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A Response to Christian Cordes and Clifford Poirot

I wish to thank both Christian Cordes (2005; 2006; 2007) and Clifford Poirot (2007) for their thoughtful contributions to an ongoing debate.[1] Work in this area is deepening our understanding of the processes of social and economic evolution and helping to develop a conceptual framework for further analysis.

In this response, I wish to address some remaining points of difference between us. These differences are more numerous in the case of Cordes' work. Indeed, Poirot remarks that there "is probably very little daylight between Hodgson's views and my own." I agree. Consequently, I shall devote my discussion largely to Cordes' article and only occasionally refer to Poirot's. My response is organized in sections, to deal with the most important issues in turn.

First, however, I wish to address a terminological point in response to both Cordes and Poirot. For various reasons, Thorbjørn Knudsen and I now prefer the term "generalized Darwinism" to "universal Darwinism." One reason is that the word "universal" suggests that it covers *everything*.[2] Instead; we propose (Hodgson and Knudsen 2006a) that Darwinism addresses a particular type of complex phenomena that we describe as "complex population systems." These are defined below.

The second reason is that the term "universal Darwinism" was termed by Richard Dawkins (1983) who has been accused of having a particularly gene-centered view of biological evolution (Hull 2001). Knudsen and I do not endorse a gene-centered view.

Third, the idea of generalizing Darwinism to social, economic or political phenomena pre-dates Dawkins by more than a century. Darwin (1859, 422-3; 1871, vol. 1: 59-61, 106, 166) himself proposed that natural selection operates upon the elements of language and argued that tribal groups with moral and other propensities that served the common good would be favored by natural selection. Following this lead, other writers such as Walter Bagehot (1872), David Ritchie (1896) and Thorstein Veblen (1899; 1919) argued that Darwin's basic ideas could help to explain the evolution not only of individuals, but also of groups, customs, nations, business firms and other social institutions.[3]

Complex Population Systems: Can Darwinism be Generalized?

What are "complex population systems"?[4] The term refers to groups of both biological and social phenomena. It will be shown that they both admit general analysis in terms of Darwinian principles. The complex systems considered here involve populations of

entities. Populations are defined by members of a type that are similar in key respects, but within each type, there is some degree of variation, due to genesis or circumstances.

It is assumed that entities within these populations have limited capacities to consume some materials and energy from their environment and they are able to process some information about their environment attained by the use of some sensory mechanisms. These entities may or may not have a developed brain or memory. They may or may not be capable of reflecting on their circumstances and imagining past or future behaviors.

All these entities are mortal and degradable, and they need to consume materials and energy in order to survive or minimize degradation. However, because they do not have access to all environmental resources at once, these entities face an omnipresent problem of *local and immediate scarcity*.[5] These circumstances present specific problems that have to be solved to minimize degradation and raise the chances of survival. In short, these entities are engaged in a *struggle for existence*, to use the term adopted by Darwin (1859, 62-63).

Finally, we assume some capacity to retain and pass on to others workable solutions to problems faced in the struggle for existence. The advantages of retaining such problem solutions or adaptations are obvious in avoiding the risks and labor of learning them anew. We assume that some capacity to pass on to others information about such workable solutions exists.

This is the basis of the Darwinian *principle of inheritance*. It refers to a broad class of mechanisms, including those of "replication" and "descent" (Mayr 1991), by which information concerning adaptations is retained, preserved, passed on or copied through time.

In sum, a complex population system involves populations of non-identical (intentional or non-intentional) entities that face locally scarce resources and problems of survival. Some adaptive solutions to such problems are retained through time and may be passed to other entities. Examples of populations in such systems are plentiful both in nature and in human society. They include every biological species, from amoebas to humans. They would include self-replicating automata, of the type discussed by John von Neumann (1966). In addition, and importantly for the social scientist, they include human institutions, as long as institutions may be regarded as cohesive entities having some capacity for the retention and replication of problem solutions. Such institutions would include business firms (Hodgson and Knudsen 2004).

