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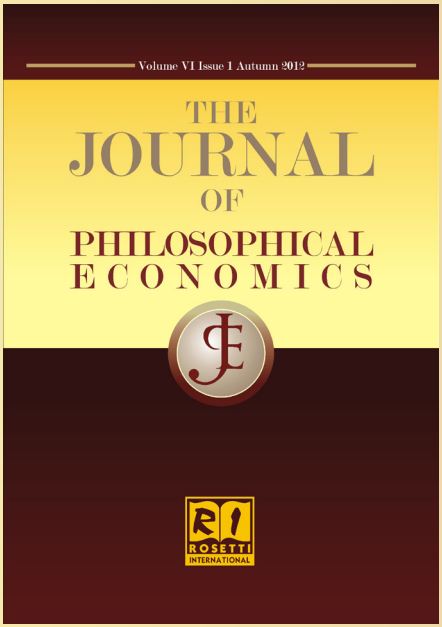

Between a rock and a hard place: second thoughts on Laibman's Deep History *and the theory of punctuated equilibrium with regard to intellectual evolution*

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Between a rock and a hard place: second thoughts on Laibman's *Deep History* and the theory of punctuated equilibrium with regard to intellectual evolution

Altug Yalcintas

Abstract: In this article I reconsider Laibman's *Deep History* (2007) in the light of Niles Eldredge and Stephan Jay Gould's theory of punctuated equilibrium. I argue that the theory of punctuated equilibrium explains (1) why conceptions of inevitability and directionality in intellectual evolution may not be as useful as Laibman thinks they are in the context of social evolution and (2) why stasis (that is, intellectual path dependence) in intellectual evolution does not allow different pathways of thought to converge.

Keywords: punctuated equilibrium, continual progress, perfection, intellectual path dependence.

I am pleased to be asked by the editor of the *Journal of Philosophical Economics*, Valentin Cojanu, to respond to David Laibman's rejoinder, "Deep History: A Rejoinder" (Laibman, 2012), in which Laibman assesses my review essay on his fine work, *Deep History: A Study in Social Evolution and Human Potential* (Laibman, 2007). My essay on *Deep History* was published in this journal in 2011 (Yalcintas, 2011).

I have read Laibman's rejoinder with great interest. Unfortunately, I do not think that his rejoinder appropriately responds to my central criticism or answers my questions. First of all, many of the arguments presented in his rejoinder are irrelevant to my critique. My intention in my essay was not to show aggression to Laibman's historical materialist reasoning, although the tone in his response

suggests that this is how Laibman feels. On the contrary, I intended to emphasize the difficulties in how Laibman "outline[s] a historical materialism that makes use of the full insights of a general-directed theory of history" (Laibman, 2012) by arguing that his book has two shortcomings which I discussed under the titles of "The Audience Problem" and "The Evolutionary Problem." My argument was (and is) that his book fails to incorporate the literature that has already debated issues such as inevitability and directionality, while his argument lacks the insight evolutionary theory might provide.

Laibman claims that I attribute an unintended project to him and that I distort and conceal the content of his book. Now, I contend that his claim that I am a "prisoner of an unexamined commitment to a view of history" (Laibman, 2012) and his question irrelevant to this debate, "what is actually going on here?" (Laibman, 2012), actually serve to attribute to me a project that I never had in mind. First of all, I never claimed that the author is a simple minded empiricist (Laibman, 2012). Secondly, Laibman claims that I resist to "any concept of a *deep structure* underlying human affairs" (Laibman 2012, italics belong to the original). This claim, just like many of his unfair claims about me, is simply untrue because I clearly and repeatedly stated in my essay (Yalcintas 2011, 170, 176) that the social realm is structured and stratified, in the sense that there is no inevitability or directionality to social evolution, even when individuals choose, behave, and act with intentions or towards a purpose. I argued that explaining the phenomena taking place at individual (or "lower") levels of the whole – that is, causes and consequences of purposeful human behaviors – is not sufficient to explain the whole itself – that is, the causes and consequences of social evolution. In other words, "higher" levels of natural, social, and intellectual evolution are not always reducible to "lower" levels, and *vice versa*. "In conclusion," I argued (Yalcintas 2011, 177), "there is no need for Laibman to position himself in favor of one level over the other. Explanations at different levels of abstraction provide different insights into the same phenomenon."

Thus, I do not claim that *all* historical materialist explanations are in conflict with the explanations provided by evolutionary political economy. I only claim that some of Laibman's explanations are not evolutionary, in the sense that he fails to address the issues of inevitability and directionality in the more sophisticated terms of evolutionary theory.

