before the fin hatches.⁹³

In this way, Lorenz emphasizes the biological indispensability of such conceptual structures in a similar manner to the Humean suggestion that there is a substantive survival value attached to guiding one's behavior via our natural beliefs, including in the causal principle *qua* necessary connection, rather than not. For instance, one might claim that life-long smokers who reject the notion that smoking causes cancer, and who continue to smoke, will probably live shorter lives than the average, and may lessen their chance of reproductive success, all other things being considered equal. Yet, at the same time, guiding our behavior with an overemphasis on the causal principle may perhaps equally lead one into abstraction and error, as, for instance, when one commits the *post-hoc, ergo propter hoc* fallacy, and/or into risk-avoidance, excessive worry, and prudishness on the part of the organism, which is also not conducive to its survival. Hume would probably repudiate the habit of construing all of our tragedies as part of God's punishment of us for our sins, as in the Biblical adage that "the wages of sin are death" (Romans 6:23). From an unmitigated Humean

a sample of experiences solidified, while the latter has somehow undone the assumption of the necessity of the connection between encounters with dogs and being bitten.

⁹³ 'Kant's Doctrine of the A Priori,' p. 233. Another loose analogy to solidify how evolutionary Kantianism sees the role of the a priori concepts of the understanding in experience is the finding of neurobiology that the retina sees things upside down, and the brain is wired to turn our perception of the sense data right side up. In similar fashion, the a priori concepts mediate and organize our experience, helping to render it intelligible.

standpoint, not only is there no empirical warrant for the belief that God is the one who causes a person to be punished by diminishing his or her life-potentiality, but there is perhaps no evidence for any necessary causal connection between committing acts that are considered sinful and such life-diminishment.

In *Evolution and the Modification of Behavior* (1965), Lorenz seeks to overcome the discordance between the various epistemological positions (rationalism, empiricism, transcendental idealism), taken in light of evolutionary biology, by arguing that in relation to understanding the organic world, it is a “fallacy”⁹⁴ to simply divide genetically innate concepts and behaviors from learned concepts and behaviors, or those which are the product of experience. As Hume suggested, many non-human animal species have an instinctive sense of cause and effect via experience. For example, this sense of causality or, perhaps more accurately, “proto-causality,” is exhibited when a dangerous predator is present, or after experiencing a particular kind of situation in which it could potentially be harmed. However, the high-level conscious awareness of causal efficacy in the environment that is possessed by human beings may have initially developed as a *habit* of thinking in pre-humans, in the manner consistent with Hume’s account of causality, and at first in relation to life and death circumstances. But over eons of evolutionary time, due to its survival value, it became “genetically assimilated”⁹⁵ via epigenetic processes such that it belongs to the very natures of rational beings. Michael Ruse (1986, 2009), following E. O. Wilson (1983), to some extent, agrees with Waddington that “epigenetic rules,”⁹⁶ namely, “inherited regularities of mental development,”⁹⁷ govern this process, although it must be noted that Wilson largely adheres to the emphasis on “hard inheritance” that was prescribed by the architects of the Modern Synthesis, while Waddington developed and deployed the notion of epigenetics in opposition to it. Daniel Dennett (1991) postulates that the Baldwin Effect is, in part, responsible for the feedback loop between the discovery of a good trick, for example, the natural belief in causality *qua* necessary connection, in the process of adapting to the environment, and the evolution of the brain structures that amplify the ability to perform the good trick.⁹⁸

⁹⁴ Lorenz, Konrad, *Evolution and the Modification of Behavior*, Chicago, University of Chicago Press, 1965, p. 7.

⁹⁵ Waddington, Conrad Hal, *The Nature of Life*, Forge Village, MA, George Allan & Unwin, 1961, p. 93.

⁹⁶ *Philosophy After Darwin*, p. 250.

⁹⁷ Wilson, Edward O., *Sociobiology: The New Synthesis* (25th Anniversary Edition), Cambridge, MA, Belknap Press of Harvard University Press, 2000, pp. vii-viii.

⁹⁸ Dennett, Daniel, *Consciousness Explained*, New York, Little, Brown, and Company, 1991, see pp. 182-208. Dennett writes,

thanks to the Baldwin Effect, species can be said to pretest the efficacy of particular different designs by phenotypic (individual) exploration of the space of nearby

Regardless, one must admit that even contemporary biological science has not provided a complete explanation of how it is that such ideas may become genetically assimilated, and how the medium of language may accelerate the replication of such memes. Furthermore, epigenetics and the Baldwin Effect are still relatively new frontiers that are being explored in biology. That said, evolutionary theorists are certain of the general direction of where the answer will lie, and that it will not involve a return to strong Lamarckism.

Today, evolutionary psychologists and ethologists emphasize that the higher organisms both rely on pre-existing habits of thinking and behavior, namely, on the good tricks which have enabled them to survive, and they modify their habits of thinking and behavior in adapting to their environment. Organisms adapt through the interplay of assimilation, by which they rely on their pre-existing conceptual structures and habits of thought and behavior to make sense of their experience, and accommodation, by which they modify their conceptual structures in the face of challenges and adversities in the environment so as to achieve equilibrium. According to Lorenz, genetically innate, instinctive, fixed, species-specific, or more accurately, *a priori* concepts and behaviors may require a particular type of event, experience, stimulus, or an appropriate environmental condition or situation which triggers a release of information encoded in the organism's genes, prompting the organism to realize the genetically innate concept or to perform the biologically indispensable behavior. Lorenz calls these conditions "releasing mechanisms"⁹⁹ and his position commits him to the notion that ideas and behaviors which are deemed to be genetically innate may be realized or triggered at specific stages in the organism's development, requiring only a prompting or an experience of a handful of model cases in order to procure a realization of the concept or behavior in question. Of course, it might be speculated that there is only a biological capacity to grasp or realize such ideas and behaviors. Regardless of this question, Lorenz's position seems similar to Kant's claim that the *a priori* categories may be derived independently of experience, but that they have a certain "mixed status," namely, they concern

possibilities. If a particularly winning setting is thereby discovered, this discovery will create a new selection pressure: organisms that are closer in the adaptive landscape to that discovery will have a clear advantage over those more distant. This means that species with plasticity will tend to evolve faster (and more "clearsightedly") than those without it (p. 186).

For a comprehensive synopsis of the Baldwin Effect, see Scarfe, Adam, 'James Mark Baldwin with Alfred North Whitehead on Organic Selectivity: the "Novel" Factor in Evolution,' *Cosmos and History: The Journal of Natural and Social Philosophy*, vol. 5, no. 2, 2009, pp. 40-107.