The Core Darwinian Principles

Having sketched in broad terms the type of "evolutionary" system we are considering, it becomes evident that the evolution of such a system *must* involve the three Darwinian principles of variation, inheritance, and selection.[6] These abstract principles do not themselves provide all the necessary details, but nevertheless they must be honored. Otherwise, the explanation of the evolution will be inadequate.

Consider the three Darwinian principles in turn. First, there must be some explanation of how variety occurs and how it is replenished in a population. In biological systems, the answers – established since Darwin's death – involve genetic recombination and mutations. By contrast, the evolution of social institutions involves very different mechanisms, but the general problem of the existence and replenishment of variety remains a vital question of evolutionary research (Metcalfe 1998; Nelson 1991; Saviotti 1996).

Second, there must be an explanation of how useful information concerning solutions to particular adaptive problems is retained and passed on. This requirement follows directly from our assumptions concerning the broad nature of complex population systems, where there must be some mechanism by which adaptive solutions are copied or passed on. In biology these mechanisms often involve genes and DNA. In social evolution we may include the replication of habits, customs, rules and routines, all of which may carry solutions to adaptive problems. There must be some mechanism that ensures that some such solutions endure and replicate; otherwise, the continuing retention of useful knowledge would not be possible.

Third, and not least, there must be an explanation of the fact that entities differ in their longevity and fecundity. In given contexts, some entities are more adapted than others, some survive longer than others, and some are more successful in producing offspring or copies of themselves. Here the *principle of selection* comes in. Briefly, selection involves an anterior set of entities, each interacting with its environment and somehow being transformed into a posterior set where all members of the posterior set are sufficiently similar to some members of the anterior set, and where the resulting frequencies of posterior entities depend upon their properties in the environmental context (Price 1970; 1995). Through selection, a set of entities, a population, will gradually adapt in response to the criteria defined by an environmental factor. In a cold environment, the proportion of mammals with more fat or longer fur is likely to increase.

This broad definition of selection is nevertheless sharp enough to distinguish itself from the principle of variation. The latter requires some explanation of the sources and replenishments of variety. Selection refers to the mechanisms that bring about the survival of some variations rather than others, often reducing variety. Even when both variety-creation and selection involve human agency, as often is the case in the human domain, the two processes are quite different. Innovation is about the creation of new variations; selection is about how they are tested in the real world.

Note that the outcomes of a selection process are not necessarily moral or just. Furthermore, there is no requirement that outcomes of a selection process are necessarily optimal or improvements on their precursors. Insofar as these outcomes carry connotations of refinement or efficiency, it is efficiency relative to the given environment, and efficiency that is tolerable rather than optimal. Darwinism does not assume that selection brings about globally efficient or (near) optimal outcomes, and in certain instances, selection can even lead to systematic errors (Hodgson 1993; Hull 2001).

Without the principle of selection, we have no way of explaining how some entities or their offspring prevail over others. The principle is widely held to apply in the natural world; some members of the species often have greater chances of survival and procreation. This helps to explain how species, over the long term, become adapted to their environment. But the move from the natural to the social world does not undermine the principle of selection. Even if there is not a fierce life-and-death struggle between rival customs or institutions, some explanation is required of why some enjoy greater longevity than others, why some are imitated more than others, and why some diminish and decline. Any such explanation must come under the general rubric of selection, as defined above.

Darwin's principles of variation, inheritance and selection are required not only to explain evolution within populations but also the origins of those populations themselves. Overall, as long as there is a population with imperfect inheritance of their characteristics, not all of them having the same potential to survive, then Darwinian evolution will occur.

Note that this argument does not propose that social or economic phenomena can be explained in biological terms. It is not a version of biological reductionism, as Poirot acknowledges and appreciates.

Note also that the idea of generalizing Darwinism does not rely on the mistaken idea that the mechanisms of evolution in the social and the biological world are similar.[7] Not only do natural and social evolution differ greatly in their details, but also detailed mechanisms differ greatly *within* the biological world. Biological organisms differ enormously in size, lifespan and reproductive fertility. Some biological species are social, others not. As well as through seeds, some plants can reproduce by lateral root-sprouts or suckers. Generally, replication among invertebrates is very different from that among vertebrates. And so on. To say that two sets of phenomena are similar in highly general terms does not imply that they are similar in detailed respects.