Since Laibman appears to have suspicions about the evolutionary quality of my criticism, I would like to use this opportunity to express my second thoughts on

Laibman's *Deep History* (and his rejoinder). In this article, I rearticulate what I mean by the "Evolutionary Problem" in *Deep History*, in the light of Niles Eldredge and Stephan Jay Gould's theory of punctuated equilibrium with regard to intellectual evolution. I argue that the theory of punctuated equilibrium explains (1) why inevitability and directionality in intellectual evolution may not be as useful as Laibman thinks they are in the context of social evolution and (2) why stasis (that is, intellectual path dependence) in intellectual evolution does not allow different pathways of thought to converge.

This article is organized into four sections. In the first section, I briefly summarize my interpretation of Laibman's Abstract Social Totality. In the second section, underlaboring for the conceptions of continual progress and perfection, I claim that these conceptions have been present in Western thought since Plato. Notable philosophers and scientists, including Karl Popper and Richard Rorty, who come from different traditions of thought, have provided criticisms of these conceptions. Next, I revisit the theory of punctuated equilibrium, focusing my attention on the works by Eldredge and Gould, arguing that continual progression and perfection in life's history are not always possible since natural evolution takes place by both gradual changes and radical transformations. In the fourth section, I suggest two different processes of knowledge production, using Laibman's "conceptual geometry approach" [1]. I argue that if evolutionary processes meant continual progress alone, intellectual evolution from antiquity to date would have been linear and directed toward perfection of knowledge. However, continual progress and perfection are not always the theme of intellectual evolution. Imperfections and oddities in intellectual history are not singled out automatically. As a consequence, many explanations in intellectual history are "unfit" and they survive while other "fit" explanations go extinct. The difficulty with the conceptions of continual progress and perfection in the context of intellectual evolution arises as processes of knowledge production are illustrated by the "ladder of life." The metaphor of a "ladder" is not fully appropriate for understanding intellectual evolution. As Gould argues, by "nurture[ing] our hopes for a universe of intrinsic meaning defined in our terms ... our continued allegiance to the manifestly false iconographies of ladder and cone [points at] cosmically justified hope and arrogance" (Gould 1991, 43 and 45).

Laibman's Abstract Social Totality and social evolution

Laibman's Abstract Social Totality (AST) is a theoretical construction of the history of capitalism in which, Laibman claims, "[e]ach stage in a theoretical sequence requires for its existence some crucial property of the preceding stage; contains within it a crucial contradiction, or progressive insufficiency leading to increasing tension and incoherence; and establishes a crucial foundation that defines the succeeding stage" (Laibman 2007, 5). Although I can see no theoretical problem with processual conceptions, of which Laibman's AST is an example, I am not sure about the justifiability of the existence of a "ladder-like pattern" of stages in social evolution (Laibman 2007, 45). The metaphor of a "ladder" implies varying "degrees of progress" (Laibman 2007, 45), an overly strict restriction. I do not think "degrees of progress" is a useful evolutionary concept because conceptions such as development, progression, and advancement, whether in "hard" and "soft" or "strong" and "weak" forms, are not consistent with the processes of natural, social, and intellectual evolution. The reason I hold that development, progression, and advancement are non-evolutionary conceptions is because emerging modes of production (of commodities and of ideas) do not always replace already-existing modes of production (of commodities and of ideas). Instead, emerging and already-existing modes of production sometimes *co-exist*, in the sense that even when variation among technologies and ideas increases, "new" modes of production may stay alive often without substituting "old" technological paradigms and without falsifying previous research programs.

Laibman argues that "if we can (legitimately) secure the understanding that human consciousness and action are qualitatively and irreversibly symbolic, the surest foundation is laid for the most central claim of historical materialism: the *conditional inevitability* of progress toward a society of equality, solidarity, and fulfillment. This is the (conditional) directionality of history: progress is inevitable – because it is possible" (Laibman 2007, 22. Italics belong to the original). I disagree with Laibman here primarily because it is not clear how he concludes that "progress is inevitable" from the proposition that "[progress] is possible." Secondly, I wonder if it is factually correct to argue that human societies are evolving "toward a society of equality, solidarity, and fulfillment." Some of my naïve questions regarding Laibman's (rather wishful) reasoning are as follows: Why would class antagonisms result in the betterment of material and intellectual conditions? How can one judge that a stage in social evolution is a more "advanced" stage than any other? For instance, is feudalism more "advanced" than slavery? How about post-Soviet

