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Abstract:

In the social sciences, the label Darwinian often means a biological explanation of social phenomena. Both Hayek and Boulding adopt a Lamarckian approach to social evolution. Hayek shows that coordination of groups larger than hunting and gathering bands requires a cultural evolution of learnt rules. Boulding uses the notion of noosphere of human knowledge, where learning transmits the noogenetic structure. Hayek's and Boulding's Lamarckian theories are compared with Darwin's theory of social evolution to explore how the latter may be extended to explain the links between human knowledge, rules, and evolution of society, outlining a Darwinian social/cultural approach.

Keywords: Darwin, Hayek, Boulding, Learning, Social evolution, Cultural evolution, Biological evolution

JEL Classification: A12, B31, B52

1. INTRODUCTION

In the social sciences, the label Darwinian often means a biological explanation of social phenomena. Sociobiology, as developed by Wilson (1975), explains social phenomena genetically, while Alexander (1987) includes environmental as well as genetic factors to explain moral systems. Dawkins (1976) views social phenomena as survivor machines of the genes, which are the units of selection. Hence, sociobiology makes the evolution of society rest on the foundation of evolutionary biology pure and simple. Wilson (1998) argues that evolutionary biology will become the foundation of the social sciences. However, Dawkins's notion of meme, as cultural analogue to the gene in biology provides for co-evolution of biology and culture in a field called memetics.

Evolutionary psychology understands the human mind in terms of evolutionary biology. According to Maryanski and Turner (1992), humans are animals with innate predispositions that are the result of a long evolutionary history. Evolutionary psychology stresses that the human brain was shaped by natural selection during human evolutionary history (Cosmides et al. 1992). Accordingly, language is innate (Pinker 1994), while the human mind evolved as a set of specialized mental modules through evolutionary adaptation (Pinker 1997). Furthermore, humans execute adaptive psychological mechanisms and culture is the product of evolved psychological mechanisms (Tooby and Cosmides 1992), while social contract algorithms (specific and functionally distinct computational units) govern human reasoning in social exchange (Cosmides and Tooby 1992). Based on evolutionary psychology, Rubin's (2002) notion of Darwinian politics means that the theory of evolution and the evolutionary history of humans are relevant for understanding contemporary political behavior. Rubin (pp. 123-127, 133-134) claims that the underlying political taste for freedom, which is best fulfilled in modern western societies, is a biological heritage from the hunting and gathering

bands of human prehistory. Hence, the view of evolutionary psychology implies a causality going from biology to culture.

However, Deacon (1997, pp. 349-350) provides a more complex view, arguing that rather than being innate, the symbolizing function of language has induced the brain's evolved capacity to sustain language in an interactive evolutionary process (i.e. co-evolution of language and the human brain):

> The evolutionary dynamic between social and biological processes was the architect of modern human brains, and it is the key to understanding the subsequent evolution of an array of unprecedented adaptations for language. This is an important shift in emphasis away from what might be called "monolithic innatism," that is, the view that the "instinct" that humans have for language is some unitary and modular function: a language acquisition device (LAD).

Interestingly, Boulding (1978, p. 19) argues that the 'evolutionary vision sees human history as a vast interacting network of species and relationships of many different things, and there is really no "leading factor" always in the forefront.' This leads us to the underlying question of this paper: How can Charles Darwin's evolutionary social thought be reconciled with the evolutionary social thought of two of the founders of evolutionary economics: Friedrich von Hayek and Kenneth Boulding? Because learning plays such a crucial role in social evolution in the evolutionary social thought of Hayek and Boulding, this paper considers these theories as Lamarckian since learning implies a Lamarckian transmission mechanism while Darwin's evolutionary social thought can be characterized as biology of interpersonal relations (as next section shows).

This paper compares Hayek's and Boulding's Lamarckian theories of social evolution with Darwin's theory of social evolution to explore how the latter may be extended to outline a Darwinian social/cultural approach that explain the links between human knowledge, rules, and social evolution. It brings together Darwin's brain-language nexus, Boulding's language-mind nexus, and Hayek's mind-culture nexus, as three combined processes in social evolution. This means co-evolution of biology and culture. In order to avoid treating history and cultural evolution as a black box, we must a focus on the prehistorical co-evolution of biology and culture, and a dynamic approach, studying the evolutionary process from human prehistory through human history up to the present, rather than, like Rubin, focusing on biological evolution of humans and employing a comparative static approach, comparing human prehistory to the present (Marmefelt 2005, p. 117).

Similarly, Seabright (2004, pp. 1-3) argues that the Great Experiment, launched ten thousand years ago of human task-sharing among strangers cannot be explained by evolutionary biology alone. The cultural capabilities of humanity are much younger than the biological changes on which they are based, which in turn can be traced back to the evolutionary pressures of hunters and gatherers on the African savanna (Seabright, p. 3). Seabright shows that culture, not biology, has caused what he considers to be the transition of humans 'From Murderous Apes to Honorary Friends' (p. 29). Humans possess an innate murderousness, reinforced by human intelligence (pp. 48-53), but cooperation evolved as the combined effect of calculation and reciprocity (p. 54), where calculation exercises trust and reciprocity inspires trust (p. 59). Successful social institutions 'entrench a culture of trust with a minimum of explicit enforcement' (p. 65).

Hence, biology is the foundation of cultural capabilities, while cultural evolution is a response to the innate murderousness biological evolution has caused, so that culture constrains biology. Co-evolution of biology and culture and a dynamic approach are essential.

Section 2 identifies the chief differences between Hayek and Boulding, on the one hand, and Darwin, on the other hand. Section 3 analyzes the Lamarckian theories of social evolution, where human knowledge and learning are crucial, of evolutionary economists Hayek and Boulding. Section 4 analyzes Darwin's theory of social evolution, which provides the biological foundations of interpersonal relations. Section 5 synthesizes the theories of Darwin, Hayek, and Boulding, thus outlining a Darwinian approach to human knowledge, rules, and societal evolution by bringing in human knowledge into a Darwinian framework. Section 6 gives the conclusions.

2. HAYEK AND BOULDING VERSUS DARWIN

This section presents the main differences between Hayek and Boulding, on the one hand, and Darwin, on the other hand. It argues that as learning plays a crucial role to Hayek and Boulding, their theories of social evolution involve a Lamarckian transmission mechanism and should be considered as Lamarckian, while Darwin provides the biology of interpersonal relations through Smith's concept of fellow-feeling.

Both Hayek (1979, pp. 153-155) and Boulding (1978, pp. 20-21) point out the common errors of sociobiology that Rubin (2002, p. 5) commits when he argues that the relevant time period is the Pleistocene, from 1.6 million years to ten thousand years ago, when humans evolved as biological species, while the Holocene (the period from when farming began up to the present) is too short to have caused significant evolutionary changes in behavior. This argument ignores that cultural evolution is a faster process than biological evolution and its dominating position among humans. Hayek (1979, p. 154) argues that 'there was certainly no justification for some biologists treating evolution as solely a genetic process, and completely

forgetting about the similar but much faster process of cultural evolution that now dominates the human scene and presents to our intelligence problems it has not yet learnt to master.' Boulding (1978, p. 21) states that the principal weakness of sociobiology

> is that it concentrates almost exclusively on what I have called "biogenetics" and the way in which behavior is directly determined by the genetic programs coded in DNA and the genes, and is somewhat neglectful of "noogenetics," the transmission of learned behavior coded in nervous systems toward which the biogenetic structure contributes only potential.