Darwin's principles of evolution do not themselves provide a complete explanation. Darwinism does not provide a complete theory of everything, from cells to human society. Instead, these principles are a kind of metatheory, or a theoretical framework wherein particular explanations must be placed.[8] Crucially, explanations additional to natural selection are always required to explain any evolved phenomenon. For example, natural selection alone cannot explain why some birds have dull plumage, and others colorful plumage. Different auxiliary explanations are required, such as camouflage against predators in some cases, or competition for mates and sexual selection in others. Selection is a general principle, but it operates in different ways. Natural selection does not itself induce variability at the individual level, and additional theories are required to explain this. The sources of variation are very different in different contexts. The general Darwinian principle of variation applies, but it does not itself explain how variation occurs.

Accordingly, the transfer of Darwinian principles from biological to social evolution does not imply that the detailed mechanisms of selection, variation and inheritance are similar. Consequently, the application of general Darwinian principles

cannot do all the explanatory work for the social scientist. Darwinism alone is not enough.

The suggestion is that the theoretical analysis of complex population systems cannot be confined to one level, with one all-embracing theory. Instead, what are required are analysis-combining theories addressing different levels and degrees of generality (Hodgson 2001, 324-9).

Analogy Versus Generalization

Having outlined the perspective addressed by both Cordes and Poirot, I turn to the particular criticisms raised by Cordes. Unfortunately, his misunderstandings are legion. Indeed, his entire argument is based on a confusion between analogy and generalization. His claim that the mechanisms of social and biological evolution are very different is valid. But, as I show below, it is an *irrelevant* response to the proposal for a generalized Darwinism.

It should be clear from the account in the two preceding sections that the idea of generalizing Darwinism has little if anything to do with biological metaphors or analogies with biology. Instead, the description of complex population systems, and the claim that they exist in both the social and the biological world, is essentially a contention of a degree of *ontological communality*, at a high degree of abstraction and not at the level of detail.

By contrast, Cordes treats the idea of generalizing Darwinism as essentially about analogies or metaphors between the social and the biological world.[9] Words like "analogy" and "metaphor" are numerous, and even appear in the title of his essay. By contrast, he shows no recognition that the idea of a generalized Darwinism rests instead on the claim of ontological communality at an abstract level. The point has been made previously that generalized Darwinism is not essentially about analogy or metaphor but about ontological communality at a highly abstract level (Hodgson 2002). Although Cordes cited this particular article, its key point and its subtitle "from analogy to ontology" have not been heeded.

What is the difference between analogy and generalization?[10] With an analogy, one phenomenon or process is taken as the reference point and other similar processes are compared to it. Differences are regarded as dis-analogies. Clearly, for example, social evolution is not closely analogous to genetic evolution, because the entities and mechanisms are very different. It has been claimed, by contrast, the Keynesian "circular flow of income" has some analogous features with hydraulic mechanisms, as illustrated by the famous Phillips Machine where money flows are simulated by water in transparent tubes.

By contrast, generalization in science starts from an array of different phenomena and processes, without giving analytical priority to any of them over others. Where possible, shared principles are adduced. Given that the entities and processes of biological evolution are very different, at most these common principles will be highly abstract and will not reflect detailed mechanisms found in any one particular domain.

The laws of motion in physics apply equally to planets, rockets and billiard balls, despite huge differences of size, composition and shape. Generalization is possible because, at an abstract level, the same principles apply to all the phenomena, despite major differences in these entities and their contexts. In biology, the recognition of different levels of analysis is vital: the phenomena are so complex that general principles have to be supplemented by many more auxiliary and particularistic explanations. That is one reason why biology differs from physics (Mayr 1985).