societies where, after decades of experiencing "communist" modes of production, the dominant mode of production today is capitalism: are the capitalistic societies of the twentieth century in Russia, Poland, and elsewhere materially and intellectually more "developed" than before? My purpose is not to invite Laibman to philosophically debate the meaning of such terms as development, progression, and advancement. Also, I would not claim that Laibman fully favors a progressive course of social evolution. In fact, in his rejoinder, Laibman argues that "far from the theory being challenged by the existence of even a single empirical instance in which the given property does not appear, the theory does not require the appearance of the property in question in any actual part of the observable record! (...) Most of the time, however, the AST does *not* appear directly in the historical record; nor should it" (Laibman 2012. Italics belong to the original.) I would nevertheless like to express my doubts about the ways in which a scientist whose aim is to provide insight into the course of social history from an evolutionary point of view embraces directionality and inevitability in his approach. My doubts have to do with the abundance of teleological claims in Laibman's *Deep History,* such as this: "[intentionality] is central to defining human activity, labor, and is the ground for *the Development Principle that drives the [production forces] in a single direction: toward ever greater human power in the transformation of the external environment*" (Laibman 2007, 62. Italics are mine). Elsewhere Laibman also claims that "[a] full, stadially elaborated model of social evolution, then, points squarely beyond the present: it is a form of historical materialism in which *all roads lead to communism* (Laibman 2007, 64. Italics belong to the original).

The ideas of continual progress and perfection

The ideas of continual progress and perfection have long dominated positivist thought in Europe. Continual progress means that human civilizations, slowly and gradually, advances from a state of uncertainty, ignorance, and cultural deprivation towards higher levels of prosperity and wisdom (Nisbet 1994, 10). Human civilizations only move one way, thus each generation while standing "on the shoulders of giants" progresses the civilization a step further (Pollard 1971, 20). Every generation, according to the idea of continual progress, is superior to its predecessor. Human ideas expand toward new horizons. Step by step, the human mind frees itself of obstacles. The flow of events relies upon the spirit of betterment. The evolution of human institutions moves toward perfection. Perfection is a unique point; it is the final destination, pre-determined. The course of progression is only

to terminate where there is nothing better beyond. Betterment upon that point is not possible. Nicolas de Condorcet (1795 [1949]), quoted by (Teggart 1949, 323) wrote thus:

> [N]ature has assigned no limit to the perfecting of the human faculties, that the perfectibility of man is truly indefinite; that the progress of this perfectibility, henceforth independent of any power that might wish to arrest it, has no other limit than the duration of the globe on which nature has placed us. Doubtless this progress can be more or less rapid; but never will be retrograde, so long, at least, as the earth occupies the same place in the system of the universe, and the general laws of that system do not effect on this globe either a general destruction or changes which would no longer permit human kind to preserve or to exercise thereon the same faculties, and to avail themselves of the same resources.

Perfection in philosophy has various meanings. It signifies a phase where no undesirable outcome is possible. It is a phase upon which evolution converges through time by means of incremental improvements. Upon such a path, there is no room for regression or depreciation. According to perfectionists, "philosophical theories [converge] a series of discoveries about the nature of such things as truth and personhood, which get closer and closer to the way they really are, and carry the culture as a whole closer to an accurate representation of reality" (Rorty 1989, 77). This is the view that intellectual history has long been locked into, perhaps since Plato.

Karl Popper (1962 [1971], 158-167) criticizes "perfectionism" in philosophy, especially inherent in Plato's philosophy, as he "believes [it] is the most dangerous," and compares it with his alternative, piecemeal engineering, which he "considers as the only rational strategy" in national and international politics. Perfectionism, according to Popper, requires that policymakers have a complete blueprint of the final society before any actions are taken. Such a blueprint would identify the best ways and means to achieve maximum happiness on earth. Popper does not claim that perfectionism is unattainable. He argues that many things that were once declared unrealizable have since been realized. Institutions have been established to help secure civil peace preventing international crime and armed aggression. What he criticizes under the name of Utopianism is

> the reconstruction of society as a whole, i.e. very sweeping changes whose practical consequences are hard to calculate, owing to our limited experiences. It claims to plan rationally for the whole of society, although we do not possess anything like the factual knowledge which would be necessary to make good such an ambitious claim.

> We cannot possess such knowledge since we have insufficient practical experience in this kind of planning, and knowledge of facts must be based upon experience. At present, the sociological knowledge necessary for large-scale engineering is simply non-existent (Popper 1962 [1971], 165).

