

Darwin's Conjecture

*The Search for General Principles of
Social and Economic Evolution*

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CHAPTER ONE

Introduction: The Challenge of Darwinism for the Social Sciences

Nothing I have said is intrinsically a matter of biological analogy, it is a matter of evolutionary logic. Evolutionary theory is a manner of reasoning in its own right quite independently of the use made of it by biologists. They simply got there first.

J. STANLEY METCALFE, (1998)

Empirical evidence is usually too malleable to be very decisive in conceptual revolutions. . . . Initial acceptance of fundamentally new ideas leans more heavily on the increased coherence which the view brings to our general world picture.

DAVID L. HULL, (1978)

Darwinian ideas are widely celebrated in biology. But human society also evolves. Could Darwinian principles also apply to the evolution of social entities? Just as organisms compete for scarce resources, businesses, states, and other organizations do likewise. They adapt and change. Some fail; others prosper. Organizations learn and pass on information. Are these not broadly Darwinian processes?

Several thinkers have suggested that social evolution could be partly understood in Darwinian terms. But a full and systematic account has so far been lacking. Elucidation of the Darwinian conceptual framework is one of the most important unfulfilled promises on the agenda of institutional and evolutionary economics. It is our aim to move this project forward and to help stimulate its further development.

Darwin's theory has been battered but never beaten. For much of the twentieth century, talk of applying Darwinism in the social sciences was curtailed. Even today, many social scientists approach Darwinism with trepidation. Writers have held that, while Darwinism is important in biology, it does not apply to human society. This book takes a different view. It explains how Darwinian principles also apply to social evolution and why

prominent objections to their use are unwarranted.¹ This chapter looks at the historical background to generalizing the Darwinian approach and provides an outline of the book as a whole.

While the advantages of a unifying evolutionary theory should be obvious, there are reasons to be cautious about an approach that spans social and biological evolution. The most important relates to the legacy of reckless generalization and oversimplification in the social sciences. Perhaps because of “physics envy” (Mirowski 1989), economists have been inclined to search for the scientific Holy Grail of explanation in terms of a few general concepts and equations. Incautious enthusiasm for such catchall concepts as *utility maximization* and *transaction costs* is evidence of this tendency. The problem with overgeneralized explanations is that they become all-embracing and impossible to falsify and lead to a neglect of vital differences of context and detail.²

One of us has written a full-scale account of how economics and sociology were diverted from historical and cultural specificities in their search for a unifying grand theory of everything (Hodgson 2001a). Does the idea of generalizing Darwinian principles not fall into the same trap? Should social scientists forget such an ambitious idea and, instead, dig deep into empirical detail?

As explained elsewhere (Hodgson 2001a), the dangers of reckless overgeneralization do not mean that generalizations should be avoided when they are appropriate. Indeed, to some extent, general frameworks and principles are unavoidable. Without classifications and communalities, no empirical work would be possible. Good theoretical frameworks are precursors to appropriate empirical classification. Theories in the social sciences should embrace appropriate generalizations without neglecting important specificities of detail and context. We require guiding theories that are sensitive to historical and other specificities.

There have been many attempts to establish general theories or frame-

1. Generally, we use the term *social* in an inclusive sense, to include business and other phenomena studied by economists as well as social structures. Occasionally, we use *socioeconomic* as an alternative but equally inclusive term.

2. In 1904, Max Weber (1949, 72–80) wrote that “the most general laws” are “the least valuable” because, “the more comprehensive their scope,” the more they “lead away” from the task of explaining the particular phenomenon in question. Ernest Nagel’s (1961, 575) “principle of the inverse variation of extension with intension” similarly alleges that there is a trade-off between the generality and the informative content of a theory. Oliver Williamson (1995, 33) has likewise conceded: “There is nonetheless a grave problem with broad, elastic and plausible concepts—of which ‘transaction costs’ is one and ‘power’ is another—in that they lend themselves to *ex post* rationalization. Concepts that explain everything explain nothing.”

works in the social sciences. Prominent among these is the Walrasian theory of general economic equilibrium (Walras 1874; Arrow and Debreu 1954). But among the deficiencies of this approach are its limited treatments of interactions between agents and of the dynamic phenomena of individual learning and development. General equilibrium analysis does not capture the innovativeness and restlessness of modern economies (Nelson and Winter 1982; Metcalfe 1998; Beinhocker 2006). Another approach that claims to offer an alternative general framework is game theory (Gintis 2007), but questions have been raised about its strong assumptions concerning information and rationality and its capacity to embrace novelty and complex phenomena (Kirman 1993, 2005; Bicchieri 1994; Hargreaves Heap and Varoufakis 1995; Hodgson 2007a).