⁹⁹ *Evolution and Modification of Behavior*, p. 48.

experience and objects of experience. As Kant describes, the “first seeds and dispositions” of the transcendental ideas “lie ready” in the understanding “until with the opportunity of experience they are finally developed and exhibited in their clarity by the very same understanding.”¹⁰⁰ Another passage that is suggestive of Lorenz’s releasing conditions, is where Kant writes that in searching for “the occasional causes of the generation ... the impressions of the senses provide the first occasion for opening the entire power of cognition to them and for bringing about experience.”¹⁰¹

Employing a neo-Kantian mode of thinking, Lorenz sees the *a priori* categories as being hardwired in, and/or “burned into the thinking processes”¹⁰² of the rational organism, to differing degrees, in accordance with the unique biological inheritance of each individual. They are enduring structures, having been instilled in us originally through the emergence of indispensable habits of thinking and action in the lives of our ancestors in the evolutionary past, but they are also subject to ongoing evolution and refinement. That is to say, for Lorenz, our biologically inheritable modes of thinking and behavior and/or our conceptual structures may be enduring, but they both had a beginning and are not fixed and final. He argues that there are serious contradictions among them and that they evolve. Logically, here, one might raise the question as to whether postulating that *a priori* categories have been generated by habit and/or can evolve destroys the whole Kantian notion of the categories as self-thought, *a priori* first principles having a purely intellectual origin, belonging as a very condition for the possibility of the experience of rational beings in general, and as neither the product of a process of development, nor subject to one.¹⁰³ A partial response to this lacuna might be to suggest that Kant is in general correct about the *a*

¹⁰⁰ *Critique of Pure Reason*, A66/B91, p. 203.

¹⁰¹ *Ibid.*, A86/B118, p. 220.

¹⁰² Ruse in *Philosophy After Darwin*, p. 252.

¹⁰³ On this note, Lorenz states,

one must realize that this conception of the “a priori” as an organ means the destruction of the concept: something that has evolved in evolutionary adaptation to the laws of the natural external world has evolved a posteriori in a certain sense, even if in a way entirely different from that of abstraction or deduction from previous experience (Kant’s Doctrine, pp. 231-232).

He continues,

our view of the origin of the “a priori” (an origin which in a certain sense is “a posteriori”) answers very fittingly Kant’s question as to whether the forms of perception of space and time, which we do not derive from experience (as Kant, contrary to Hume, emphasizes quite correctly) but which are a priori in our representation ‘were not chimeras of the brain made by us to which no object corresponds, at least not adequately’ (Prolegomena)” (p. 233).

priori nature of the concepts of the understanding, but he was writing well before Darwin, whose theory of evolution by natural selection had colossal ramifications for metaphysics, epistemology, and ethics that he could not have envisioned. As Nietzsche recognized after Darwin, language, knowledge, religion, science, technology, morality, and even the concept of the truth had to be interpreted as chance inventions of nature, namely, as random products stemming from biological processes over eons of evolutionary time. In this way, to make Kant's appeal to *a priori* concepts of the understanding more relevant after Darwin, biological theory providing a plausible explanation of the origin of such concepts, his philosophy would do well to be adapted to modern biology, the latter being the basis of Lorenz's project. Hume's claim that the concept of causality *qua* necessary connection is indispensable in that it has survival value, as well as his account of causality via the notion of a perceived regularity of accompaniment of like As and Bs are not to be jettisoned here, as they offer insight as to how such a notion as causality might have originally been generated as a habit of thinking in the minds of our ancestors in the evolutionary past, consistent with the biological interpretation.

The interpretation that a sense of causality *qua* necessary connection has been assimilated and become a biologically inheritable trait provides a plausible background for explaining the extrapolative leap from the recognition of a perceived regularity of accompaniment between like As and Bs to a determination of causality *qua* necessary connection. Certainly, Kant might suggest that to be a rational being requires the possession of the *a priori* categories in one's very nature, and that a being is either rational or is not. But considering that biology studies life in all of its manifestations, evolutionary theory is finding that it is very tough to draw such strict and fixed lines around organisms, groups of organisms, their capacities, and the mechanisms underlying biological processes. Also, a human being is not an entirely rational creature, and there are gradations of rationality. Not only is the very definition of rationality a fleeting one, but as Alfred North Whitehead says, "it is said that 'men are rational' ... this is palpably false: they are only intermittently rational—merely liable to rationality."¹⁰⁴ And the mechanistic viewpoint which biology embraces in its very methodology is to some extent divorced from what biology exactly studies: life. One might further ask here: are not Hume's skeptical arguments about causality *qua* necessary connection rational? In any event, it would suffice to say that reason cannot be divorced from biological explanation.

¹⁰⁴ Whitehead, Alfred North, *Process and Reality: Corrected Edition*, New York, The Free Press, 1929 / 1978, p. 79.

Given the Humean claim that the concept of causality *qua* necessary connection is a biologically indispensable habit of thought, although one which is not empirically warranted, to conceive that certain Bs will necessarily succeed from As, and to guide one's actions accordingly, what needs further clarification here is in what respect does such an operation of thinking confer a survival advantage, in contrast to doing so on the basis of perceptions of regularities of accompaniment between like As and Bs. That is to say, regardless of the epistemic abstractions pertaining to the notion of causality *qua* necessary connection that Hume has identified, why exactly would the leap toward a natural belief in causality *qua* necessary connection, and in certain circumstances, of guiding one's actions in accordance with assumptions of strict causal rules and laws, rather than by way of perceptions of regularities of accompaniment between like As and Bs improve the possibility of survival and of reproductive success? Beyond the question of how causality *qua* necessary connection renders the experience of rational organisms possible, one might suggest that the natural belief in causality *qua* necessary connection and the capacity of guiding our actions by way of strict causal rules and laws grounds both knowledge of the world and practical wisdom, provides clear advantages for problem solving, for setting and accomplishing goals, for knowing how to satisfy biological needs and desires, for predicting consequences, for warning others and heeding warnings about environmental dangers (e.g. poisonous organisms, harsh weather, etc...), for instrumental thinking, and for procuring resources from the environment. It may facilitate in relation to establishing norms and a common sense of morality, and social and group cohesion, which endows rational organisms with a multitude of additional survival advantages. The concept of causality *qua* necessary connection may also be examined in respect to whether it facilitates the upbringing of children, which requires order, structure, clarity, and fixed and coherent explanations about the how the world operates. On the contrary, guiding one's actions via perceived regularities of accompaniment of like As and Bs, and in assumptions of probability rather than in presumed necessities (of grey rather than of black and white) in various situations, might heighten the risk of injury or death. Furthermore, it would be safe to suggest that assumptions of necessity are more conducive to taking action than probabilities or mere possibilities. And in various circumstances, regardless of the epistemic problems surrounding the assumed certainty that is involved in the former, the clarity of causal judgments *qua* necessary connection might also make a more efficient use of "brain power" than mitigating our behavior by way of more nebulous way of thinking involved in the latter. Just as Hume realized that although the empirical concreteness of the concept of causality *qua* necessary connection is, indeed, misplaced, his lacuna revealing the finitude and

the limitations of humanity's reasoning power, the concept causality *qua* necessary connection is biologically indispensable, for Lorenz humankind preserves itself and "lives by the function of the innate category of causality"¹⁰⁵ *qua* necessary connection. Not only is stamping certain perceived regularities of accompaniment with the character of causality *qua* necessary connection a curious habit of thought, as Hume has described, but habits of thought and behavior, upon which survival and well-being seemingly depend, revolve around making determinations of necessary connection between like As and Bs. For purposes of length, a more detailed analysis of the relation between the processes of habit formation in organisms and making determinations of necessary connection, which will draw on the evolutionary psychology of James Mark Baldwin (1861-1934),¹⁰⁶ shall have to be left to a future paper.