Perfection in politics, Popper claims, can easily turn into violence in place of reason. Because of a lack of experience and the cumulative consequences of policy mistakes, unexpected results on a large scale are very likely to materialize. No social action's result are entirely expected. "It is not reasonable," Popper argues, "to assume that a complete reconstruction of our social world would lead at once to a workable system" (Popper 1962 [1971], 171). Perfectionism in politics would necessarily lead to strong centralized rule of by a select few, which become a dictatorship. Such authoritarianism would discourage criticism and violent measures would be taken against those who advocate compromise and improvement via democratic methods.

Popper's political program is Darwinian, in the sense that he points out the lack of necessity and even the dangers of a perfectionist view in politics. Popper argues that perfectionism in politics would only lead to further disaster, not happiness. The international political situation is not perfect and cannot be considered to have a tendency to perfection. It is instead a complex, flawed, and evolving system. Just as there is no evidence for the whole of species in nature to evolve towards perfect individuals so there is not any logic in expecting a perfect political system that would bring absolute contentment to the world's people.

The theory of punctuated equilibrium revisited

Gould and Eldredge discuss the implausibility of continual progress and perfection, developing their own theory of punctuated equilibrium [2]. Like most other theories, Gould and Eldredge argue, "punctuated equilibrium is a claim about relative frequency, not exclusivity" (Gould and Eldredge, 1993). The logic behind the theory is that while large populations in nature change slowly and maintain relative stability of variety among themselves, tiny populations separated from bigger populations moving to other areas of residence, develop more rapidly and produce daughter species through speciation. Speciation is the main mechanism that leads to the evolution of new species. It takes place within a "geographical millisecond" – that is, a thousand or tens of thousands of years – and fails to change thereafter (Gould and Eldredge, 1972). The theory of punctuated equilibrium argues that

> new species may arise when a small population becomes isolated at the periphery of the parental geographic range. Isolation can occur by a variety of geological and geographic contingencies – mountains rising, rivers changing course, islands forming. Without geographic isolation, favorable variants will not accumulate in local populations, for breeding with parental forms is a remarkably efficient way to blur and dilute any change that might otherwise become substantial enough to constitute a new species. Most peripherally isolated populations never become new species; they die out or rejoin the larger parental mass. But as species may have no other common means of origin, even a tiny fraction of isolated populations provide more than enough "raw material" for the genesis of evolutionary novelty (Gould, 1991).

The theory of punctuated equilibrium maintains that perfection among species in nature is not always possible. It is, however, not because nature does make leaps through time. Punctuated equilibrium is a theory of differential rates of evolution among diverging pathways. It explains how a large population can come out of a small population. The total number of species increases; however, no species transforms into another. In other words, "punctuated equilibrium clearly does not require or imply macromutation" (Gould 2002, 1006-1021). The new population need not be bigger than their parent species. It is the proliferation of stasis that generates branches that lead in different directions from their ancestors. The small sub-population after speciation gets bigger and bigger, and new pathways occur. The pathway from small to large involves short-cut generating mechanisms. There is no single pattern that determines who gets through and who does not. In other words, evolution is not directed to a single superior, perfect creature but maybe two or even more species with "less perfect" features. Evolutionary pathways are rather a combination of a number of evolutionary lineages. By way of several mechanisms in nature, such as speciation, diversity among species tends to increase, resulting in the co-existence of a few diverse species at the same time, which may have long been isolated from their parent species and may feature no anatomical advantages over one another.

In other words, after an increase in diversity, evolution may hit such pathways where "life settles down to generating endless variants upon a few surviving models" (Gould 1991, 47). The system may lock itself into specific evolutionary lineages in which an overwhelming majority of species are destroyed and only a few survive. Species that survive may not have prevailed for a normal survival advantage. "Perhaps, the actual reasons for survival do not support conventional ideas of cause as complexity, improvement, or anything moving at all humanward" (Gould 1991, 48). Perhaps an earthquake hits the region, or an unpredictable

environmental catastrophe provokes mass extinction. Evolution may take place dependent upon improbable courses of events, which are sensible in retrospect yet unpredictable before their occurrence. This does not mean that evolution after a chance or contingent event is senseless. It only means that the strict determinism of perfectionism may not apply. Due to some specific cause, each stage gives way to the next one but no final term can be specified ex ante, even with full knowledge of the initial step of a process. Moreover, no event would occur again if we had run the system for a second time. No matter how small in size an event may be, replace it with another that seems improbable or without apparent importance and evolution would lead to a completely different pathway (Gould, 1991).