Like the social sciences, biology addresses systems of immense complexity. Specificities are vital, but that does not mean that general principles cannot be established. Darwinism is a model here. It can neither explain nor predict everything. Instead, it provides an overarching theoretical framework in which explanations of specificities and contingencies must be placed. This involves theorizing on multiple levels (Hodgson 2001a, chap. 21). A grand theory of this type is necessary to organize the empirical quest and to accommodate all the differences of specific mechanism and detail. The pursuit of this type of grand theory, far from abandoning empirical material, gives it full scope and power.

We suggest that generalized Darwinism could become the backbone of a unified evolutionary framework for the social and behavioral sciences. Many of the details must await further research, and at this stage we can provide only a limited number of empirical illustrations. The main contribution of this volume is to clarify the conceptual framework, to probe its potential, and to prepare the ground for this venture. Long overdue in the Age of Darwin, its time has now come.

1.1. DARWIN'S TRIUMPH

On his mission to explain evolution, Charles Darwin gathered masses of empirical material. His theory of evolution was not the result of armchair introspection but the outcome of a theoretically guided and persistent interrogation of the facts. Although aspects of his argument can be modeled mathematically and we have powerful formulations such as the Price Equation, Darwinian evolution cannot be modeled fully with simple and universal equations akin to those in physics.

Darwin's classic 1859 *On the Origin of Species* became the foundation of modern evolutionary biology. His ideas attracted much attention because of their suggestion that humankind was not of divine origin but descended from apes. But this proposition was neither original nor his major achievement. Indeed, Darwin postponed discussion of human evolution to the 1871 *Descent of Man*. Instead, his supreme triumph was to propose connected mechanisms of evolution that relied on materialist causes and effects, rather than regarding evolution as a product of design or as some mysteriously predestined process toward improvement or perfection. In short, Darwin advanced evolutionary science by building a theory in which cause and effect both have material substance and are subject to scientific inquiry. His triumph was to create a theoretical framework to help explain the causal processes of the evolution of astoundingly complex phenomena with recourse to neither predestination nor design.

Darwin often expressed ignorance about the detailed mechanisms involved, and several of his speculations at this level have proved wrong. He knew nothing about genes or DNA, and their discovery, as well as the crucial fusion of Darwinian theory with Mendelian genetics, had to wait until the twentieth century. Nevertheless, he laid out the core, overarching principles of variation, inheritance, and selection that are now recognized as essential to the understanding of the evolution of species and the complex marvels of nature.

This scientific triumph was quite different from others, such as in physics. With Newton's laws of motion, for example, it is possible to predict with impressive degrees of accuracy the motions of the planets or the journey of a space vehicle to the moon. No such precise predictions are possible with Darwin's theory. Although some Darwinian biologists have discerned trajectories in evolution, these remain controversial, and the strength in Darwinism lies in its powers of explaining observed facts, rather than predicting any future evolutionary outcome.

Crucially, as Darwin acknowledged, his theory of natural selection is inadequate to explain specific phenomena *on its own*. This core theory cannot entirely account for the fact, for instance, that some birds have colorful plumage and others are gray or brown. Some auxiliary explanations are required to explain these divergent outcomes. Darwin himself pointed to these, and some are special cases of his general principle of selection. Bright plumage is explained by the specific mechanism of *sexual* selection. Duller plumage is explained by the specific advantages of camouflage and the avoidance of predators. These two mechanisms work against each other: bright plumage has the opposite effect to camouflage, and neither is univer-

sal. The principle of selection relies on specific auxiliary theories or special cases in order to complete the explanation of the phenomena in question.

Accordingly, the general evolutionary principles of variation, inheritance, and selection do not provide a complete theory in the manner of those of Isaac Newton or Albert Einstein in physics. Instead, Darwin provides an overarching theory, in which other, special assumptions and auxiliary theories must be placed. This theoretical framework is a major stepping-stone for the sciences of evolving, complex phenomena. At the same time, Darwinism obliges us to focus on those detailed mechanisms in order to identify the causal mechanisms or “algorithms” that generate complex outcomes (Dennett 1995). Darwin was one of the first and most profound theorists of complexity.