It must be noted that Lorenz's evolutionary neo-Kantianism, as expressed in his essay on the nature of the Kantian *a priori*, offers a far from detailed, scholarly interpretation of Kant's overall philosophy, which he attempts to adapt to evolutionary biology. However, Lorenz's evolutionary account does provide a plausible, coherent, easy-to-grasp, and novel way to understand the Kantian system in a manner that synthesizes it with Hume's philosophy into a coherent whole, and renders it relevant to contemporary perspectives. Providing that we, in general, agree with Lorenz's evolutionary reading of Kant, and that we agree that the *a priori* categories have a certain endurance and/or stability as habits in the natures of rational beings, yet are changeable and can evolve as consciousness develops (which Kant himself would be reluctant to accept), it is my contention that Hegel's placement of emphasis on the ongoing progression of the logical Concept (*Begriff*) in accounting

¹⁰⁵ 'Kant's Doctrine of the A Priori,' p. 244.

¹⁰⁶ In Baldwin's analysis, novelty in terms of the behavior of organisms is due to the interaction of habit and accommodation, which are active functions of mentality. As he explains,

a mental organism is subject, at any stage, to ... Habit and Accommodation ... Habit represents what is congenital with what it tends most naturally to do, under the guidance of experiences up to date. Accommodation represents the degree of openness or adaptability, in giving the new reactions, which new stimulations or arrangements of stimulations call upon it to make" (Baldwin, James Mark, *Mental Development in the Child and in the Race: Methods and Processes*, New York, The Macmillan Company / Kessinger Publishing, 1894 / 1906, p. 366).

Since habit "is the tendency of an organism to continue more and more readily processes which are vitally beneficial" (p. 452), conformity to habit, in general, can preserve an organism, under "ordinary" circumstances. Under conditions in which organisms are subject to severe selection pressures, as in moving into a new territory, they may need to break up previous habits and to embrace new behaviors and means of life, for example, hunting for different prey in water rather than on land.

for how the concepts of reason are dialectically generated, and crystallize in the understanding; namely, aspects of his system of Absolute Idealism, can facilitate Lorenz's evolutionary interpretation of Kant's *a priori* categories. This thesis may seem surprising, given that Lorenz argues that the *a priori* categories are enduring yet changeable. But as will be shown, to suggest that Hegel's Absolute is absolute in the sense of fixed, final, and/or eternal, comes as the product of a failure to understand its nature. However, before attempting to integrate aspects of Hegel's system of Absolute Idealism, and most importantly the dialectical generation and crystallization of the categories, into Lorenz's neo-Kantian evolutionary epistemology, first, I shall outline Hegel's response to Hume's skepticism concerning causality.

V. HEGEL'S RESPONSE TO THE UNMITIGATED HUMEAN SKEPTICISM CONCERNING CAUSALITY

G. W. F. Hegel considered the challenges of Ancient skepticism, with its destructive equipollence method, more daunting than those of Modern skeptics, including, in his assessment, figures like Hume and Schulze.¹⁰⁷ He also downplayed Hume's contribution to philosophy, suggesting that it "has been given a more important place in history than it deserves" and that "its historic importance is due to the fact that Kant really derives the starting point of his philosophy from Hume."¹⁰⁸ However, a considerable portion of Hegel's metaphysical analyses of causality in the *Science of Logic* (1812-1816) and in the *Encyclopedia Logic* (1830) can be read as an indirect response to the Humean lacuna concerning causality, and Kant's reply. For Hegel, the dialectical progression of the logical Concept (*Begriff*), which, for Hegel, is the motive force in the development of consciousness, pervades the notion of causality *qua* necessary connection in four interconnected ways.

First, in response to Hume's claims that there is nothing that one could point to in experience that is representative of necessary connection between putative causes and effects, and that the mind imposes the notion of necessary connection onto reality, Hegel believes that the causal principle is not merely a product of human subjectivity. Rather, it belongs to how objective states of affairs determine themselves. In Hegel's system, not only is the rational identical with the real, but concepts such as causality

¹⁰⁷ See Hegel 1985; Hegel 1931 / 1991; Forster 1989. Here it is to be qualified that in the *Enquiries* (pp. 149-165) Hume admits that his own skepticism of causality may be seen to lead logically to the excessive skepticism of the Ancient variety, but he argues against the latter.

¹⁰⁸ Hegel, Georg Wilhelm Friedrich, *Lectures on the History of Philosophy* (Vol. 3), eds. E. S. Haldane and F. H. Simson, New Jersey, The Humanities Press, 1805-06 / 1983, p. 269.

belong neither one-sidedly to subjectivity, nor to objectivity. Rather, for Hegel, the content of causality is both subjective and objective. Hegel writes that as regards

two events as standing to one another in the relationship of cause and effect; what is perceived here is the two isolated events, which succeed one another in time. But that one is the cause and the other is the effect (the causal nexus between them) is not perceived; on the contrary, it is present merely for our thinking. Now, although the categories (e.g. unity, cause and effect, etc...) pertain to thinking as such, it does not follow from this that they must therefore be merely something of ours, and not also determinations of objects themselves.¹⁰⁹

So, while Hegel agrees with Hume that necessary causal connections are not perceived, he feels that this does not warrant the latter's conclusion that the concept of causality is, one-sidedly, the product of thought and subjectivity. Hegel is open to the idea that the proto-objects, which are constituted as objects via the *a priori* concepts of the understanding, "lend" themselves to the manners in which human beings conceive of them, for instance, as causally related to one another, causal efficacy being a part of the very fabric of the objects or substances that we cognize in experience.

Second, according to Hegel, drawing from Fichte's *Foundations of Transcendental Philosophy* (1796 / 1799),¹¹⁰ the notions of substantiality and causality stand together in

¹⁰⁹ Hegel, Georg Wilhelm Friedrich, *The Encyclopedia Logic*, trans. T. F. Geraets, W. A. Suchting, and H.S. Harris, Indianapolis: Hackett, 1931 / 1991, §42Z3, pp. 85-86.

¹¹⁰ Here, Fichte elucidates the relationship of the concepts of substance and causality, stating,

substantiality cannot be thought of apart from causality, nor can causality be thought of apart from substance. {Admittedly, from Kant's account of these it might seem as if this were possible. This is why Platner (1793) asked how substantiality could exist without causality.} An accident is never anything other than a determinate expression of the inner force, and hence [an instance of] the efficacy of the latter. Substance would be the power to act efficaciously, a power that is always considered capable of producing a variety of different effects. Conversely, efficacy cannot be thought of except in relation to some {inner} force, and the force in question is identical to the innermost core of substance itself. {There is thus no causality apart from substantiality.} The synthesis of these two categories {of causality and substantiality} is the category of reciprocal interaction, which is based upon the necessity of deriving the external power from the pure power, and vice versa. Reciprocal action is the category of categories. Substantiality and causality are coordinated with each other, but both are subordinate to the category of reciprocal interaction. {Everything proceeds from the category of reciprocal interaction. According to what was said above, our every act of thinking of anything is an act of thinking of reciprocal interaction and interrelations} (pp. 421-422).