Furthermore, Boulding (p. 123) finds that once we come to humans, 'noogenetics dominates biogenetics to a remarkable extent' and that the 'processes by which each generation of human beings learns from the last are far more important than the process by which biological genes are inherited.' The emergence of humans as biological species meant that 'evolution of this planet went into a new gear' (p. 121).

In Hayek's (1979, p. 156) analysis, 'the most important part of cultural evolution, the taming of the savage, was completed long before recorded history begins', while 'mind and culture developed concurrently'. Hayek (1979, p. 160) shows that coordination of groups larger than hunting and gathering bands requires a cultural evolution of learnt rules:

> The transition from the small band to the settled community and finally to the open society and with it to civilization was due to men learning to obey the same abstract rules instead of being guided by innate instincts to pursue common perceived goals. […] Instead of the direct pursuit of felt needs or perceived

> objects, the obedience to learnt rules has become necessary to restrain those natural instincts which do not fit into the order of the open society.

Hence, learning, by which human knowledge evolves, is the key to the evolution of human society, hereafter called social evolution.

Social evolution, called societal evolution by Boulding and cultural evolution by Hayek, differs from biological evolution, especially the transmission mechanism. Boulding (1978, pp. 122-123) uses the notion of the noosphere of human knowledge as a counterpoint to the biosphere of genetic knowledge and argues that learning transmits the noogenetic structure, like mutation changes biogenetic structure, explicitly pointing at the Lamarckian nature of social evolution, in contrast to biological evolution. 'Change in the biogenetic structure takes place through mutation in its own patterns in the genes. These are not produced by any learning process of the organism as Lamarck thought,' while 'the learned knowledge is represented by some kind of acquired brain structure, which is not produced by the biogenetic structure, though the biogenetic structure does produce the potential for it.' Using the bird's brain, Boulding (p. 123) illustrates this:

> A bird's genes produce a brain in the bird, which has the potential for learning the bird's song, but if it does not hear other birds, this potential will not be realized and the brain will remain unstructured. Here we do have something like a Lamarckian genetic process. It is a different kind of process, however, from pure biogenetics, which is clearly not Lamarckian.

Using this statement by Boulding, we may argue that the bird's song co-evolves with the bird's brain, along the lines of Deacon, rather than being innate, along the lines of Pinker, as it

involves learning through interaction with other birds. Hence, Boulding's view is that whenever we have learning, we have Lamarckian evolution. Boulding (p. 136) states:

> The great difference between biological and societal evolution is that, whereas prehuman organisms occupy niches and expand to fill them, the human organism is a niche-expander creating the niches into which it will expand. […] Three great epochs of niche expansion of the human race may be noted corresponding roughly to our three forms of knowledge formation.

Human learning is the key to social evolution, and as learning involves a Lamarckian transmission mechanism, social evolution is Lamarckian, or in Hayek's (1988, p. 25) words:

> although biological theory now excludes the inheritance of acquired characteristics, all cultural development rests on such inheritance – characteristics in the form of rules guiding the mutual relations among individuals which are not innate but learnt. To refer to terms now used in biological discussion, cultural evolution *simulates* Lamarckism.

Lamarckian evolution is characterized by a progression from the simplest animals to the humans, the most complex and perfect, in which various organs are acquired successively (Lamarck, 1830, p. 5). This is a rather deterministic sequence of stages. According to Hayek (1973, p. 23), the theory of social evolution has been discredited by "laws of evolution", such as 'a statement of a necessary sequence of particular stages or phases through which the process of evolution must pass and which by extrapolation leads to predictions of the future course of evolution.' Theories of social evolution cannot be Lamarckian in this sense, but in

terms of the evolutionary mechanisms. Indeed, Lamarck (pp. 233-234) develops a view of the evolutionary process, where changed circumstances yield changed needs, which necessitates adaptation. Lamarck's two evolutionary laws say that characteristics develop according to the frequency and duration of use, increasing with use and decreasing with disuse, which is the first law, while the acquired characteristics of a generation may be inherited by the succeeding generation, which is the second law (pp. 235). Acquired characteristics may be inherited in social evolution through learning, but not in biological evolution. Human knowledge, which is acquired by learning, is the result of what all previous generations have learnt. Hence, as both Hayek and Boulding stress human knowledge, they adopt a Lamarckian approach to social evolution, in terms of the evolutionary mechanisms, especially the transmission mechanism (i.e. their theories are consistent with Lamarck's two evolutionary laws, mentioned above).

Darwin (1882) points out that the intellectual faculties of humans allowed articulate language to be evolved (p. 48), and that the human lack of size, strength, and ferocity facilitated the acquirement of higher mental qualities, such as sympathy and the love of fellow humans (p.64). Our capacity to perceive sympathy in others depends on their expression through movements of the face and body that aid the force of language. Darwin (1898, p. 354) concludes that the power of communication 'by means of language has been of paramount importance in the development of man; and the force of language is much aided by the expressive movements of the face and the body.' 'We readily perceive sympathy in others by their expression' (p. 364), thus making the expression of emotions crucial to interpersonal relations.

This can be seen in the light of concept of fellow-feeling in Adam Smith's *The Theory of Moral Sentiment*, originally from 1759, as essential to morality as a complex order that emerges through interaction, and the current notion of interpersonal relations, which recently has received attention in economics. According to Smith (1790):

> Pity and compassion are words appropriated to signify our fellow-feeling with the sorrow of others. Sympathy, though its meaning was, perhaps, originally the same, may now, however, without much impropriety, be made use of to denote our fellow-feeling with any passion whatever. (part I, section I, paragraph 5)

> whatever may be the cause of sympathy, or however it may be excited, nothing pleases us more than to observe in other men a fellow-feeling with all the emotions of our own breast; nor are we ever so much shocked as by the appearance of the contrary. (part I, section I, paragraph 14)

Expressions of emotions are powerful in their capacity to induce sympathy or fellow-feeling. 'Grief and joy, for example, strongly expressed in the look and gestures of any one, at once affect the spectator with some degree of a like painful or agreeable emotion' (Smith, part I, section I, paragraph 6).

Adam Smith's impartial spectator provides normative faculties that we need for a normative theory with two-tiered preferences, that is, a set of preferences to decide among the set of preferences about immediate objects, where the impartial spectator puts a check on excessive self-interest (Rizvi 2002, pp. 243-247). The impartial spectator represents conscience and operates to bring individual sentiments into alignment through a social process that forms morality (Sugden 2005, p. 64). Pelligra (2005, pp. 117-119) considers trustworthiness as a relational good because the capability of self-reflection is a consequence of reciprocal sympathy, while the impartial spectator plays a crucial role in self-evaluation. Interestingly, Darwin (1882, p. 106) makes a distinction between love and sympathy,

referring to Adam Smith. Essentially, Darwin provides the biological foundations of interpersonal relations through Smith's fellow-feeling.