The idea of perfectionism fascinated many thinkers especially in the Victorian period, and, of course, Darwin himself (Wright 2005, 1-28). Darwin saw the large in the small but he did not argue, as Gould claims, that the large would emerge out of the small by basically adding time into the process. Natural patterns are not always the outcome of uninterrupted proliferation and betterment. Darwin was puzzled by the following idea: why would there be so many diverse creatures in similar climates and geographies? Darwin (1859 [1952], 60) writes: "but it may be objected that if all organic beings thus tend to rise in the scale, how is it that throughout the world a multitude of the lowest forms still exist; and how is it that in each great class some forms are far more highly developed than others? Why have not the more highly developed forms everywhere supplanted and exterminated the lower?" The answer would be either that there were two creators at work at the same time or that species evolved separately, tracking down different pathways at different times. It seemed certain to him that, in either case, there would have been no inherent direction of internal perfecting among species. "Natural selection," Darwin claimed (1859 [1952], 98), "will not necessarily lead to absolute perfection; nor, as far as we can judge by our limited faculties, can absolute perfection be everywhere predicated."

The existence of imperfections and oddities among species, according to many natural scientists, proved to Darwin that there were pathways in nature in which we could trace the particular causes that led life's history to follow this or that route (Gould 1982, 28). One could not reconcile evolution with perfection, Gould claims, because perfection does not require a history. If perfection existed, any organism in nature would have been created for the purpose to which it pertained perfectly. To put it differently, there was proof of evolution because the root of an organism did not always coincide with the "modern form" of the organism. If these two were equal, then there was no indication of evolutionary history.

Natural selection is a mechanism that causes "better adapted" species to win. A species' better adaptation, however, does not necessarily mean that the species' are in any anatomical sense superior creatures. Natural selection involves mechanisms of positive feedbacks in which consequences of historical contingencies (or "historical small events" (Arthur, 1989; Yalcintas, 2006)) are sometimes reinforced in such a way that certain creatures survive, such as birds with an aerodynamic feather design or insects by way of mimicry that enable them to look like a leaf or a stick. Optimal adaptation does not always occur in life's history. "Darwin recognized," Gould claims, "that perfection cannot provide evidence for evolution ... that the primary evidence for evolution must be sought in quirks, oddities, and imperfections that lay bare the pathways of history" (Gould, 1991).

However, as Nicholas Georgescu-Roegen argued (1971, 196), "if science were to discard a proposition that follows logically from its theoretical foundation, merely because its factual realization has never been observed, most of modern technology would not exist. Impossibility, rightly, is not the password in science." Indeed, from a theoretical point of view, perfectionism does not go hand in hand with evolutionism but perfect solutions have often come about in natural and social history. The difficulty here has to do with "repeated perfection." In the evolutionary history of a number of species oddities never occur. Some kind of an "ordering force" interlocks evolution in certain directions. This is not a contradiction, Gould argues, because the Darwinian notion that evolution is unplanned and undirected does not cancel out the fact that "natural selection builds good design by rejecting most variants while accepting and accumulating the few that improve adaptation to local environments" (Gould 1982, 40). Optimal solutions are prevalent in natural history. In disparate groups, abstract forms of ideal worlds exist. Final adaptation is both complex and peculiar so that in some cases physical forces may override natural selection in such a way that species obtain an optimal form by virtue of physical forces acting upon them. Complex forms are shaped by simpler mechanisms in a variety of unexpected ways. A number of natural states, Gould claims, such as hexagonal creatures or spiral leaves, are created as a consequence of only a small perturbation and modification in the form of the species. Numerous social insects, identically, relied on the division of labor and harmonious collaboration among individuals in their colonies in order to survive (Mayr 1976, 31). Nevertheless, examples of the most incredible and miraculous adaptations in nature do not serve as "proof of intrinsic tendency toward perfection" (Mayr 1976, 46). The efficiency of an organism's instinctive reactions is not sufficient for evolutionists to conclude that

nature is designed so as to perfectly serve some specific purpose. Evolutionists claim that perfect solutions arise despite arbitrariness, planlessness, and accidents.

Demonstration and interpretation: a conceptual geometry of intellectual evolution

Gould and Eldredge (1977, 1972; Gould 2002, especially Chapter 9) argue that life's history in evolutionary biology and paleontology is often incorrectly demonstrated. They claim that conventional iconography represents natural evolution as if species in nature grow upward. This representation implies a ranking among ancestors and cousins, as "upward" species are assumed to gain the advantages of complexity, which results from the success of species at previous stages of evolution. The problem with such iconographies is that they conceive of evolution as if there was a single pathway in life's history, directed to a perfect ideal that will inevitably result in the future. However, as a matter of fact, there is almost always more than one surviving pathway.