their mutual dialectical requirement. That is to say, the notion of causality presupposes the concept of substance and vice versa. As Hegel writes, “substance is relationship (of causality) in the most proper sense ... substance is cause”¹¹¹ in so far as “the relation of substantiality passes over into the relation of causality.”¹¹² The concept of causality not only represents how substances are active in deploying or in transferring their variable accidents to other substances, as for example, in the case of rain causing a person’s wetness, or in the case of a red pigment causing something to be colored red, but it is also a function of the self-determination of substances in general. Hegel points out how a substance, defined by Aristotle as a unity of form and matter, by Descartes as that which depends only upon itself in order to exist, and/or by Spinoza as a unity of thought and extension and as that which is the cause of itself, determines itself in its independence over against another through the causal relation. A thing comes into its own being (*qua* “power”) as a substance via the causal process, the mark of a substance, for Hegel, Plato, and Leibniz, being its causal power. Substances are substances precisely because they cause, occasion, produce, or work on, effects, namely, they have the power or capacity to affect and/or to be affected. As the Visitor from Elea suggests in Plato’s *The Sophist*,

I suggest that anything has real being that is so constituted as to possess any sort of power either to affect anything else or to be affected, in however small a degree, by the most insignificant agent, though it be only once. I am proposing as a mark to distinguish real things that they are nothing but power.¹¹³

In the causal relationship, the substance that is the putative cause occasions, produces, or works on the effect, determining itself as cause and as substance, precisely through the process of occasioning, producing, or working actively on the effect. However, Hegel describes that in the causal process the active substance that is the cause is sublated in the effect. Even a passive effect is a substance determining itself, as for instance, in relation to a thing produced with reference to its formal, material, efficient, and final causes, substantiality and causality being considered here as metaphysical correlates. In relation to this distinction between active power and

It is clear that Fichte’s notion of causality as “reciprocal interaction” here, which Hegel develops fully in the *Logic*, has its origin in Kant’s notion that “all substances, so far as they are simultaneous, stand in thoroughgoing community (i.e., [reciprocal] interaction with one another),” as articulated in the second edition of *The Critique of Pure Reason*, A211/B256, pp. 216, my addition.

¹¹¹ *Encyclopedia Logic*, §152, p. 227.

¹¹² Hegel, Georg Wilhelm Friedrich, *Science of Logic*, trans. A. V. Miller, New York, Humanities Press International, 1969, p. 557.

¹¹³ Hamilton, Edith and Cooper, Lane, (eds.), ‘Plato’s Sophist,’ in *The Collected Dialogues of Plato*, New Jersey, Princeton University Press, 1973, section 247e.

passive power, which is also present in Locke's *Essay Concerning Human Understanding* (1689), Hegel writes that the effect is "another substance present, upon which the cause happens to work."¹¹⁴ As itself a substance, the effect

sublates the activity of the first substance; but the first substance is likewise this sublation of its immediacy or of the effect posited in it, so that it sublates the activity of the second, too, and reacts. As a result causality has passed over into the relationship of reciprocal action.¹¹⁵

Thus, for Hegel, the dialectic pervades the interaction of cause and effect. A cause, in producing its effect, is sublated, namely, it is "surpassed while maintained"; it is "cancelled," "preserved," and "raised up," thereby determining itself as a substance. The cause produces its effect in a determinate manner, yet it is finite, because inasmuch as the cause and the effect are representative as two independent substances, the first substance's determination as a cause is sublated, or extinguished in the process of producing its effect. Hegel states, "the cause has its substantial actuality only in its effect; [but] when this is sublated, its causal substantiality is sublated."¹¹⁶ Not only does the cause produce its effect, but it is only in virtue of the production of the effect that the first substance may be considered a cause. At the same time, it has its causal substantiality sublated through the causal process. Hegel insists that the effect is equally the cause of the resulting state of the first substance as cause, although for him, it is fallacious for the mind to dwell in a spurious infinite series of causes and effects. Instead, Hegel depicts causality as involving a process of reciprocal action, in which putative causes and effects, both substances, are considered equally determinate, each sublating the other, as in a symmetrical relationship. The notion of reciprocal action implies that the causal process is not an asymmetrical one, in which a cause merely produces an effect and determines itself in its substantiality, but that there is also a converse dialectical movement of passing over from the effect to the cause, which is at the root of the notion of necessary connection. For Hegel, a cause and an effect are engaged in a symmetrical relationship, the one acting on the other and being acted on by the other in the causal process. In addition, as he recounts, there is nothing in the cause that does not belong equally to the effect, and vice versa. As such, while thinking holds the two substances apart, the cause and the effect, it connects them together are in the relationship of causality. While for Hegel, the concept of reciprocal action is the truth of causality, namely, it is that which grounds the notion that the cause and the effect are bound together necessarily,

¹¹⁴ *Encyclopedia Logic*, §154, p. 229.

¹¹⁵ *Ibid.*, p. 230.

¹¹⁶ *Science of Logic*, p. 568.

in grasping the dialectic of causality, the notions of cause, effect, and reciprocal action, Hegel points out that they form a triad, the dialectical progression of the logical Concept (*Begriff*) having primacy over them.

The mutual sublation of the two substances—the cause and the effect—as represented by the notion of reciprocal action, points to Hegel’s claim that whatever is determinate is finite, and hence, determinate substances are finite substances. Essentially, coinciding to a certain extent with the passage from *The Sophist*, for Hegel, *causality is the negative moment belonging to substances in their finite self-determination*, the intrinsic relationship between the concepts of causality and substance having been originally indicated in Kant’s *Critique of Pure Reason*. As Hegel states, causality is “the negative relation of substance to itself,”¹¹⁷ not only pointing to the notion that particular substances are sublated in the causal process, but that substantiality, as a metaphysical concept, requires the notion of causality and vice-versa, these two concepts being dialectically generated out of one another, and synthesized in experience. Hegel’s analysis suggests that through the process of their mutual sublation via the causal process, substances are not as metaphysically distinct, self-contained, fixed, static, and dependent on themselves, as for example, postulated by Descartes. And it may be charged that Hume assumes a substance metaphysic when he attempts to explain the origin of the concept of causality, although admittedly, elsewhere in his writings, Hume questions the whole notion of a substance. Overall, Hegel’s analysis of causality serves to show how the dialectic, or more accurately, the logical Concept (*Begriff*) pervades the conceptual and objective grounds of the triad of substantiality, causality, and reciprocal action.

A third point to be made in respect to Hegel’s response to Humean skepticism of causal relations involves the notion that the metaphysical notion of substantiality is implicit in the notion of causality. In order to posit a causal relationship, to some extent, putative causes and effects must be conceived of as distinct substances, isolated or separated off from one another, but necessarily connected to each other. While objects of experience lend themselves to the substance concept, and while rational beings make use of the category of substances in constituting their experience, to a certain extent, the notion of a substance is an abstraction. To be sure, in immediate perception, the world is not primitively divided. Rather, from a “purely empirical perspective,” if one were even possible, it may be said that, in primitive experience, the world has the character of spatio-temporal extension that is a potentiality for division.¹¹⁸ Therefore, in response to Hume’s skeptical claim that there is no

¹¹⁷ *Science of Logic*, p. 558.

¹¹⁸ It must be remarked that of course concepts are being prescribed to experience here.

impression of any *necessary connection* that binds any putative cause to its effect, it is just as true to say that there is no perception of a *necessary separation* between them. This dialectical response to Hume's skepticism concerning causality would seem to issue directly from Hegel. Surprisingly, however, it is Kant who makes this claim.