Summing up, as both Hayek and Boulding stress human knowledge, they adopt a Lamarckian approach to social evolution in terms of the evolutionary mechanisms, especially the transmission mechanism (i.e. their theories are consistent with Lamarck's two evolutionary laws), while Darwin provides the biological foundations of interpersonal relations through Smith's fellow-feeling, whose acquirement was facilitated by the human lack of size, strength, and ferocity.

3. LAMARCKIAN SOCIAL EVOLUTION: HAYEK AND BOULDING FROM A SEARLEAN PERSPECTIVE

This section compares the evolutionary social thought of Fredrich von Hayek and Kenneth Boulding, two of the founders of evolutionary economics. Boulding's evolutionary social thought is the most complete and comprehensive, while Hayek's evolutionary thought is more fragmented, and by reading Boulding together with Hayek we will be able to appreciate the breadth in Hayek's evolutionary thought. Learning will be identified as playing a key role in their theories. The human brain gives the capacity to learn through the neural order, while the human mind gives a sensory order by which humans form images. The crucial role the symbolizing function of language plays will be studied by means of philosopher John Searle.

Society as spontaneously evolved social order is, to Hayek (1967, p. 78, 1973. p. 74), based on both the innate, genetically inherited rules of human behavior and the learned, culturally transmitted rules of human conduct. Hayek (1979, pp. 160-161) shows that coordination of groups larger than hunting and gathering bands requires a cultural evolution

of learnt rules. Boulding (1978, pp. 122-123) considers evolution to be a process in knowledge or genetic structure with human knowledge in the noosphere and genetic knowledge in the biosphere, where learning transmits the noogenetic structure, like mutation changes biogenetic structure. Again, cultural evolution is most important to humans. When we come to the human race, Boulding states, 'noogenetics dominates biogenetics to a remarkable extent' (p. 123), which means that the knowledge and value structure of human persons guide their behavior rather than human genome. According to Boulding (p. 122):

> Just as there is the genosphere or genetic know-how in the biosphere, so there is a noosphere of human knowledge and know-how in the sociosphere. The noosphere is the totality of cognitive content, including values, of all human nervous systems, plus the prosthetic devices by which the system is extended and integrated…

Boulding considers human history and social dynamics as the evolution of human artifacts (pp. 121-122), where knowledge, materials, and energy are factors of production used to produce the human artifacts of technology (material things), organizations, and knowledge (personal, embodied in the human mind) (pp. 211-222). The production of human artifacts makes human history into a process of niche expansion (pp. 136-139). The ability to fit into a niche is crucial to evolutionary viability, since Boulding employs "survival of the fitting" (those fitting into a niche in an ecosystem) as metaphor for his selection system (p. 110). Niche expansion and the ability to fit into a niche imply some discovery procedure, such as competition in Hayek's (1976, pp. 115-120) wealth creating game of catallaxy, or the market order. Hayek (p. 109) defines catallaxy as 'the special kind of spontaneous order produced by the market through people acting within the rules of property, tort and contract.' Learning is the key, and Boulding's noogenetic evolution of human artifacts is consistent with Hayek's

cultural evolution of learnt rules. Hayek (p. 115) points out that the game of catallaxy is wealth creating because

> the returns of the efforts of each player act as the signs which enable him to contribute to the satisfaction of needs of which he does not know and to do so by taking advantage of conditions of which he also learns only indirectly through their being reflected in the prices of the factors of production which they use.

Competition is, according to Hayek (1979, p. 68), an experimental learning process:

> Competition is thus, like experimentation in science, first and foremost a discovery procedure. […] Competition must be seen as a process in which people acquire and communicate knowledge; to treat it as if all this knowledge were available to any one person at the outset is to make nonsense of it.

Hence, the market order implies that dispersed knowledge is used. Hayek (1945 [1948, pp. 80-83]) stresses the importance of the knowledge of the particular circumstances of time and place, which is dispersed among individuals, in contrast to general, scientific knowledge. Indeed, the knowledge of the particular circumstances of time and place constitutes what Boulding (1978, pp. 108-109, 128, 132-133) calls image (knowledge embodied in the human mind, the "intervening" variable between the stimulus and the response) that is subject to change through learning and becomes more widely shared with increasing communication.

In addition to language, money provides through market prices the means of communication. Hayek (1945 [1948, pp. 86-89]) points out that the function of the price system is to communicate information, thus using the knowledge of many people, while

Boulding (1978, p. 128) stresses the importance of language as a means of communication that is used to form images of large, complex, and integrated systems unknown from personal experience that are of great importance in the genesis of human artifacts, among them social organizations. Indeed, money has through market prices a language-like symbolizing function in the economy (Horwitz, 2007). The communicative function of market prices is crucial in Austrian economics, as (Horwitz, 2000, p. 33) argues:

> [T]he process of monetary exchange that takes place in the market is a way of communicating tacit information outside of natural languages. Monetary exchange is therefore an extension of linguistic communication. The communication made possible by monetary exchange is essential of course, because without it much of the knowledge necessary for economic coordination would go uncommunicated.

Boulding (1978, pp. 222-224) mentions three kinds of social organizers: the threat system, the exchange system, and the integrative system, stressing that all societies have combined these three systems into a specific bonding structure. He argues that benevolent integrative identification tends to initiate exchange and that integrative structures are necessary to sustain exchange (p. 277). In the integrative system, species of ideas, images, valuations, affections, and symbols interact (p. 200). Essentially, these define the characteristics of the map in Hayek's (1952) sensory order, which is a part of the overall spontaneous order called society. The map 'reproduces some of the relations which exist in certain parts of the physical world' (Hayek, 1952, p. 109). Hence, these reproductions are what Boulding calls images in the human mind. We may, therefore, conceive Hayek's map as a set of Boulding's images, thus implying complementarity, but not identity, between Hayek's map and Boulding's images.

The evolutionary character of the map can be seen in its being what past experience has created in the brain and its continuous, gradual change, where a set of impulses reproduce a record of past associations. The map is, to Hayek, merely an apparatus for classification, by which a sequence of individual mental images result from streams of impulses (pp. 115-118). Yet, this mental or phenomenal order is based on the neural order of the fibers of the nervous system that brings in the impulses from the physical order of the external world that is to be represented by the sensory order in the form of a model emerging from classification (pp. 39-40, 52-53, 64, 105-106).

The neural order and the sensory order belong to what Boulding (1978, pp. 100, 109) calls the biosphere and the noosphere, respectively, where the latter includes the former. Cultural evolution includes human biological evolution, but not the other way around (Marmefelt, 2005, p. 117). Caldwell (2004, pp. 296, 299) observes that Hayek uses little of evolutionary concepts in his analysis of the sensory order and argues that his later attempted, but unfinished, general theory of communication is as an evolutionary extension that models communication between two classificatory systems, each containing numerous classificatory systems. Nevertheless, the sensory order is an evolutionary process (i.e. an ongoing, continually emerging order) since sense experience is, according to Hayek (1952, pp. 166-167), based on accumulated knowledge of an acquired sensory order. A sensation is an interpretation in the light of past experience. Already there, we find an evolutionary idea that can be illustrated by means of Boulding's view of the noosphere.