His failure to distinguish between analogy and generalization, different levels of abstraction, and different domains of similarity or dissimilarity, misleads Cordes into numerous (valid but) irrelevant claims that social and biological evolution are different at the level of detail. In response, if the core Darwinian principles can be generalized, it is at the meta-theoretic or highly abstract level, not at the less abstract levels that address particular details or mechanisms.

For example, Cordes (2007, 138) makes the familiar point that the development of firms is very different from the development of biological organisms because the former is much more dependent on learning, entrepreneurial imagination and other feedbacks than organism development programmed by the genes. The first reaction to this is to point out that not all social entities are highly dependent on foresight and learning for their development. Some customs and folkways change little. Second, the ontogenetic development of some organisms, including apes, is highly dependent on learning and foresight. Consequently, while they exist, the differences between biological and socio-economic evolution in this respect are not as sharp as Cordes suggests. Third, and most important, leaving aside the validity or invalidity of the first two reactions, the point made by Cordes is *irrelevant* because it applies to the level of detail rather than the metatheoretical level of generalized Darwinian principles.

Other Criticisms and Responses

Cordes (2007, 138) also points out that "human intentionality and deliberation play a crucial role in this aspect of cultural evolution." Again, the implied distinction is too sharp. To some degree, intentionality plays a role in some non-human organisms and it does not play a universal role in human and social evolution. Again, the point is largely true but irrelevant.

Darwin did not treat humans as if they were incapable of self-reflection, reason, foresight, purpose or planning. Such attributes are foreshadowed in the non-human animal world. Darwin (1859, 208) wrote: "A little dose . . . of judgment or reason often comes into play, even in animals very low in the scale of nature." As Darwin (1871, vol. 1: 46) repeated elsewhere: "animals possess some power of reasoning. Animals may constantly be seen to pause, deliberate and resolve."

Human intentionality is very important in the social sphere. Humans have unique capacities for prefiguration and deliberation. Human social interaction also involves the imputation of such powers to others with whom we interact. However, nothing in Darwinism excludes or belittles human intentionality, prefiguration,

deliberation, and choice. What Darwinism requires is that they too should be subject to causal explanation.

As Veblen (1914; 1919) made amply clear, intentionality would have little bite unless it was guided by prior knowledge and experience, which in turn is necessarily shaped by the individual's habits and instincts. Thus, in order to explain why decision-makers intend particular outcomes, why they sometimes continue to intend particular outcomes despite negative feedback, and why systematic errors often continue to lead to unintended and unwanted outcomes, it is important to understand how intentions build upon prior habits and instincts (Hodgson 2006b).

Cordes suggests that the Darwinian concept of selection necessarily implies that the selected entities have "proven adaptive value" and he associates selection with "progressive evolution." If this means that selection necessarily results in the survival of the fittest, the most adaptive or the most efficient, then this statement is wrong. First, it is widely acknowledged that selection, even in biology, does not necessarily result in relatively efficient or superior outcomes (Dupré 1987). Second, fitness or efficiency is context dependent: what are fit or efficient in one context can be less efficacious in another. Third, nothing in the technical definition of selection – based on the work of George Price (1970; 1995) – requires that selected outcomes necessarily involve improvement in any sense, including fitness or efficiency (Andersen 2004; Frank 1998; Henrich 2004; Hodgson and Knudsen forthcoming; Knudsen 2002; 2004a). Cordes completely ignores this literature.

Cordes also argues that relevant social entities "cannot be considered to be 'gene-like' and thus fail to serve as inert units of selection." First, the phrase "units of selection" is widely recognized in the modern philosophy of biology as ambiguous. Elliott Sober (1984) makes a useful distinction between "selection *of*" and "selection *for*." Biological evolution involves the *selection of* phenotypes (not genes) that leads to changes in the population gene pool and the *selection for* genotypes (including genes). Hence, even in biology, "units of selection" do not have to be genes and they do not have to be inert.