In the *Prolegomena*, in attempting to "dispose thoroughly of the Humean doubt"¹¹⁹ Kant mimics what he feels are Humean pretensions to a "purely empirical perspective," in order to undercut the latter's skepticism of causality *qua* necessary connection. Kant states we have "no insight ... into how substances, each of which has its own *separate* existence, should depend on one another, and should indeed do so necessarily." Kant continues, writing in an ironic tone, "I do not have the least concept of such a *connection* of things in themselves, how they could exist as substances or work as causes or be in community with others ... for I have no concept of the possibility of such a *connection* of existence."¹²⁰ Again, his point here is to suggest that Hume's skeptical descriptions of the origin of the causal principle presuppose the prescription of *a priori* concepts to experience, and that he cannot somehow escape such concepts to experience something "more real." It must be remarked that Kant's dialectical opposing of the notion of *necessary connection* with that of *necessary separation* to respond to Hume resembles the equipollence method of the Ancient skeptics, in which all truth claims which are articulated are immediately contradicted, leading to a suspension of judgment. For the Ancient skeptics, the result of the dialectic is then taken as an empty negative, the skeptic being able to repose in unperturbed tranquility (*ataraxia*). And it was precisely this empty negative that Hume thought quite objectionable in the Pyrrhonian skepticism, and lead him to claim that "all human life must perish, were [the skeptic's] principles universally and steadily to prevail,"¹²¹ putting him on track to adopt a more mitigated skepticism. But for Hegel, as opposed to the Ancient skeptics, the dialectic does not merely have a negative result. Rather, the dialectic belongs to the process by which thought works out what is true, with possible reference to contradictory assertions about what caused an effect. Hegel's dialectical analysis of the relationship between substantiality and causality, which has been outlined above, offers a partial resolution to the dialectical tension, as alluded to by Kant, between the apparent connection of existence and the division of extension into isolated substances. Determinations of necessary causal connections imply a particular relation between substances, which is distinct from the merely primitive relatedness, or more accurately, the primitive undividedness, that is implied

¹¹⁹ *Prolegomena*, §27, 4:310, p. 63.

¹²⁰ *Prolegomena*, §27-28, 4:310-311, pp. 64-65, my emphasis.

¹²¹ *Enquiries*, H128, p. 160.

in the notion of extension. Accordingly, from a Hegelian point of view, the process by which thinking makes determinations of causal relations can be said to involve a dialectical movement, from the primitive connectedness of extension to the division of extension, in which substances are considered separate and distinct, and finally, to the necessary causal connection of the “separate” substances, namely, of the putative cause and the effect.

Fourth, in the *Encyclopedia Logic*, Hegel distinguishes between three moments constituting the dialectical form of the logical Concept (*Begriff*): that of the understanding; the skeptical moment, and the speculative moment. His intent here is to provide a general description of the process of thinking, by which the concepts of reason (e.g. being, finitude, the one, cause, quality, action, and so on) are generated and deployed in synthetic relation to their opposites (e.g. nothing, infinitude, many, effect, quantity, reaction, and so on), and by which the truth is worked out in respect to any controversy. Hegel associates the understanding with moments of thinking in which finite, abstract, one-sided determinations, concepts, hypotheses, and truth claims are deployed. The skeptical moment is represented as the negatively dialectical moment in which the one-sided determinations and concepts of the understanding overturn into their respective opposites and/or are contradicted by an equal and opposite claim or concept, as in the equipollence method of Ancient skepticism. Here we might recall Hume’s statement in the essay, “On the Immortality of the Soul” that “it is an advantage in every controversy to defend the negative”¹²² as commensurate with the dialectical moment, and it is such skepticism that can motivate inquiry. Hegel states that the “dialectic is often (considered to be) no more than a subjective seesaw of arguments that sway back and forth,”¹²³ but he goes to great lengths to show that “the dialectical constitutes the moving soul of scientific progression ... [and] is also the soul of all genuinely scientific thought.”¹²⁴ One might implicate the tension between Hume and Kant in relation to the nature of the notion of causality, which is the theme of this paper as evidence for Hegel’s claim of the priority of the dialectic over one-sided determinations.

The third moment of the logical Concept is the speculative moment. It involves the working out of the opposition between the determinations, concepts, hypotheses, and truth claims of the understanding and their skeptical or negatively dialectical counterparts. The speculative moment involves “the apprehen[sion of] the unity of

¹²² Hume, David, ‘On the Immortality of the Soul,’ in *Selected Essays*, eds. S. Copley and A. Edgar, New York, Oxford University Press, 1993, p. 331.

¹²³ *Encyclopedia Logic*, §81, p. 128.

¹²⁴ *Ibid.*, pp. 128-129.

the determinations in their opposition.”¹²⁵ The speculative moment is the moment of synthesis, namely, of thinking the “unity of distinct determinations.”¹²⁶ The speculative moment may involve the realization that contradictory determinations and opposed concepts stand together in mutual dialectical requirement, just as has been alluded to in this paper, that the evolutionary interpretation of the Hume-Kant debate over the nature of concept of causality shows them to overlap such that they may be brought together in coming to a novel understanding of this topic. The synthesis of opposed determinations is not always, for Hegel, to be thought of as simplistic, neat, and symmetrical in nature. In fact, the result of the dialectic might be quite complex, messy, and one-sided. The speculative moment involves the mature concurrence of all the relevant knowledge and evidence surrounding a particular controversy, the possibility of arriving at the truth via inquiry into the veracity of competing claims, and the potential working out of the tension between opposed determinations and concepts. As such, in Hegel’s view, the dialectic does not end in nullity or in a suspension of judgment in respect to competing claims as to what is true. Stemming from his description of the form of the logical Concept (*Begriff*), Hegel’s “overcoming” of skepticism equally involves a preservation of it, for, in Hegel’s system, the negatively dialectical or skeptical moment can be described as the dynamic motivating element in the progress of thinking. In relation to hypotheses involving causal relations that are found in the natural sciences, for example, the claim that the large-scale burning of fossil fuels on the part of human beings is the chief cause of global warming, or that the current deficiency of phytoplankton in the oceans is caused by global warming, skepticism can be said to present a challenge which motivates scientists to ensure that their claims are fully corroborated by the evidence and to eliminate unsound hypotheses through ever more precise inquiry.

VI. INTEGRATING ASPECTS OF HEGEL’S SYSTEM OF ABSOLUTE IDEALISM INTO LORENZ’S NEO-KANTIAN EVOLUTIONARY EPISTEMOLOGY TO ACCOUNT FOR THE ONGOING PROCESS OF DEVELOPMENT IN RELATION TO THE CONCEPTS OF THE UNDERSTANDING

Returning to the previous discussion of the evolutionary significance of the concept of causality and other Kantian categories, it must be reiterated that Hume’s and Kant’s respective epistemological analyses of causality, as well as Hegel’s system of Absolute Idealism are historically pre-Darwinian. It is safe to say that Hegel and Darwin are

¹²⁵ Ibid., §82, p. 131.