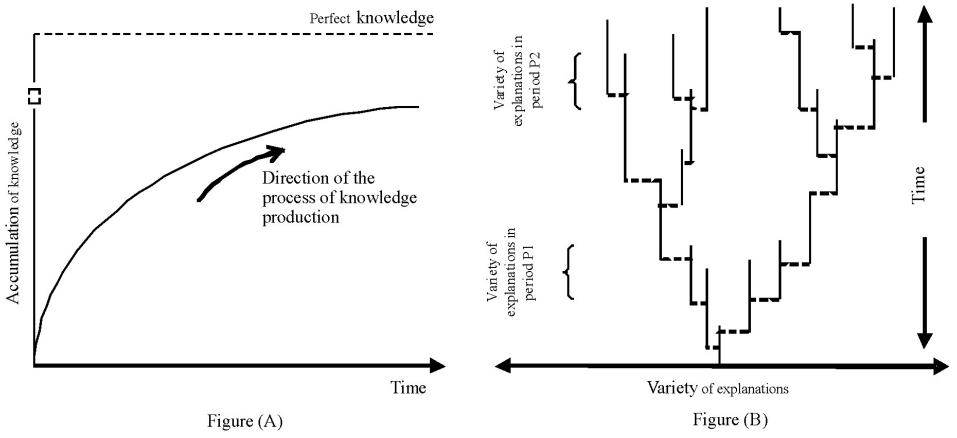

Figure One Conceptual geometries of two different processes of knowledge production

What if the evolution of species in nature, as well as institutions in society and explanations in intellectual history, had all evolved on a number of multi-directional pathways rather than one single unidirectional pathway? For the sake of brevity, I will restrict this paper to discussing my view on the multi-directionality of intellectual pathways in scholarly life. A larger set of specificities are involved in natural and social evolutions. For instance, explanations do not always have intentions, whereas most humans – and some animals (see, for instance, (Dennet, 1995; Beisecker, 1999; Shew, 2008)) – have a set of beliefs that motivate their actions. Also, the interplay of mechanisms of evolution at different levels (or "units") of selection in natural life, such as genes, cells, individuals, groups, species, and populations, might not match the interplay of mechanisms of evolution at different levels (or "units") of selection in scholarly life, such as ideas, theories, scholars, schools of thought, and sciences. In other words, natural and social scientists' understanding of "deep history" might not overlap with the intellectual historians' understanding of it. Insofar as intellectual evolution is concerned, I contend that explanations in intellectual history do not always become more sophisticated as time goes by. They do not necessarily evolve in the direction of perfection, or even better knowledge. Instead, several multi-directional pathways in intellectual history cause diversity among explanations. Diversity sometimes takes place at the expense of "intellectual improvement" because "less fit" explanations are not always eliminated and substituted by "fitter" explanations.

Diagrams illustrate the conceptual geometries of two different processes of knowledge production. Figure (A), on the one hand, demonstrates the course of intellectual history as if it is headed towards a point of perfect knowledge. The production function of knowledge in Figure (A), represented by the curved line, is an increasing function: pieces and bits of knowledge, as time goes by, accumulate in a systematic way. However, the process of knowledge production never reaches the point of perfection, represented by the horizontal dotted line, since new findings become more difficult to acquire over time as the marginal benefits of new knowledge is smaller than the marginal benefits of previous knowledge. Therefore, Figure (A) does not represent the process of knowledge production by a straight line but instead as a curve asymptotic to the maximum. This state of perfect knowledge is hypothetical in the sense that its existence is not proven and not provable by any conceivable evidence. Human knowledge is always imperfect. Figure (A) represents a ladder-like pattern of evolution in which increments in the stock of knowledge are accumulated as if every small increment is perfectly fitted to what we already know in a smooth and continuous manner. Normally, a ladder-like pattern of evolution

would require steps (or permanent branches) elevating the course of history to higher stages gradually and steadily. Here, steps are simplified into a flat lineage where "unfit" additions are smoothly removed out of the process of theoretical adaptation. Finally, Figure (A) demonstrates a unidirectional pathway of evolution. Since there is only one pathway of evolution, converging to a perfect state of affairs, intellectual evolution features inevitability and directionality. This demonstration therefore represents a Whiggish view of history, where there is only one process, one methodology, and one unidirectional pathway to the perfection of knowledge. Figure (A) is a result of "uniformitarian and continuationist beliefs" (Gould 2002, 61).