Second, plausible replicators (the equivalent of genotypes) in the social domain – such as habits, customs and routines – are clearly very unlike genes and they are not inert. To be replicators, all that is required is that they conform to the abstract definition of a replicator (Hull 1988; Sterelny, Smith, and Dickison 1996; Godfrey-Smith 2000; Sperber 2000). Knudsen and I argue that they do (Hodgson 2003a; Hodgson and Knudsen 2004; 2006a, 2006b). Cordes should engage with these definitions and arguments instead of making the obviously valid, but undamaging and irrelevant, point that candidate social replicators are very different from genes.

Cordes claims that natural selection is an *a posteriori* phenomenon, in contrast to processes of change in human society. This is strictly incorrect. If Cordes were aware of the technical literature (Price 1970; 1995), he would appreciate that selection is a *processual and causal relation* between an anterior and posterior set, and is not a purely *a posteriori* phenomenon.

Cordes draws a sharp contrast between diffusion and selection. However, under widespread conditions, diffusion can be regarded as a special case within Price's

(1970; 1995) widely accepted definition of selection. Unfortunately, Cordes does not make it clear what he means by diffusion.

Cordes shares with John R. Commons the misunderstanding that "artificial" and "natural" selections are mutually exclusive. By contrast, Darwin (1859) did not suggest this. Instead, examples of the former were used to support the idea of the latter. Furthermore, as pointed out elsewhere (Copeland 1936; Hodgson 2003b; 2004) any "artificial selection" of institutions depends on the prior selection of guiding ethical rules or other principles that are used in the selecting process. The rules or dispositions used in "artificial" selection are also caused, and their evolution must be explained.

The "Continuity Hypothesis"

Cordes follows his teacher, Ulrich Witt (2003; 2004), in advancing a proposition differing from the idea of generalizing Darwinism and described as the "continuity hypothesis." Witt (2004, 131-2) explains that the "continuity hypothesis" involves the idea that natural evolution has

> shaped the ground, and still defines the constraints, for man-made, or cultural, evolution . . . not withstanding that the mechanisms and regularities of cultural evolution differ from those of natural evolution. The historical process of economic evolution can be conceived as emerging from, and being embedded in, the constraints shaped by evolution in nature.

According to Cordes (2007, 141):

> The continuity hypothesis represents a way of showing how Darwinian theory can be relevant for turning economics into an evolutionary science – thereby meeting a Veblenian desire: the human species is a result of natural (Darwinian) evolution; natural evolution has shaped the ground and still defines the constraints for human-made, or cultural, evolution.

Personally, I fully agree with this "hypotheses" as formulated above. Indeed, I would regard it as something much less tentative: I cannot imagine how it could be false. Since I am neither religious nor a creationist, I would argue as *fact* that all aspects of human social evolution emerge from and are embedded in "the constraints shaped by evolution in nature." Since Darwin such an idea has become commonplace, even among social scientists. I cannot think of a reputable contemporary social scientist that believes otherwise.

Beyond this fairly obvious post-Darwinian and anti-creationist contention, it is unclear what the continuity hypothesis really means. It could simply mean that the social is based on the biological, but this point does not seem worth much emphasis

among modern social scientists (Knudsen 2004b). The continuity hypothesis might point to something more particular or profound, but so far, it is unclear what this is. Witt's (2003; 2004) work usefully suggests in places a conjoined research program involving insights from both the biological and social sciences, but this suggests a stronger definition of the "continuity hypothesis" than the one provided so far. In any case, as currently formulated, it is neither inconsistent with, nor an alternative to, the idea of a generalized Darwinism.[11]

In Lieu of a Conclusion

Throughout the twentieth century, the social and biological sciences have had an uneasy relationship (Degler 1991; Hodgson 2004). Facing such abominations as eugenics and the holocaust, social scientists have been trained to be suspicious of any rapport between the social sciences and biology. However, as Veblen fully understood, Darwinism has shaped more than our understanding of biological evolution. It has major ontological and theoretical implications for all the sciences, including economics.