The noosphere is to Boulding (1978) the totality of cognitive content of all human nervous systems, plus prosthetic devices, such as libraries, computers, and so on (p. 122), and he points at the extraordinary capacity of the human brain for making images of innumerable worlds of the imagination (p. 127). Boulding stresses the role of human language when

humans form images of large, complex, and integrated systems, and he views a word as an individual of a species whose genome is the knowledge of the word in human minds:

> The human mind can form images of large, complex, and integrated systems of which it has no personal experience through the magic of human language and other forms of human communication, such as pictures, music, and so on. (p. 128)

> A word actually spoken or written can be thought of as an individual of a species, of which the total existing number of such words is a population. Its genome is the knowledge of the word in the human minds; it is born when it is used either in speech or in writing. (p. 129)

Hence, human language is crucial to the formation of complex images of the future, another capacity of the human mind, which Boulding finds of great importance in the genesis of human artifacts (p. 132). An image of the future is, to Boulding, some projection of the image of the past, while images change when they no longer work (pp. 132-134). As Hayek's map can be seen as a set of Boulding's images, this implies that the map changes when the old images become less useful. Boulding argues that the human noosphere is an evolutionary structure that develops large numbers of intersecting species of ideas, images, valuations, affections, and symbols, thus giving the dynamics of the integrative system (pp. 198-200). He points out the heritage of intellectual, affectional, moral, and symbolic "chromosomes" in the human mind, as well as learning as the key to evolution of the integrative system where acculturation is important (pp. 199-203).

Hence, we have seen that both Hayek and Boulding give learning a crucial role, but also that they view learning to be based on the biological capacity of the human brain. The

human brain gives the capacity to learn through the neural order, while the human mind gives a sensory order by which humans form images. Studying the interrelations of mind, language, and society as parts of the natural world, philosopher John Searle (1999) attributes a crucial role to the symbolizing function of language in the evolution of social institutions with the mind as biological phenomenon. Searle's concepts of consciousness and intentionality, which he uses to characterize the mind, give meaning to Hayek's map and Boulding's images and clarify the interrelations in social evolution between the neural order, the sensory order, and the social order.

Searle argues that consciousness is a biological phenomenon because conscious processes are biological processes, as a fact of neurobiology (pp. 51-53). In order to understand the field of consciousness, he uses the metaphor of an open prairie, where the flux of our conscious experiences are shifts and changes in the structure of the field (p. 82), while intentionality is subjective states, such as beliefs and desires, intentions and perceptions, loves and hates, and fears and hopes that relate a person to the rest of the world (p. 85). Concerning the relation between intentionality and consciousness, he argues that nonconscious brain states can be mind states only if they are capable of yielding conscious states, and he distinguishes between nonconscious brain states and unconscious mind states capable of becoming conscious (p. 86-89). Searle's view of consciousness, as a unified field from the start (p. 82), and Hayek's view of the map, as apparatus of classification that represents events that the organism has met during its whole past (1952, p. 115), both give history a crucial role, including biological evolutionary history of humans. From a Searlean perspective, we may distinguish between consciousness and the neural order in the biosphere and intentionality and the sensory order in the noosphere.

Searle argues that neurobiological processes cause conscious intentional states, such as thirst and hunger, which provide an evolutionary advantage (pp. 95-96). Having a good map,

referring to Hayek, or good images, referring to Boulding, is essential to what Searle calls the satisfaction of intentional states, such beliefs being true, desires fulfilled, intentions carried out, thus giving a match between propositional content and reality represented (p. 103). In order to account for social phenomena, Searle (pp. 119-120) uses the notion of collective intentionality, which implies intersubjectivity, since personal intentions are combined with beliefs about the others' intentions:

> [T]he requirement that all intentionality be in the heads of individual agents, a requirement that is sometimes called "methodological individualism," does not require that all intentionality be expressed in the first-person singular. There is nothing to prevent us from having in our individual heads intentionality of the form, for example, "we believe," "we intend," and so on. […] Whenever you have people cooperating, you have collective intentionality. Whenever you have people sharing their thoughts, feelings, and so on, you have collective intentionality; and indeed, I want to say, this is the foundation of all social activities.

According to Searle, a social fact is any fact that involves agents having collective intentionality, while institutional facts also require the assignment of function (p. 121). He argues that the ability to impose status functions (functions that require collective recognition, such as money) is unique to humans because it requires language or at least a language-like capacity for symbolization, thus making language the fundamental institution (pp. 152-156). Indeed, Searle's view of language comes very close to that of Boulding's, as a means to form images of large, complex, and integrated systems unknown from personal experience, mentioned earlier. Language also allows the formation in the brain of a model of complex events to be explained through Hayek's map.

Hayek (1979, pp. 156-157) argues that mind and culture developed concurrently, while the distinguishing characteristic of humans is the superior capacity to imitate and learn, and he views the mind as a part of culture that persists and can develop because many minds constantly absorb and modify parts of it. Needless to say, language plays a crucial role. Hayek mentions language as an obvious case of acquired cultural traits affecting physiological evolution, the physical capacity of clear articulation (pp. 155-156). Hence, maps or images evolved with language, thus creating an evolutionary advantage of clear articulation.

Classification is a process by which status functions are assigned by means of language through intersubjective, interpersonal relations. The map must, therefore, be seen as the result of an ongoing history of intersubjective, interpersonal relations. These, in turn, must be understood, as Rizvi (2002, pp. 244-246, 248-249) points out, in terms of Adam Smith's theory of sympathy, which he calls normative because the impartial spectator provides the required normative faculties while the use of imagination for normative understanding yields fellow-feeling. Hence, one feels sympathy based upon imaginative reconstruction on how others feel in their situations. Using Smith's concept of fellow-feeling and view of morality as emerging property of interaction among individuals, Sugden (2005, p. 70) points out that interpersonal relations endow corresponding sentiments, which are crucial to morality, with normative status. This requires, following Searle, the assignment of status functions by means of language; because corresponding sentiments are what he calls social facts that require language, in order to turn into norms, as institutions. Hence, language plays a crucial role in interpersonal relations as a means to assign normative status.

Similarly, Boulding (1978, pp. 128-133, 197-198) argues that symbols are the messengers of the integrative system, where symbol and sentiment reinforce each other and the images of the future become wider in scope and more widely shared through increasing communication, which is made possible by the evolution of language. Hayek (1979, p. 163)

considers language, morals, law, and money to be the basic tools of civilization, which have evolved spontaneously. In his vision, the evolution of the extended market order is a process of infringements of old, customary rules and submission to new rules, thus opening up for the extensive division of labor by means of impersonal signals through market prices emerging out of the market order (pp. 161-162).

Nevertheless, as Searle (1999, p. 153) argues, all institutions but language require language or language-like symbolism. In a sense, market prices possess a language-like symbolizing function, but language is required to establish a shared meaning of money, property, exchange, and price, in order to give market prices that function. In a similar way, Horwitz (2007) argues that Searle's description of the symbolizing role of language as the foundation of the social universe is quite analogous to the symbolizing role played by money prices in the economic universe.[1] He points out that money prices communicate contextual and tacit knowledge, which is beyond the capacity of language.