Figure (B), on the other hand, represents a multi-directional course of intellectual history where intellectual evolution features rapid shifts leading to the emergence of two or more divergent pathways. After these rapid episodes in which variation arises, explanations compete with alternative explanations, and are challenged critically on their merits. Explanations survive this process by becoming a part of the numerous scholarly apparatus that help the explanation become isolated from its parent explanation. By receiving citations from a specific network of scholars and the analysis of supportive data, explanations gain credibility and so their findings and methodologies diffuse to various fields of research. As Eldredge argues, diffusion of knowledge is "a matter of differential economic success biasing reproductive success" (Eldredge 1992, 113). Indeed, explanations that are able to survive are often the explanations that are able reproduce in the works of a specific network of scholars. Figure (B) shows that after punctuations (represented by the dotted horizontal lines), stasis (represented by the longer vertical lines) prevails within the explanation. Therefore, intellectual evolution is the sum of the processes in which (1) the variety of explanations tends to increase following rapid shifts in the perception of an explanation and (2) explanations survive the critical challenges and alternative explanations in a state of stasis (or "inertia"). (Variety is depicted here along the horizontal axis.) Explanations do not always replace other explanations; instead, explanations may co-evolve, and diversity and discontinuity of explanations is prevalent. However, as Figure (B) demonstrates, explanations also go extinct when emergent explanations cease to attract the attention of scholars after periods of time. Explanations are not able to reproduce themselves forever. In other words, explanations are "spatiotemporally bounded, i.e. [explanations are] localized in time and space, with a beginning, a history, and (eventually) an end" (Eldredge 1986, italics are omitted). For instance, in period P1, six different explanations, represented by six vertical lines, are available to scholars whereas in period P2 the number of available explanations increases to eight. After period P2,

the number of diverse explanations might increase or decrease again. The theory of punctuated equilibrium with regard to intellectual evolution suggests that there is no inevitability in the process of variation since contingencies leading to rapid shifts in perception might give rise to either the extinction of old explanations or the creation of new ones. This process has no definitive termination because historical small events may cause further discontinuities in the course of history.

Having summarized my views on the theory of punctuated equilibrium with regard to intellectual evolution, I conclude this section with a few final remarks on Laibman's *Deep History*. The question at this stage is the following: which figure better represents Laibman's AST and social evolution? I hold that although both figures provide valuable insight to help us understand the merits and shortcomings of Laibman's work, neither figure fully represents Laibman's AST and social evolution. This does not mean that Laibman's ontology cannot be represented in terms of the theory of punctuated equilibrium or that his ontology is much different from positivistic conceptions of intellectual history. Both figures (A) and (B) illustrate intellectual evolution where explanations (not species, not modes of production) struggle for survival in scholarly life. As I argued earlier in this article, intellectual evolution may not perfectly feature the specificities that are common in natural and social evolution. Additionally, the processes of knowledge production are often processes of increasing returns to scholarly scale. However, Figure (A) describes the process of knowledge production as if the process is one of decreasing returns. This representation is not realistic because knowledge is not a commodity with declining marginal utility. In fact, the world in which we live is a world of increasing returns and in this world multi-directionalities are likely. On the other hand, Figure (B) is not sufficiently realistic either, at least, on the grounds that Figure (B) leaves one question without an answer: does continual progress require perfection? This is an open question and the answer is less than obvious. My view is that it is difficult to show whether there is progress, continual or discrete, in the absence of some kind of a measure of proximity to perfection. I think that in most cases continual progress requires a conception of perfection even when contingencies cause disruptions. Pathways of discrete evolution, which Figure (B) represents, cannot continually progress. In fact, this is the core of the theory of punctuated equilibrium, according to which discrete shifts give rise to the emergence of new pathways in which individual explanations achieve differential reproduction success rates. Reconciliation of different pathways is not always possible due to different rates of adaptation. However, different explanations often give rise to further pathways through "new" explanations.

The significance of the theory of punctuated equilibrium with regard to intellectual evolution is that it is not always possible to reconcile diverse intellectual pathways that have had unique histories. One of the implications of the discussion presented in this article is that the reconciliation of historical materialist traditions and evolutionary political economy may not be easy, or even possible. Although Laibman's *Deep History* has provided us with useful insights into the "deep histories" of these two traditions, it does not seem plausible for me to reconcile diverging pathways. The absence of subsidiary pathways between evolutionary political economy and historical materialism does not necessarily mean that no scholar has attempted to fill in the theoretical gap between the two traditions. The absences might mean that it is the nature of scholarship that intellectual pathways emerge and then diverge. One of conclusion that I draw out of Laibman's *Deep History* is that strong evidence for the evolution of explanations is the existence of diverging intellectual pathways.