1.2. THE GENERALIZATION OF DARWINISM TO SOCIAL EVOLUTION

Given this achievement, the possibility emerges of applying Darwinian ideas to other complex evolving systems, outside biology. Darwin himself left further clues. In *The Origin of Species*, for example, he briefly considered the possibility that natural selection operates on the elements of language (see Darwin 1859, 422–23). In 1869, the German economist Hugo Thiel sent him his 1868 pamphlet *Über landwirtschaftliche Genossenschaften* (On agricultural cooperatives). Thiel crudely interpreted Darwin’s theory as supporting individual competition in the economic sphere. He did not consider the selection of cooperatives or other firms as entities. In his immediate response, Darwin politely expressed interest in the application of his ideas to “moral and social questions.” He wrote modestly: “It did not occur to me formerly that my views could be extended to such widely different and most important subjects” (Darwin 1887, 3:113).³

But Darwin had already hinted at the possibility of some such applications in the *Origin*. In *The Descent of Man*, he again conjectured that natural selection operates on the elements of language (see Darwin 1871, 1:59–61,

3. To what extent did Darwin understand or endorse Thiel’s argument? He wrote in his autobiography: “During my whole life I have been singularly incapable of mastering any language.” In his letters, he admitted to reading German “very slowly” and “so badly.” And, while he taught himself some German and read some biological texts in that language, he still allowed: “Though I can read descriptive books . . . pretty easily, when any reasoning comes in, I find German excessively difficult to understand” (Darwin 1887, 1:32, 2:278, 319, 279). The extent to which he appreciated the details of Thiel’s argument and its crude and inadequate depiction of Darwinian principles is a mystery.

106).⁴ Therein, he described attempts by Walter Bagehot to apply Darwinian principles to political evolution as “remarkable” (162n).⁵ He also proposed that tribal groups with moral and other propensities that served the common good would be favored by natural selection (162–66). In effect, he suggested that selection could operate on ethical principles. He thus endorsed a version of group selection and hinted at the natural selection of institutions as well as the natural selection of individuals.⁶ However, these were no more than hints, and Darwin never attempted to apply his ideas systematically to socioeconomic evolution.⁷

Darwin’s brief conjecture that his core principles might apply to other evolving systems outside the biological sphere did not imply that explanations of social (or other) phenomena had to be reduced to biological entities. On the contrary, Darwin suggested that the principles of variation, selection, and inheritance have a broader applicability and are not confined to biology. This conjecture was very different from the reductionist proposal that social phenomena can be entirely explained in biological terms.

A few years after the publication of *The Origin of Species*, several scholars followed Darwin’s hints that the principles of selection, variation, and inheritance may have a wider relevance than to biological organisms alone, in-

4. No doubt Darwin was encouraged by his friend Charles Lyell’s (1863, chap. 23) claim that languages and dialects were related by descent from common origins and were subject to a “struggle for existence” and processes of “selection.” Lyell believed that languages evolved, but he was equivocal on the question of organic and human evolution by natural selection.

5. Bagehot’s essays appeared in the *Fortnightly Review* from 1867 to 1869 and were later republished in book form (see Bagehot 1872).

6. But Darwin neglected some possible further extensions of group selection arguments in the social sphere. In 1872, he wrote to the German law professor Heinrich Fick and acknowledged his argument that military recruitment leads to the death of the fitter individuals. He added that trade unionism undermined individual incentives (Weikart 1995, 1998). He did not consider group selection and efficiency-enhancing arguments for cooperation in this context (Campbell 1994). Generally, the idea of group selection remained underdeveloped in Darwin’s work. Much later, after criticism of the work of Vero Copner Wynne-Edwards (1962), it fell out of favor (Williams 1966; Dawkins 1976). Its importance in the social domain was inadequately appreciated until the end of the twentieth century (Boyd and Richerson 1985; Hodgson 1993; Campbell 1994; Sober and Wilson 1998; Bergstrom 2002, 2003; Henrich 2004; Wilson 2002; Bowles 2006; Wilson and Wilson 2007).