However, as morality is crucial to monetary exchange, language is still fundamental, although the language-like symbolism of money prices is crucial to the market economy. Hayek (1979, p. 164) stresses that the diffusion of certain gradually evolved moral beliefs made the coordination of extensive division of labor by the variable market process feasible. Consequently, market prices, which through their symbolizing function provide for coordination of extensive division of labor, derive this function from morality that emerges through interpersonal relations, which in turn require language.

Hayek (1976, p. 57) considers morality as an evolutionary process in which there is a natural selection of rules according to the success of the group obeying them. Bonding is, according to Boulding (1978, pp. 222-224), the result of some form of communication and a combination of threat, integration, and exchange, which reinforce each other as elements of a

[1] As we had developed the same argument independently of each other, Steven Horwitz sent me his then-forthcoming book chapter (2007) just before the Southern Economic Association Conference 2006, when an earlier version of this paper was presented with him as discussant.

compound. Boulding (1973, pp. 107-108) sees a pattern in human history, starting during Paleolithic times with a high level of threat, changing during Neolithic times to a stronger integrative system, and with the urban revolution and the rise of civilization, there was a relative increase of threat and a continued rise toward exchange, leading to higher levels of exchange and integrative systems during feudalism, turning into more exchange with capitalism. Hayek's (1973, pp. 20, 37, 48-52, 98-101, 124-126) social organizers are rules: *nomos* (rules of spontaneous order) and *thesis* (rules of organization) that govern *kosmos* (the grown order) and *taxis* (the made order), respectively, rather than actions employed by Boulding, but the rules determine what actions are used to achieve a social order. *Nomos* determines both the integrative system and exchange, while *thesis* determines threat. Hayek's bonding structure is given by the specific combination of *nomos* and *thesis*. For example, organizational culture provides norms that emerge as spontaneous order within the organization.

Hayek acknowledges the importance of civil society, as voluntary associations without exclusive and compulsory powers in the wealth-creating game the market order establishes (1976, pp. 115, 150-152), and the independent sector between the commercial and governmental sectors (1979, pp. 49-51). Boulding (1973, pp. 25-27) argues that exchange almost always evolves out of reciprocity, which has integrative aspects, lacking in exchange, and he defines reciprocity as mutual grants that are formally uncoordinated two-way transfers, in contrast to exchange, which is a formalization of reciprocity through contracts. Both Hayek and Boulding essentially maintain the importance of the small-group order, out of which large, complex capitalist societies derive their moral culture. Hayek (1979, pp. 163-165) points out that civilization evolves spontaneously through the submission of new rules of conduct, while the coordination through market prices and the coordination of the division of labor require diffusion of certain gradually evolved moral beliefs. Boulding (1978, pp. 190-

193, 277) argues that integrative structures, founded upon group identification that emerges out of individual images of personal identity and identity of others, are crucial to exchange because exchange requires a small amount of benevolence. The image of identity is crucial to the integrative system. Boulding (1978, p. 190) says:

> When two persons identify with the same group an integrative relationship of some kind, however tenuous, is established between them. A husband and a wife in a successful marriage have a strong mutual integrative relationship and each identifies with the "couple" of which they are a member.

Hence, both Hayek and Boulding share Adam Smith's notion of morality as a complex order that emerges through human interaction. Searle shows language as fundamental institution and language-like symbolism to have a crucial role in this process. In the case of marriage, the role of language and language-like symbolism is obvious, as the marriage certificate and the weeding ring, respectively, illustrate.

Consequently, Hayek's and Boulding's Lamarckian social evolution has the following structure. Biological or biogenetic evolution yields the brain with its neural order that gives the physical capacity to learn and imitate. Cultural or noogenetic evolution yields the human mind with its sensory order that through the formation of language defines our images. The sensory order requires symbols that allow classification, thus necessitating language or language-like symbolism, which makes language the foundation of other institutions. The image-creating and image-communicating faculty made possible by language provides the functional advantage behind the evolution of language. The interpersonal relations made feasible through language open the way for shared images and the emergence of morality, on which the extended market order is based, as well as a shared meaning of money, property,

exchange, and price, which give monetary exchange and market prices language-like symbolism.

4. DARWIN AND SOCIAL EVOLUTION

This section analyzes Darwin's theory of social evolution. Fellow-feeling, as an outcome of evolutionary adaptation, is identified as playing a key role in his theory. Fellow-feeling, and thereby morality, is to Darwin a consequence of human biological evolution rather than cultural evolution through human knowledge and learning, which Hayek and Boulding stress. Humans developed fellow-feeling, or sympathy, as an evolutionary adaptation to inferior size, strength, and ferocity, while interpersonal relations and morality are biological phenomena because these are based upon biologically evolved intellectual faculties. Indeed, Darwin (1882, p. 64) contrasts the great size, strength, and ferocity of the gorilla with higher mental qualities, such as sympathy and love of fellows, of humans.

Darwin (1882, pp. 5-7, 24-25, 48) argues that humans co-descend with other species from some ancient, lower, and extinct form and that natural selection has favored powers of movement for gaining subsistence or for defense; at the same time, humans are superior due to their powers of intellectual faculties, out of which articulate language has evolved. As they became erect, their hands and arms were modified for prehension, while their feet and legs were transformed for firm support and progression, together with many other changes in the bodily structure (pp. 53-54).

Darwin essentially describes the biological evolution of humans who increased their fitness for a life in open fields, such as the savanna. As already mentioned, he explains the higher mental qualities, such as sympathy and the love for fellow humans, and humans being

social in general as an evolutionary adaptation to insufficient size, strength, and ferocity. One may argue that Darwin (1882, p. 130) provides a biological explanation for the evolution of fellow-feeling and sympathy:

> When two tribes of primeval man, living in the same country, came into competition, if (other circumstances being equal) the one tribe included a great number of courageous, sympathetic and faithful members, who were always ready to warn each other of danger, to aid and defend each other, this tribe would succeed better and conquer the other. […] A tribe rich in the above qualities would spread and be victorious over other tribes: but in the course of time it would, judging from all past history, be in its turn overcome by some other tribe still more highly endowed. Thus the social and moral qualities would tend to slowly advance and be diffused throughout the world.

Hence, Adam Smith's normative theory of sympathy, in which the impartial spectator provides normative faculties, should be seen as a consequence of human biological evolution. Morality, as an emerging property of social interaction, thus becomes a biological phenomenon, in the sense of being based upon our biologically evolved intellectual faculties. Fellow-feeling is the use of imagination for normative understanding.

Darwin (1882, pp. 73-75, 79) argues that animals also possess attention, imagination, and reason and that humans and the higher animals have the same senses, intuitions, and sensations. Consequently, animals would be able to muster some rudimentary fellow-feeling. He claims that they have similar passions, affections, and emotions, but also possess the same faculties of imitation, attention, deliberation, choice, memory, imagination, and the association of ideas, and reason, though in very different degrees (p. 79). Hence, Darwin's

theory implies that biological evolution gives a sensory order to higher animals as well as humans, although with different degrees of complexity.