Thus, the theory of punctuated equilibrium with regard to intellectual evolution, to my reading, has implications not only for the specific issues debated in evolutionary political economy but also for the general set of issues related to the evolutionary history of economics, including the issue of intellectual path dependence, an intellectual form of "blockages and equilibrium traps" (Laibman 2007, 37). (For a survey of this literature, see (Yalcintas, 2012)). Most of all, the theory of punctuated equilibrium provides insight into the possible answers to the following question: why do scholars *de*-select the option of interaction and co-operation with other scholars who have different worldviews when critics challenge them? To my view, this question would take us to the issue of path dependence in intellectual history. I have (Yalcintas, 2010) been interested in how errors in the history of economics emerge and why they remain uncorrected so long. In a case study on the "Coase Theorem," I argued that the majority of articles covering a variety of issues on the "Coase Theorem" have misrepresented the main message of Ronald Coase's original article on transaction costs (Coase, 1960). The remaining controversy over the "Coase Theorem," I claimed, was because the literature on transaction costs has been locked into a pathway which was set out by Stigler' 1996 book, *The Theory of Price*. Even almost 50 years after the publication of Coase' original article, the consequence of the initial condition under which Coase's contribution was first formulated (Stigler, 1952 [1966]) is not perfectly eliminated. Another example of punctuations in the history of economics, in which "[t]he current structure of incentives is such that one cannot expect that the current wrong practices will be easily abandoned or significantly modified" (Altman, 2004), is statistical significance (McCloskey, 1986,

1992; Ziliak and McCloskey, 2008). Statistical significance tests are an example of important intellectual pathways in the scholarly life of economics for which setting a new path in motion has long been impossible. In fact, Randall Collins (1998) once argued that epistemology often turns away from answering old questions and occupies itself with its own arena of dispute. Philosophy, Collins claimed, re-digs its foundations and do not always "move forward." In other words, explanations do not evolve by way of displacing other explanations. I fully agree and I argue that the same is true with economics. The central theme of the theory of punctuated equilibrium with regard to intellectual evolution is to reveal the dynamics that prevent scholars from displacing refuted, unrealistic, controversial, useless, or arrogant explanations. The theory of punctuated equilibrium does not just account for "pluralism" in economics; it also explains why scholars are stuck between a rock and a hard place.

Conclusion

I contend that revising or giving up the rhetoric of inevitability and directionality is intellectually costly for many scholars. It is costly because these scholars' habits of thought do not allow them to deviate from the conventional ontologies of social theorizing, which are characterized by traditional preconceptions such as continual progress and perfection. Elsewhere, trying to account for the reasons why economists do not change their minds when they are confronted with criticisms demonstrating the shortcomings of their work (Yalcintas 2013, Forthcoming), I argue that one of the reasons why scholars do not change their minds is the "epistemic costs" that scholars face when criticisms force scholars to implement newer and better institutional solutions to the problems of academic scholarship. In the world of positive epistemic costs, economists hesitate to change their minds if and when they have to face challenges toward their belief systems and ideologies. Now, the theory of punctuated equilibrium suggests that changing one's mind is not only costly in epistemic terms; it is often impossible, especially when the scholars are intolerant to interpretations of their work.

Endnotes

[1] "Conceptual geometry approach" is "the use of nonquantitative diagrams .... to working out relations among concepts ... [Such diagrams] seek to give some visual determinacy to sets of interrelated concepts" (Laibman 2007, xii).

[2] See, for instance, (Gould 1985, 1981, 1993, 1982, 1991, 2002, 1992; Gould and Eldredge 1972, 1993; Eldredge 1992, 1986; Gould and Eldredge, 1977). For a collection of essays by prominent authors on the history and applications of theory of punctuated equilibrium in natural and social sciences see (Somit and Peterson, 1992; Sepkoski and Ruse, 2009). For the applications of the theory in economics see (Mokyr, 1990; Perelman 1999, 57-102; Gowdy, 1993; Somit, 1993; Nelson, 1994; Boulding, 1992; Schot and Geels, 2007; Gersick, 1991; Romanelli and Tushman, 1994; Khalil, 2000, 1995; Hodgson and Knudsen, 2006; Aldrich et al., 2008; Cojanu 2013).

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