¹²⁶ Ibid.

not generally considered to be ideal dancing partners. On the one hand, while Hegel was probably very familiar with Lamarckism, in an addition in his *Philosophy of Nature*, he was highly critical of the evolutionary notion of “species developing successively, one after the other, in time”¹²⁷ for the purely philosophical reason that he thought that imagining the chronological progression of the series of forms did not truly explain each form’s emergence. This comment might be viewed as a statement that teleology is missing from the mere chronological succession. On the other hand, contemporary evolutionary science does not look favorably on speculative metaphysical edification of the type that Hegel engaged in. It does not look favorably on the latter’s attempt to provide proof of the notion that the logical Concept (*Begriff*) pervades nature, nor does it welcome Hegel’s emphasis on teleology in nature, something which is generally repudiated by today’s mainstream biology, which favors empirical analysis of phenotypic change over time, as well as indeterminacy, randomness, and contingency in the evolutionary process. Nevertheless, as I intend to show in this section, Hegel’s emphasis on the dialectic, by which the concepts of the understanding undergo a process of development in the minds of rational beings, does serve to facilitate Lorenz’s evolutionary neo-Kantian position, which may be said to bring aspects of the positions of both Hume and Kant together.¹²⁸ Of course, as an evolutionary

¹²⁷ Hegel, Georg Wilhelm Friedrich, *The Philosophy of Nature*, trans. A. V. Miller, Oxford, Clarendon Press, 1970, §249Z, p. 20.

¹²⁸ In explaining the aim of Hegel’s *Phenomenology of Spirit* (1807) to hasten the realization of the dialectical process at the root of thinking as human consciousness experiences the world, Weiss (1974) makes an interesting connection between Hegel and biology, stating,

we might ... attempt to clarify one very important issue that is most likely to be problematic for the student approaching Hegel’s *Phenomenology* for the first time, and this is the relation between the single consciousness and universal mind. Perhaps the easiest way to grasp this relation is to employ an analogy from current biological theory. The development of the single consciousness may be said to be related to that of the universal mind in the way that ontogenesis (the history of the individual development of an organized being) is believed to be related to phylogenesis (the history of the group or species of which the individual is a member). In biology, most of the evidence for phylogeny is afforded by ontogeny. Individuals of different species are quite diverse in their adult stages; but they appear very like in most of the preadult phases of embryonic development. Hegel would say that this concept of the biologists who associate phylogeny and ontogeny illustrates, rather naively, the objectivization of thought processes. Thought is read into the geological record and into the embryological record, and the objectified thought—that projected thought—is taken for a mass of facts from which to induce the thought of an evolution of the species or universal, which is recapitulated in the development of the individual.

psychologist and ethologist, Lorenz's work focuses on what may be called "ethotypic"¹²⁹ selection and change over time, involving the structures of mind and behavior, in abstraction from what most evolutionary biologists and geneticists study, namely, "phenotypic" and "genotypic" selection and change over time. So, perhaps it is not so preposterous to bring Hegel into our discussion of evolutionary epistemology after all, providing we make such a distinction.

Drawing from Kant's Third Critique, near the end of the *Science of Logic*, Hegel emphasizes how rational organisms proceed through a teleological process to a realization of the Absolute Idea, organic teleology (i.e. life) being a state-of-affairs that has been rendered possible and has emerged as a result of the grounding conditions provided by mechanical / physical and chemical aspects of the world.¹³⁰ Regardless of the controversy of whether any form of teleology, involving appeals to final causation, is commensurate with contemporary evolutionary biology,¹³¹ the accomplishment of purpose by the determinate living, rational organism and/or substance, for Hegel, is itself a causal process. Through purposive activity, whether or not the rational organism is instrumentally setting up a herd of bison to be run off of a cliff, persuading someone to marry them, or writing a novel, it brings about some change of state of affairs in the world, which reciprocally affects him or her. Purposive activity

This inducing of an evolutionary thought that has been projected is fraught with epistemological difficulties which the naturalist can avoid only by ignoring them. But, if the naturalist can understand that the universal pattern of biological development is recapitulated in each individual animal or plant, he should have no difficulty in understanding what Hegel means when he says that the individual consciousness, on each of the historical levels of human intellectual development, recapitulates the universal development of experience up to his time. The forms of consciousness traced in the Phenomenology are thus a sort of geological record, on each level of which are found the fossils of once-living organisms, each of which was a living whole, but a whole which was to become a part of the "whole" of the next level. This does not, of course, imply steady, linear progress. Even phylogenetic evolution recognizes retrograde development, degeneration or degradation...

Hegel remarks elsewhere that the diversity of the historical record of experiences must not be regarded as fixed and stationary, and composed of what is mutually exclusive; the differences are thoughts, and the various levels, frozen or petrified biographically, like fossils, constitute a development. What that development was like we can see by examining our own individual intellectual development (pp. 39-41).

¹²⁹ Ricklefs, Robert, 'Structures and Transformation of Life-Histories,' *Functional Ecology* 5, 1991, p.174. Ricklefs defines the term "ethotype" as "the behavior, including physiological processes, of the organism."

¹³⁰ See Kisner (2008) for an account of Hegel's non-reductionistic concepts of mechanism and of chemism.

¹³¹ See Weismann 1882; Bergson 1911; Jonas 1966; Dennett 1995, etc...

is both caused and implies a causal process, a point that Lorenz takes into account in *On Aggression* (1963), where he writes,

the appreciation of the fact that life processes are directed at aims or goals, and the realization of the other fact that they are, at the same time, determined by causality, not only do not preclude each other but they only make sense in combination. If man did not strive toward goals, his questions as to causes would have no sense; if he has no insight into cause and effect, he is powerless to guide effects toward determined goals, however rightly he may have understood the meaning of these goals.¹³²

Lorenz is open to ethologists and to evolutionary psychologists providing causal physiological explanations of animal behavior, and in fact provides his own examples in respect to the underlying causes of aggression, although those who undertake this form of analysis ought to be careful of the dangers of anthropomorphic abstraction.

The accomplishment of purpose in actuality (which involves the causing of an effect), for Hegel, implies a realization of the Absolute Idea, which is representative of a mature comprehension of the ongoing dialectical progression of the logical Concept (*Begriff*). While what he calls “the Idea” is the “*Subject-Object, ... the unity of the ideal and the real, [and] of the finite and the infinite,*”¹³³ the Absolute Idea is the recollected Idea. The Absolute Idea is representative of the mature development of novel conceptual structures via the dialectical process, and/or a state of non-regression that is attained in the accomplishment of any purpose or discovery of any new truth. According to Hegel, there is no “passing-over within (or overturning of) the Absolute Idea,”¹³⁴ namely, the ‘marks’ on human consciousness left by the novel conceptualities involved and/or the truths that are grasped cannot be further overturned, for example, by skepticism, and/or sublated. Rather, the realization of the Absolute Idea is both a byproduct of a process of development and is representative of ineradicable developments in the immortal past. However, Hegel’s Absolute differs from the autonomous emergence and absoluteness of the Kantian categories chiefly by the former’s explicit reference to the notion that the infinite realization constituting the Absolute Idea results from the dialectical process, involving determinate negativity and the mutual sublation of finite moments, of which it reflects the whole. Hegel’s opaque descriptions of the Absolute Idea, however, blur the distinction between the organism’s striving to satisfy biological needs and appetites in the struggle for survival and the rational organism’s quest for truth, rendering these inseparable, which may

¹³² Lorenz, Konrad, *On Aggression*, Orlando, FL, Houghton Mifflin Harcourt Publishing Company, 1963 / 1966, p. 231.

¹³³ *Encyclopedia Logic*, §214, p. 288.

¹³⁴ *Ibid.*, §237, p. 303.

be seen to facilitate the integration of the German Idealists with Darwin, Nietzsche, and contemporary evolutionary theory.