Both humans and animals create images, even if the degree of complexity differs greatly. This can be attributed to the differences in the symbolizing faculties. Even small children form images before acquiring language, but the level of complexity is low and increases as they acquire language. Darwin (1882, pp. 85-86) points out that language is an art that has to be learnt and that its habitual use in articulate form is peculiar to humans, while humans also use inarticulate cries, gestures, and movements of the muscles of the face, like lower animals. By doing so, he hints at the mechanisms by which images are formed without language.

Darwin (1898, pp. 27-29) specifies the three principles of the expression and gestures involuntarily used by humans and the lower animals. First, serviceable movements, if often repeated, become habitual and are performed even if they are no longer of any service. Second, antithesis is the habit of voluntarily performing opposite movements under opposite impulses. Third, the direct action of the excited nervous system on the body, independently of the will and, in large part, of habit, occurs when the strongly excited sensorium generates excess nerve-force that is transmitted in the nervous system. Darwin stresses that our chief expressions are innate and inherited, having little to do with learning and imitation, but once acquired genetically, the expressions can be used voluntarily and consciously as means of communication (pp. 350-355). Hence, Searle's intentional states have, in Darwin's vision, biological expressions that may be used consciously as means of communication.

The expressions have some symbolizing feature, which blushing that communicates some sense of inferiority illustrates. Darwin (1898, p. 325) mentions that self-attention, which cause blushing that he considers as the most human of expressions, is the essential ingredient of the mental states shyness, shame, and modesty, and its cause is the opinion of others, where

blame carries more weight than praise. Here, we have collective intentionality and social facts, thus implying intersubjective, interpersonal relations. Blushing signals embarrassment in a social context whose meaning is a failure to meet group standards, be it moral conduct or etiquette (i.e. a sense of inferiority). The biological phenomenon of blushing, thus, induces submission to rules of moral conduct and of etiquette. However, this presupposes a cultural evolution of such rules. Darwin mentions that the young blush more freely than the old, but not during infancy, which he attributes to undeveloped mental powers of infants (p. 310). We may, however, explain this as an outcome of differences in social positions among those who are aware of the rules, while infants still have to learn them. This suggests co-evolution of human biology and culture.

Darwin (1882, p. 87) argues for a co-evolution of language and vocal organs, but also and more importantly of language and the brain. Darwin finds words expressive of various complex situations in the imitation of musical cries by articulate sounds and the community of descent of distinct languages reflected in their striking homologies (p. 90). He also argues that there is a struggle for life constantly going on amongst the words and grammatical forms in each language (p. 91). Darwin's view of the evolution of language resembles Boulding's (1978, pp. 128-132) view, according to which differences between languages are functional, a word is an individual of a species with the knowledge of the word in human minds as its genome, and sentences are ecological communities of words constrained by grammar that is the structure of the niches. Nevertheless, Boulding rejects the "struggle for life", or "struggle for existence", metaphor and uses the "survival of the fitting" as the metaphor to describe selection according to fitness into a niche and regards the production of human artifacts as niche expansion (pp. 17, 110). The latter dynamic feature of niche expansion is lacking in Darwin.

According to Darwin (1882, p. 48), occasional severe struggle for existence will preserve beneficial variations, whether in body or in mind, and eliminate injurious ones:

> The early progenitors of man must also have tended, like all other animals, to have increased beyond their means of subsistence; they must, therefore, occasionally have been exposed to a struggle for existence, and consequently to the rigid law of natural selection. Beneficial variations of all kinds will thus, either occasionally or habitually, have been preserved and injurious ones eliminated.

Competition as a discovery procedure comes naturally into mind, but Hayek (1979, p. 68) views competition as a discovery procedure by which we acquire and communicate knowledge. This is the key to the dynamic feature that Darwin's theory lacks.

In Hayek's (1976, pp. 115-120) market order (catallaxy), there is a crucial wealth-creating "game of catallaxy," where competition operates as a discovery procedure by giving players the possibilities to exploit circumstances profitably and by conveying to other parties the information that there is such an opportunity, thus securing the utilization of widely dispersed knowledge. Hence, the acquisition and communication through money prices give a positive-sum game, in contrast to Darwin's "struggle for existence", which implicitly assumes a zero-sum game. Referring to Boulding (1978, pp. 62-64), it is possible to expand into such a niche until the population of the species at issue reaches its equilibrium point and ceases to grow. Boulding's crucial point is that the increase in knowledge continually pushes back the limits set by energy and materials (p. 225). This is made possible through communication by means of language, which to Boulding enables communication into the future. Hence, knowledge growth (i.e. learning) is the key to Hayekian-Bouldingian dynamics. In Darwin'

natural selection, learning and conveyance of information are missing. This has implications for his view on interpersonal relations.

Concerning interpersonal relations, what Darwin (1882, p. 105) mentions is less attributed to language than to reciprocal sympathy among all social animals, which he considers as an extension of parental or filial affections emerging when parents take care of their offspring for a long time; humans are social animals who wish for society beyond the immediate family:

> The feeling of pleasure from society is probably an extension of the parental or filial affections, since the social instinct seems to be developed by the young remaining for a long time with their parents; and this extension may be attributed in part by habit, but chiefly to natural selection.

Darwin (1882, p.106) even refers to Adam Smith's concept of fellow-feeling, although using the term sympathy:

> Adam Smith formerly argued, as has Mr. Bain recently, that the basis of sympathy lies in our strong retentiveness of former states of pain or pleasure. […] The mere sight of suffering, independently of love, would suffice to call up in us vivid recollections and associations.

The wishes, approbation, and blame of fellow-humans, expressed through language and gestures, Darwin (1882, p. 109) finds very influential. However, the crucial point he makes is that moral faculties have emerged because they make community more viable (p. 130). This is essentially the same argument as Hayek's (1973, p. 19) one that rules of conduct are

observed, because they give the group in which they are practiced superior strength. However, to Hayek, cultural evolution is very important, and he points out that Darwin borrowed the conception of evolution from the social sciences, where it together with the conception of spontaneous order was used to study social formations, such as language, money, law, and morals (p. 23). In particular, Hayek discusses the evolution of universal rules of conduct. Silent barter is the starting point for the evolution of universal rules of conduct (p. 82).

Abstract rules become relevant as we go from the small face-to-face society to the Great Society, where knowledge of most of the particulars become impossible, and in order to deal with our ignorance, rules of conduct and of speech are produced through a cumulative process (Hayek, 1976, pp. 11-12, 23). Rules of conduct made humans adapt, using the repertoire of learnt rules, while custom serves humans better than understanding in the sense that mind exists only as a part of culture, so coordination of activities of groups larger than hunting and gathering bands requires a cultural selection of learnt rules, according to Hayek (1979, pp. 157, 160). Ignorance plays no role to Darwin, whose notion of society, even the world community, is that of a hunting and gathering band. Darwin (1882, p. 131) mentions that the praise and the blame of our fellow-humans are a powerful stimulus to the development of social virtues. Needless to say, the small-group order of civil society is important and recognized by both Hayek and Boulding, as explained earlier, but civil society has its function within the large, anonymous extended market order. Civil society gives what Heyne (1985, p. 478) refers to as personal elements that nurture the moral rules upon which rule-coordinated capitalist societies are founded. Darwin explores the small-group order, but not the Great Society.