Accordingly, I wish to advance a "discontinuity hypothesis." This hypothesis addresses the resistance of many social scientists to the use of core Darwinian concepts to help explain the evolution of socio-economic phenomena. My "discontinuity hypothesis" is that this resistance, with its associated contention that Darwinism is relevant for nature but not for human society, stems from a culturally transmitted aversion among social scientists to any importation of Darwinian ideas in their domain. This aversion is found in the works of Karl Marx, Émile Durkheim and many other twentieth century social scientists (Hodgson 2006). Current evidence in favor of this "discontinuity hypothesis" as that the opponents of attempts to generalize Darwinism have generally failed to address carefully the definitions and arguments involved. Unfortunately, so far such an engagement has been limited at best. I look forward to the occurrence of more substantial and better researched scrutiny and debate.

Notes

1. I also wish to thank David Hull, Thorbjørn Knudsen and Jan-Willem Stoelhorst for very useful comments on an earlier draft of this response.

2. Cordes (2005, 1065) writes that Dawkins "has claimed that Darwinian principles may be as universal as the laws of physics." Perhaps the closest that Dawkins (1976, 205) gets to suggesting this is by raising this question: "The laws of physics are supposed to be true all over the accessible universe. Are there any principles of biology that are likely to have similar universal validity?" This is similar but not identical to Cordes' depiction. Nevertheless, in any case, I agree with Cordes that the idea that Darwinian principles are "as universal as the laws of physics" is wrong. The laws of physics apply to simple as well as complex systems, but Darwinian principles apply to complex population systems only. This instance provides further evidence that the term "universal Darwinism" can be misleading.

3. Hence, the description by Cordes (2005, 1065) of Dawkins as the "inventor of Universal Darwinism" is at best misleading. The idea of generalizing Darwinism was largely neglected after Veblen but was revived after the contributions of Childe (1951) and Campbell (1965). See Hodgson (2004; 2005) for a more detailed history, including demonstrations of the support of Veblen and others for the idea of generalizing Darwinism.
4. This account of complex population systems makes use of material from Hodgson and Knudsen (2006a), where some further details of the argument appear.
5. See Hodgson and Knudsen (2006a, 4) and Hodgson (2006a, 30-31) for brief discussions of this specific concept of scarcity.
6. Cordes confusingly uses the term "neo-Darwinian," which is capable of several different meanings. It can refer to the post-Weismann modification of Darwinism, the synthesis of Darwinism with genetics, or Dawkins-type "selfish gene" theory, among others. Cordes is unclear what *he* means. For the response here, the term "neo" is unwarranted and unnecessary, for all the key principles involved in generalizing Darwinism are present in Darwin's (1859) original work.
7. For this reason, the (obviously correct) observation by Cordes (2005, 1065) that "the units and processes of selection differ in the biological and cultural spheres" is not a valid objection against a generalized Darwinism. I discuss this objection in the context of Cordes' (2007) paper below.
8. Poirot (2007, 174) writes: "Hodgson's definition of Universal Darwinism is at the level of meta theory, a concept of which I am admittedly, innately suspicious. I have advanced and supported the argument that Darwinism should be viewed as an empirically oriented scientific research tradition and that the principles of variation, inheritance and selection must have empirical applicability." Poirot is absolutely right to say that Darwinism is empirically oriented. This point has been stressed by Hull (1973, 3-36), who crucially also embraces a generalized Darwinism (Hull 1988; Hull, Langman, and Glenn 2001). The two stances are perfectly compatible and complementary. This is because the metatheory promotes more specific and empirically oriented questions concerning *how* variety is sustained and renewed, *how* adaptations are inherited, and *how* selection occurs, in specific instances.
9. The same error is present in Cordes' (2006) critique of generalized Darwinism in another journal.
10. It should also be pointed out that analogy and metaphor are different. As Lewis (1996, 498) argues: "Metaphor is *prior* to analogy, describing similarities and analogies that were unknown before their existence was pointed out by metaphor. Metaphor uses the known to express the unknown."
11. Cordes (2006, 531) depicts the continuity hypothesis as implying a rejection of any application of abstract Darwinian principles to socio-economic evolution. But there is nothing in his (2006; 2007) definitions of the continuity hypothesis that implies such a rejection.

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