7. In 1873, Darwin thanked Karl Marx for sending him a copy of *Capital* and noted its contribution to “the deep and important subject of political economy.” However, the pages of this volume in Darwin’s library in his house in Kent remained uncut (Colp 1974). The idea that Marx went so far as to ask permission from Darwin to dedicate a volume of *Capital* to him turns out to be a myth (Feuer 1975; Fay 1978; Colp 1982). In relation to Adam Smith, there is evidence in his notebooks that Darwin read *The Theory of Moral Sentiments* but none that he read *The Wealth of Nations* (Gruber 1974; Vorzimmer 1977). Generally, references to social, political, or economic evolution are rare in Darwin’s works and correspondence.

cluding to the evolution of human society. We have already mentioned that Bagehot (1872) applied the principles of selection and inheritance to ideas and political institutions. Subsequently, William James (1880) considered the natural selection of ideas in human learning and in the development of science. He was among the first to consider an evolutionary epistemology.⁸ James (1880, 441) opened his essay with the observation of a “remarkable parallel . . . between the facts of social evolution on the one hand, and of zoölogical evolution as expounded by Mr. Darwin on the other.” But his discussion was largely confined to the selection of ideas in the heads of individuals.

Samuel Alexander (1892) and Benjamin Kidd (1894) also wrote on the natural selection of ethical principles. Albeit limited in robustness and scope, their works were exceptional in bringing the Darwinian principle of selection into the social domain and considering units of selection other than individuals alone. These early precedents show that the idea of generalizing Darwinism to other evolving systems, outside biology and including human society, was taken on board by a number of influential thinkers from the 1870s to the 1890s.⁹

While several writers believed that Darwinian principles could be applied to social phenomena, they applied them loosely and incompletely. Hence, Bagehot’s emphasis was broadly on the struggle between nations, not on a process of selection involving well-specified additional social units or structures. He considered the role of imitation and the “cake of custom” but did not identify particular institutions as units of selection. Similarly, Sidney Webb (1889, 53) insisted that “the units selected are not individuals but societies.” But he was also unclear of the mechanisms of selection, other than to allude to the competitive struggle between nations for access to raw materials and for supremacy in world markets.

Kidd (1894, 43) suggested a process whereby the selection of human “societies” was driven by “the survivals of the fittest.” But he did not clearly establish any notion that social structures were themselves subject to selection processes. In the same year, Henry Drummond (1894) saw Darwinian evolution in human society, but he did not examine the selection process in

8. Evolutionary epistemology was later rediscovered and developed by Popper (1972) and Campbell (1974).

9. Remarkably, in 1898, the American philosopher Charles Sanders Peirce proposed that the laws of nature themselves evolve (Peirce 1992). This idea is being further developed by physicists today, involving the mind-blowing argument that key physical constants take the values they do because alternative universes in which the constants took different values failed to survive (Smolin 1997).

more detail. These writers failed to consider the natural selection of social structures or institutions or to address the problems involved in establishing levels of selection above the individual human actor. When they applied Darwinian selection, it was loosely to individuals or collections of individuals. In seeing individuals as units of selection, it was widely accepted that the selected traits might also be conducive to the harmony and the survival of groups or nations. But this did not establish a viable concept of selection at the group level or higher.

Accordingly, these early extensions of Darwinian principles to social evolution failed to establish the social units of replication and selection, other than to refer imprecisely to societies or groups. It was not explained why human social evolution involved anything more than the selection of individuals. After all, the selection advantage of one group over another may result simply from the selection advantages of the members of the more adapted group. In this case, group (or social) selection amounts to nothing more than individual selection. Without a supplementary explanation, such notions of social evolution dissolve into simply the evolution and selection of human individuals.

Several prominent accounts in the 1890s of Darwinian evolution in human society shared this limitation. The then prominent analyses of Otto Ammon (1895), Georges Vacher de Lapouge (1896, 1897), and Carlos Closson (1896a, 1896b) addressed individual selection, not the selection of social units. The writings of Ammon and Lapouge were preoccupied with explanations of social phenomena in terms of the alleged racial characteristics of individuals. Even when Lapouge and Closson emphasized the term *social selection*, they meant the selection of ethnically defined individuals in the context of their social environment.

For these and many other writers at that time, the quality of human civilization depended principally on the biologically determined capacities of the human individuals within it. Accordingly, the prominent thinker Alfred Marshall (1923, 260) could write: “Economic institutions are the products of human nature and cannot change much faster than human nature changes.”