Consequently, the structure of Darwin's thought on social evolution is founded on biological evolution. Natural selection has favored powers of movement for gaining subsistence or for defense when humans became erect, while they are superior due to their

powers of intellectual faculties out of which articulate language has evolved. Humans developed fellow-feeling, or sympathy, as an evolutionary adaptation to inferior size, strength, and ferocity. Interpersonal relations and morality, as an emergent property of social interaction, thereby become biological phenomena. Biological evolution provides expressions that supplement language as symbolizing features. Concerning language itself, Darwin acknowledges its co-evolution with vocal organs and, more importantly, the brain. Darwin gives less importance to human knowledge than Hayek and Boulding, thus neglecting ignorance, and more to reciprocal sympathy in the small-group order.

5. A DARWINIAN APPROACH TO HUMAN KNOWLEDGE, RULES, AND SOCIETAL EVOLUTION

This section combines Darwin's theory of social evolution with the corresponding Lamarckian theories, in the sense earlier defined, which Hayek and Boulding develop, in order to outline a Darwinian approach to human knowledge, rules, and societal evolution that combines biology and culture. It makes a case that evolutionary biology sheds light on culture.

The core of Darwin's theory of social evolution is the emergence of fellow-feeling through durable parental care of their offspring in conjunction with the co-evolution of language and the brain. The complexity of the human brain that allows for language requires a very long duration of parental care, thus creating a desire for social relationships that starts with the family and later extends beyond the family to other communities. Moral rules emerged as moral faculties that made communities more viable evolved. Rules of conduct are observed because they give the community superior strength, along the lines of Hayek.

Recollections and associations play a crucial role to fellow-feeling, while gestures and language express the wishes, approbation, and blame of fellow-humans. Expressions through gestures are innate and inherited, but may be used voluntarily and consciously as means of communication, while language is an art that has to be learnt. Communication through gestures and language is a prerequisite for fellow-feeling since it enables us to imagine how others feel about our behavior. Fellow-feeling, or sympathy, constitute an evolutionary adaptation of humans to their inferior size, strength, and ferocity, thus enabling them to become highly viable on the savanna through the co-evolution of language and the brain. Language and the brain give humans an extraordinary capacity to make images, which define knowledge embodied in the brain and nervous system, along the lines of Boulding.

The key to learning (change in images that fail) is the symbolizing faculty that above all language and gestures provide. Darwin stresses the community of descent of languages, thus suggesting a biological origin of language. Maryanski and Turner (1992, p. 58) support this argument by finding the origin of language in neurological changes that operated due to selection pressures of the savanna to change the sensory patterns and the integration of relations between the cortical and limbic structures of the brain. This relates to Hayek (1952), to whom the neural order is the foundation of the sensory order, although his emphasis is upon the latter.

In particular, Maryanski and Turner (1992) stress the greater dominance of vision arising from bipedalism, so the origin of language ultimately resides in the initial extension of visual symbolization in the savanna environment, while vocalization, constrained by vision, opened the way for human symbolic communication, where the control of the auditory vocal channel emerged under the selection pressures of the savanna (pp. 58-65). They regard human culture as an extension of the neurological capacities of all apes (humans being big-brained ones) and the social bond as cultural, where culture is a by-product of increased levels of

communication made possible by a larger brain (pp. 52-53, 65-68, 73-76). The possibilities for social bonding through shared ideas and symbols increase with the extent, depth, and complexity of individual interaction (p. 72).

Cronk (1999, pp. 93-94, 99-100) argues that culture provides the raw material of the signals the group members apply to their day-to-day social interactions and that language replaced grooming as social glue among humans while also constituting a social marker that defines who belongs to the group or community. Hence, we may argue that the biological evolution of the human brain provided for the cultural evolution of language and thereby other social institutions, but following Darwin, language and the brain co-evolved, an argument *de facto* supported and elaborated by Deacon (1997). However, language has biological foundations. As mentioned earlier, Deacon argues there is an underlying evolutionary dynamic between social and biological processes behind both the evolution of the brain and the subsequent evolution of language.

Nevertheless, as Guthrie (1993, pp. 197-198) argues, language and its related symbolism are biologically broadly based and deeply integrated, resting on a complex of anatomical, physiological, and neurological features that coevolved over million of years, and the neurology enables infants to learn the speech of their community merely by exposure. Boyer's (2001, p. 47) claims that the human brain has dispositions for learning and that these dispositions shape the way children learn a language support this argument. Consequently, language with its symbolizing features has a biological foundation in the human brain, thus making co-evolution of language and the brain essential, or in other words, the neural order is the foundation of the sensory order, and they evolved concurrently.

Being human means a continual search for signs, symbols, and meanings. Religion provides a case in point, as Boulding (1978, p. 307) illustrates:

> It was probably the capacity of the human nervous system for language that evoked the capacity for religion, which is very deeply embedded in the symbolic systems of the human race. […] It has occupied a complex set of niches in the noosphere relating to humans' images of themselves and their larger environment. […] Religion has also played an important part in organizational phyla – temple organizations, hierarchical priesthoods, monasteries and nunneries, organized churches, and so on.

Concerning religion and politics, Boulding (1978, p. 308) points out that 'religion has given the state an integrative structure that it otherwise might have lacked.' Similarly, Rubin (2002, p. 135) considers religion an important part of political behavior and argues that the biology of politics, which he labels Darwinian politics, would be incomplete without it since religion defines group identity in both conflict and cooperation and may also legitimize regulations. Hayek (1976, pp. 13-14) makes a distinction between will, impulse, and command, on the one hand, and opinion, disposition, and rule, on the other hand. Religion may influence political choice between these two options.

Guthrie (1993, pp. 177-178) shows that religion is anthropomorphic since deities act symbolically, like humans. He explains how religion is relational and requires significant communication that in turn requires language and thereby likeness, and he finds symbolic communication central to religion (p. 199). Hence, deities must share our language and its context. Similarly, Boyer (2001, pp. 163-164, 171-174, 178) notes that anthropomorphism implies that deities have minds, general agency going beyond human agency, and perfect strategic information, unlike the imperfect strategic information of humans, where strategic information is information that activates the social-mind inference systems.

Boulding (1978, pp. 309, 311-312) describes this as an underlying fundamental demand for order and stresses not only the role of religious language as metaphor that facilitates the experiences and the practices in which religion really originates, but also that ethical rhetoric was one of the first uses of language. Referring both to Guthrie and Boyer, Rubin (2002, p. 140) argues that religion may free ride on innate moral tendencies of individuals and it strengthens them by means of punishment in case of cheating. We may, therefore, explain the co-evolution of religion and ethics in terms of anthropomorphism. In religion, it simply means that humans use their own self as a frame of reference to create their own images of God, while in ethics, humans use their own self to create images of other human persons, thus providing the foundation of fellow-feeling, which to some extent extends to animals as well. This suggests that the structure of the human brain induces humans to use their own self as frame of reference, which makes sense under ignorance. Mental structures constrain imagination (Boyer, 2001, p. 70).