To get a sense for what Hegel means by the realization of the Absolute Idea as a product of the dialectical process, one might postulate an analogy to Darwin's *The Origin of Species* in which the theory of natural selection as the chief *efficient cause* of morphological evolution is advanced. Darwin's theory of natural selection was generated through the concurrence of Darwin's experiences on the Beagle, his appropriation of prior biological theories and understandings of the human condition (e.g. Malthus' *Essay on the Principle of Population*), the pressure placed on him to publish by Wallace's 1855 essay "On the Law Which Has Regulated the Introduction of New Species," Darwin's weighing of the evidence for this theory, the resulting dialectical see-saw of ideas in Darwin's mind, his authoring of *The Origin of Species*, the reception and debates surrounding it over the next fifty years, etc... to name just a few factors leading to the theory becoming a central, ineradicable piece of the canon of modern biology and of human culture. While the theory of natural selection may be criticized, denied, refined, or otherwise viewed skeptically, or provide the grounding conditions for the advancement of new understandings and theories, it has identified the chief efficient cause of morphological evolution, and has become an enduring, and largely ineradicable, part of the history of modern biology, namely, to be reckoned with by anyone who wants to understand this domain of thought. In the same sense, the realization of the Absolute Idea involves the mature comprehension that although such novel conceptual structures and truths are enduring and largely ineradicable, they can be refined, and new concepts and truths can be arrived at. The process leading to a realization of the Absolute Idea involves thought working out contradictions between ideas and hypotheses, confirming or disconfirming them in terms of whether they correspond with the real, and arriving at a dialectical unity of subject and object, the ideal and the real, and of the finite and infinite.¹³⁵

Analogously, in this respect, from a Hegelian point of view, no matter how habitual the concepts, categories, and structures of thinking that are developed by rational organisms become in respect to the ways that they constitute their experience, how necessary they seem to be for the purposes of survival, and/or how influential they become in grounding their behavior, they are generated, become solidified, evolve, and are refined through the dialectical process. For Hegel, the Absolute Idea is not representative of a dogmatic, fixed, and final end point of all thinking. On the contrary, the realization of the Absolute Idea involves a reference to all of the finite moments that lead up to arriving at a novel concept, insight, or

¹³⁵ Ibid., §214, p. 288.

solidified truth, as well as to the possibility of the refinement of the novel concept, insight, or truth. As he writes,

when the expression ‘absolute idea’ is used, people may think that it is only here that we meet with what is right, that here everything must be given up. It is certainly possible to sing the hollow praises of the absolute, far and wide; in the meantime, its true content is nothing but the entire system, the development of which we have been considering so far.¹³⁶

The analogy to the theory of natural selection is not meant to imply that it is possible for a complex theory of this type to be genetically assimilated by members of the human species. Rather, it must be learned anew by each individual, although considered as a reflection by an organism on the conditions of its own existence, a realization of some of the ramifications of the theory of natural selection will certainly prove advantageous in life.

Hegel’s emphasis on the ongoing dialectical progression of the logical Concept (*Begriff*), which is the vital force in the development of consciousness, namely in the process by which thinking generates novel conceptual structures and by which they evolve and crystallize, deviates from the Kantian position which seemingly holds that the *a priori* categories are fixed conceptual structures belonging equally and uniformly to all rational beings. Hegel’s standpoint, which has its origin in the Kantian critical philosophy, provides a picture of the *a priori* categories can be integrated with Lorenz’s neo-Kantian evolutionary epistemology, so as to preserve the view that the concepts and structures of thinking belonging to rational beings, even those which are the most habitual, deeply rooted, indispensable, and biologically hardwired, such as that of causality *qua* necessary connection, are subject to an ongoing process of evolution. Extending Hegel’s insights to fit with Lorenz’s evolutionary epistemology allows for the possibility that the conceptual structures of rational beings can evolve and be further refined. As such, Hegel’s account of the development of such mental structures involves a careful equilibrium between habit and creative novelty. From this vantage point, Kant’s *a priori* categories, including the concept of causality, can be said to comprise the enduring, biologically inherited, conceptual framework by which rational beings actively constitute their experience in our contemporary epoch. Such conceptual structures or habits of thought may have been selected for over eons of evolutionary time, but they are still provisional and subject to continual challenge by subsequent thinking, and hence, they are in flux, dynamic, plastic, and creative, rather than fixed and final. To the neo-Kantian who would suggest that the *a priori* concepts of the understanding are absolute in the sense of fixed and final, one might

¹³⁶ Ibid., §237Z, p. 304.

reply that such a position presents a dogmatic challenge to the possibility of progress by rational organisms in relation to their comprehension of the world and of themselves, as well as their comprehension of the conditions for their comprehension, something that Kant himself certainly would probably never have agreed to providing that his questioning concerning the future of metaphysics were otherwise taken seriously. Yet, the Hegelian emphasis on the development of consciousness and on the dialectical progression of the logical Concept (*Begriff*) may perhaps be said to provide a more adequate correlate for Kant's analogy to weak epigenesis than the latter's own transcendental idealism.

Overall, as consistent with Lorenz's Kantian evolutionary epistemology, a careful reading of Hegel's writings reveals that his system of Absolute Idealism is not to be construed either as a one-sided idealism or as the most extreme form of idealism, as it is commonly understood. Rather, Hegel is chiefly concerned to examine the dialectical interplay of the ideal / conceptual and the real / perceptual in the life-processes of rational organisms. And in the *Logic*, Hegel provides phenomenological descriptions not only of how Spirit passes over into Nature, and determines it, but also how Spirit is sublated by Nature, and issues from it, these dialectical processes being mediated by Logic. Such descriptions may be compared with the active processes of assimilation (adapting the environment to cognitive structures) and accommodation (adapting cognitive structures to the environment) in order to achieve equilibrium that have long been studied by evolutionary psychologists.¹³⁷ While Hegel and Darwin are incommensurate in numerous respects, some aspects of the former's system are conducive to be woven into the Lorenzian evolutionary interpretation of the Kant in order to mitigate the apparent inconsistency between Kant's emphasis on the categories as self-thought, *a priori* first principles belonging to all rational beings, making their experience possible and the requirements of an evolutionary perspective. In any event, I pass now to a discussion of the evolutionary significance of critical thought and skepticism, which further highlights the importance of Hegelian modes of thinking to evolutionary epistemology.