Pelligra (2005, p. 122) considers trustworthiness as a relational good, being the product of self-reflection, which arises from the relation with others – other as a mirror of the self. Based upon Smith's view that the capability of self-reflection is a consequence of reciprocal sympathy and impartial spectator who plays a crucial role in self-evaluation, he develops the notion of trust responsiveness, which implies that trustful behavior induces trustworthiness (pp. 117-120), thus formally illustrating that sympathetic understanding is quite possible. He points out that self-reflection implies that due to the impartial spectator, the individual wants praiseworthiness, which yields self-esteem as well as praise from others. Hence, reciprocal sympathy gives trust responsiveness so that trustful behavior is reciprocated by trustworthiness. Rizvi (2002, pp. 249-251) argues that Adam Smith's theory is truly normative, calling for the use of imagination for normative understanding that Smith finds quite possible, even if difficult.

However, trust responsiveness requires an image of the other person with the own self as frame of reference, given that mental structures constrain imagination and thereby the means by which normative understanding is achieved. Based on this frame of reference, one sees others as mirrors of the self, including those with different religion and ethnicity. This mechanism is, thus, essential to the capacity of living in peace and prosperity with others, even if they have a different religion and ethnicity, something Seabright (2004, p. 252) finds essential to the survival of humanity.

This suggests that the human brain has dispositions for seeing God, other humans, and to some extent animals as mirrors of the self with the self as frame of reference in religion and ethics. The evolutionary selection pressures of the savanna brought dispositions of the human brain for creating images of God, other humans, and to some extent animals with the self as framework of reference and having them as mirrors of the self, but these pressures also brought dispositions for learning that define how humans learn a language. In communities based upon symbols, language provides effective social glue. The symbolizing features of language gave rise to religion, which co-evolved with ethics. Hence, language, religion, and ethics as well as other social institutions emerged as a by-product of the larger brain that gave superior fitness to humans. As Seabright (2004, pp. 2-3) argues, evolutionary biology has something important to tell us, although it cannot alone explain why cooperation among strangers has evolved among humans. Biology gives the capacity to learn, but culture is an outcome of learning made possible by this capacity.

According to Boulding (1978, pp. 122-123), learning transmits the noogenetic structure, like mutation changes biogenetic structure, explicitly pointing at the Lamarckian nature of societal evolution, while biogenetic structure only produces the potential for learned knowledge. Here, in this paper, noogenetic evolution yields the human mind with its sensory order that through the formation of language defines our images and opens the way for shared

images that are essential not only to morality, but also to money, property, exchange, and price, because they are essentially relational. The background of intentionality, which shapes institutions, is both the deep background common to all cultures and local cultural practices that vary between cultures (Searle, 1999, p. 109). The deep background is itself a blend of biology and culture and, given Searle's view of consciousness upon which intentionality is based, as a unified field from the start; Hayek's (1952) view of the map, as apparatus of classification that represents events that the organism has met during its whole past, cultural evolution includes human biological evolution, but not the other way around (Marmefelt, 2005, p. 117).

When we consider dispositions for learning made possible by the human brain, we are in the realm of the biosphere, but when we come to learning itself and the growth of human knowledge that certainly matters to the evolution of rules, we enter into the noosphere. A Darwinian theory of social evolution will remain incomplete unless it includes the noosphere and noogenetics, thus bringing in Lamarckian social evolution. Cronk's (1999, p. 92) biological warfare analogy of culture that views culture as traits transmitted from one person to another, capable of evolving like any other replicator along the lines of memetics while recognizing the role of the individuals who use culture as a tool, provides a way by which we may extend the Darwinian approach into the noosphere. To Cronk, culture is the raw material for the messages we send each other, while the purpose of communication is to change what others think and do, thus manipulating them (pp. 93-94). This requires that others are ignorant about things we know; otherwise they would not be susceptible to manipulation.

Hence, symbolic communication through language yields changing images (i.e. learning) by means of shared images in the culture of the community. The knowledge of the particular circumstances of time and place is dispersed among individuals, along the lines of Hayek (1945 [1948, p. 80]), thus making learning a consequence of communication, which

language makes possible. Hence, morality through religion and ethics and human knowledge are due to their relational nature the outcomes of symbolic communication made possible by language that is founded biologically in the human brain.

6. CONCLUSIONS

In fact, Darwin, Hayek, and Boulding all recognize what Hayek labels innate, genetically inherited rules of human behavior and the learned, culturally transmitted rules of human conduct. The difference is upon the weight attributed to them. Darwin stresses the former, while Hayek and Boulding stress the latter. Hayek's and Boulding's Lamarckian theories of social evolution, where learning plays a crucial role, focus upon cultural or noogenetic evolution, which yields the human mind with its sensory order that through the formation of language defines our images and allows us to share them. This opens the way for interpersonal relations and the emergence of morality on which the extended market order is based, as well as a shared meaning of money, property, exchange, and price. However, the structure of Darwin's thought on social evolution is founded on biological evolution because its core is the emergence of fellow-feeling through durable parental care of their offspring in conjunction with the co-evolution of language and the brain. The complexity of the human brain that allows for language requires a very long duration of parental care, thus creating a desire for social relationships that starts with the family and later extends beyond the family to other communities. Fellow-feeling, or sympathy, constitute an evolutionary adaptation of humans to their inferior size, strength, and ferocity. Darwin gives less importance to human knowledge than Hayek and Boulding and more to reciprocal sympathy in the small-group order.

A Darwinian approach to human knowledge, rules, and societal evolution that combines biology and culture is outlined, based upon Darwin's emergence of fellow-feeling through durable parental care of their offspring in conjunction with the co-evolution of language and the brain. Images represent human knowledge, while the symbolizing faculties that above all language and gestures provide give learning, which is a change in images that fail. Darwin's community of descent of languages suggests a biological origin of language. The human brain evolved as an evolutionary adaptation to the selection pressures on the savanna through language with its symbolizing faculties. The biological evolution of the human brain provided for the cultural evolution of language and thereby other social institutions, but these evolutions were concurrent, not subsequent.

Furthermore, the human brain created a disposition for a continual search for signs, symbols, and meanings. Anthropomorphism, as dispositions of the human brain for creation of images of God, other humans, and to some extent animals with the self as framework of reference, explains the co-evolution of religion and ethics. The evolutionary selection pressures of the savanna brought these dispositions of the human brain for creation of images of God, other humans, and to some extent animals with the self as framework of reference and having them as mirrors of the self, thus giving normative understanding.

A Darwinian theory of social evolution must include the noosphere and noogenetics of Lamarckian social evolution. Human learning in a cultural context is a matter of symbolic communication and occurs when humans change their images in the light of new information, which has been made available through communication, thus sharing images in the culture of the community since knowledge is dispersed. As cultural evolution includes human biological evolution, but not the other way around, a Darwinian theory of social evolution must be both Darwinian and Lamarckian. The Darwinian element is that learning and communication are the results of the co-evolution of language and the brain, while the emergence of fellow-

feeling through durable parental care of their offspring defines the community that shares a culture. Morality and human knowledge are relational and require symbolic communication made possible by language that is founded biologically in the human brain, thus bringing together Darwin's brain-language nexus, Boulding's language-mind nexus, and Hayek's mind-culture nexus.

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