VII. THE EVOLUTIONARY SIGNIFICANCE OF CRITICAL THOUGHT AND SKEPTICISM: INTELLECTUAL SELECTION

Drawing from the preceding analysis of the responses of Kant and Hegel to Humean skepticism concerning causal relations, from the perspective of Lorenz's neo-Kantian evolutionary epistemology, skepticism itself can be interpreted as a biological

¹³⁷ For example, see Baldwin 1902 / 2005; Piaget 1950.

phenomenon, its role being a chief selective mechanism by which the mettle of ideas, hypotheses, theories, concepts (including the Kantian categories), knowledge claims, is tested (and pre-tested) critically by individuals and by communities of rational beings, and is the means by which such ideas may be thrown creatively into fresh combinations. Hegel's dialectic can be understood as a loose and imperfect analogue for this process of "intellectual selection," that may be at the root of the development and refinement of the Kantian framework of categories. For instance, in addition to the dialectic between Hume versus Kant in relation to the legitimacy of the principle of causality *qua* necessary connection, the tension over the legitimacy of teleological explanations of the growth and development of organisms in biology, thinkers such as Hume, Whitehead, and contemporary ecologists have advanced serious and critical inquiries regarding the adequacy of the metaphysical concept of substances in its capacity to represent the real things of the world.¹³⁸ And on the basis of critical inquiries such as these, rational beings may seek to accept, reject, alter, or refine their ways of thinking concerning these concepts (i.e. causality, teleology, substance) accordingly. To a certain extent analogous to the role of skepticism as the negative or dialectical moment in Hegel's logical Concept (*Begriff*), it is through the selective mechanisms of critical thinking and skepticism that rational organisms make judgments concerning the usefulness, the merit, and the truth of their ideas, hypotheses, theories, concepts, linguistic structures, symbols, values, and knowledge claims, some being "selected and preserved,"¹³⁹ others being eliminated, discarded, and/or rendered inoperative. Skeptical judgment and critical thinking are processes of intellectual selection, helping to identify what is problematic and what calls for reconstruction, so that rational beings can rewire themselves in responding to changing environments and circumstances, and/or transmit their realizations to future generations. Even the norms concerning the criteria of selection may be subject to such processes of selection, as for example, in relation to the aforementioned question concerning the extent to which metaphysical knowledge claims that cannot be justified empirically ought to be admitted. It should not be accepted that this last claim necessitates recourse to either epistemic or moral relativism. Rather, it simply

¹³⁸ Whitehead (1929) suggests that the metaphysical concept of a substance should be mitigated or replaced by the notion of an event, an actual occasion, and/or an actual entity. He does so largely the basis of the Cartesian description of a substance as "a thing which exists in such a way as to depend on no other thing for its existence" (Descartes 1644 / 1988, 177), which, for him, creates unfounded materialist-mechanistic abstractions in the way that human beings represent the real.

¹³⁹ Richards, Robert, *Darwin and the Emergence of Evolutionary Theories of Mind and Behavior*, Chicago, University of Chicago Press, 1987, p. 576.

means that enduring criteria of selection may be reviewed and/or refined and new norms and methods of assessment can be established.

“Successful” ideas and theories may enter into the intellectual canon of the human species, some becoming habits of thought and grounds for behavior, perhaps being passed down to subsequent generations of human beings through education and learning. One might recall that for the unmitigated Hume, stamping perceived regularities of accompaniment with the character of causality *qua* necessary connection is described as a *habit* of thought that is not warranted by any empirical evidence. But the most successful and indispensable concepts in terms of the biological survival of our species may be so valuable and advantageous that they become learned and transmitted via language or proto-language, assimilated, habitual, biologically hardwired, and inheritable, such that future generations of people are genetically pre-disposed to them. That said, structures of thinking and behavior that have become habitual, for example, the habit of large-scale fossil fuel burning by human beings, can also be challenged via skeptical negativity.

The evolutionary interpretation is open to the notion that longstanding habits of thought which structure the experience and the behavior of rational organisms can be broken up, undone, or reformed via critical thinking and/or by skepticism, as can evolutionarily-hardwired, biologically innate ideas, and/or the Lorenzian neo-Kantian *a priori* categories of thought. One must recall that Hume’s skeptical questioning in relation to our curious habit of causal thinking helped to revolutionize our understanding of inductive reasoning and of the scientific method. Yet skeptical negativity of a radical sort can also lead to a stubborn rejection of those principles that preserve the human species. One might further implicate the rigid skepticism of those who do not believe that the large-scale burning of fossil fuels is the chief cause *qua* necessary connection of climate change as another example. If humanity abided in a complete skepticism, for example, in relation to the causal connection between fossil fuel overuse and global warming, and guided its actions accordingly, potentially, then new meaning would be given to the Humean notion that “all human life must perish, were [the skeptic’s] principles universally and steadily to prevail.”¹⁴⁰ Furthermore, various skeptical methods and types of skepticism are also equally subject to this type of intellectual selection. Here, we might consider intellectual selection to be a subordinate form of biological selection to that of natural selection, and perhaps commensurate with contemporary memetic theory. In any case, it is through the selective mechanism of critical thinking and/or moderate skepticism that rational beings in our contemporary epoch continuously remold, recast, and/or refine the

¹⁴⁰ *Enquiries*, H128, pp. 160.

conceptual framework by which our species constitutes its experience and upon which it grounds both behavior and societal norms. Critical thinking and/or a moderate degree of skepticism is what encourages learning and/or adaptive plasticity.

All of this is not to suggest that every development in the various fields of inquiry, such as in the humanities, the social sciences, and the natural sciences are simply reducible to biology. Rather, it just means that they cannot escape from an evolutionary interpretation—that reasoning with a view to finding out the truth in relation to any subject matter of inquiry takes place within a biological context. And, in light of Kant and Hegel’s philosophies, as merged with evolutionary epistemology, our conceptual framework by which we do so not only has an active subjective ground by which ideas are selected for and against on the basis of their practical utility and of their biological indispensability, but it also has an objective ground which aims to ensure that they are selected for in terms of their truth, perhaps even beyond their adaptive indispensability; both sides being interconnected. A synthesis of correspondence and pragmatist theories of truth might be assumed here.¹⁴¹ In addition, human beings are the dominant selective agents on the planet, not only shaping the lives of their fellows and the evolutionary destiny of their own species, but also determining the evolutionary fates of most of the other beings on the planet. Operations of intellectual selection are at the root of ethical deliberation, judgment, and decision-making, but, in turn, particular habits and modes of intellectual selection ought to be subject to critical moral scrutiny.

My point in the last parts of this essay has been to acknowledge the evolutionary significance of critical thinking and/or skepticism, namely, their role in the process of intellectual selection by which the conceptual structures of rational beings are scrutinized critically and transformed over time, as in what Julian Huxley (1964) calls “psychosocial evolution,” which involves a mechanism that he calls, “psychosocial selection.”¹⁴² For Huxley, “psychosocial evolution” involves a phase of human evolution that is not centered explicitly on the “survival of the fittest” in terms of morphological traits, but on the appropriation, exchange, transmission, critique, and

¹⁴¹ As articulated by William James,

any idea that helps us to deal, whether practically or intellectually, with reality, that doesn't entangle our progress in frustrations, that fits, in fact, and adapts our life to the reality's whole setting, will agree sufficiently to meet the requirement [of truth] ... The true, to put it briefly, is only the expedient in our way of thinking, just as the right is only the expedient in our way of behaving ('Pragmatism's Conception of Truth,' *The Writings of William James: A Comprehensive Edition*, ed. John McDermott, Chicago, University of Chicago Press, 1977, pp. 435, 438.

¹⁴² Huxley, *Julian, Evolutionary Humanism*, Amherst, NY, Prometheus Books, 1964, pp. 76, 33.

selection of ideas that achieve “breakthroughs to new dominant patterns of mental organization”¹⁴³ which, in turn, drives cultural change. In any case, overall, from the perspective of evolutionary epistemology, critical thinking and/or skepticism can indeed be interpreted, as Hegel suggests, as constituting the “moving soul”¹⁴⁴ of reason, or alternatively, as an efficient cause in the evolution of the conceptual structures by which rational organisms constitute the world in our contemporary epoch.

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¹⁴³ Ibid., p. 76.

¹⁴⁴ *Encyclopedia Logic*, p. 128.

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