1.3. EARLY RECOGNITIONS OF SOCIAL UNITS OF REPLICATION OR SELECTION

In the 1890s, and independently of each other, two writers first clearly formulated the notion that there were social units of selection, irreducible to

individuals, to which Darwinian principles might apply. The first of these was the Scottish philosopher David George Ritchie. Like Alexander—with whom he corresponded—Ritchie saw that Darwinian selection could be applied to the evolution of ethical ideas. But he went further than that.

In *Darwinism and Politics* (1889), Ritchie held that, in human societies, “language and social institutions make it possible to transmit experience quite independently of the continuity of race.” In other words, cultural transmission functioned alongside, and in addition to, what today we describe as *genetic inheritance*.¹⁰ Ritchie argued: “An individual or a nation may do more for mankind by handing on ideas and a great example than by leaving numerous offspring” (59). This is a far-reaching claim.

In the second edition of *Darwinism and Politics* (1891), Ritchie added a new essay: “Natural Selection and the History of Institutions.” It offered one of the earliest coherent arguments that Darwinian principles of variation, inheritance, and selection applied to the evolution of both social institutions and organisms. Ritchie saw language and institutions as social mechanisms through which adaptations and knowledge can be inherited. He wrote of a struggle between “institutions, languages, ideas” (139) as well as a struggle between individuals. But he warned that, although Darwinian principles applied to social evolution, they must always be used carefully and with meticulous acknowledgment of differences in the mechanisms involved.

Later, Ritchie (1896) developed these ideas in more depth. Although he regarded biology as a better source of ideas for the social sciences than physics or chemistry, he repeatedly warned against the casual and uncritical use of biological terms in the social context. He argued that there was not simply a process of struggle in society between individuals but also one between different “social organisms,” including the family, social organizations, nations, and so on. This second level of struggle vastly complicated the processes of social evolution and selection. For instance, as Ritchie pointed out, one individual might simultaneously belong to several social units or institutions. Accordingly, different processes of selection at a social level might conflict with each other as well as with the natural selection of individuals.

Ritchie noted that natural and social evolution differed in other respects. For instance, selection in the natural world works through the death of the unfit. In contrast, in the social sphere, it is not simply through “the slow and deadly process of natural selection that the various elements in our

10. George Henry Lewes (1879) and Henry Drummond (1894) also suggested this idea.

civilization have been produced, preserved, and diffused.” He argued that, in social evolution, “a great many habits are due to imitation and not to instinct, *i.e.*, they are transmitted in the *social inheritance* of the race, and are not dependent on *heredity*, in the biological sense” (1896, 168–69).

Ritchie established imitation as an important element of cultural transmission and outlined what is today known as a theory of *dual inheritance*, according to which cultural and genetic evolution take separate but interdependent trajectories. Here is his description of a separate cultural inheritance track: “the *habits* may be changed without the extinction of the *race* . . . customs and institutions may perish without the necessary destruction of the race that practiced them” and “customs and institutions may be handed on from race to race, and may long survive the race from whom they originated” (1896, 170). Cultural inheritance and biological inheritance were governed by different processes even to the point where the life span of the social units of selection could be entirely noncoextensive with the lives of the human individuals who sustained them.

While carefully acknowledging important differences between evolution in nature and society, Ritchie still regarded the theory of selection as being applicable to the social domain. Despite detailed differences of evolutionary mechanism, the “range” of Darwinian theory could be extended from the biological to the social sphere. In a prescient passage, Ritchie (1896, 170–71) wrote: “But in asserting that human society presents many phenomena that cannot be accounted for by natural selection in its purely biological sense, I am not denying the truth of the theory, but rather extending its range. There is going on a ‘natural selection’ of ideas, customs, institutions, irrespective of the natural selection of individuals and of races.” This is a pathbreaking recognition that Darwinian principles could be applied to social evolution and to nonbiological units of replication or selection. The idea of “extending [the] range” of Darwinian principles to outside the biological sphere tallies with what was many years later described by Richard Dawkins (1983) as *universal Darwinism*. The work of Ritchie and others shows that the idea of generalizing Darwinian principles was established in the nineteenth century rather than the twentieth.¹¹

Ritchie’s key innovation was to recognize that the units of replication or selection could be social entities such as customs and institutions, rather

11. We prefer the term *generalized Darwinism*. Dawkins’s (1983) *universal Darwinism* can misleadingly suggest that Darwinism covers *everything* or has “universal validity” (Dawkins 1976, 205). As explained below, Darwinian principles apply to complex population systems only, notwithstanding that these systems cover a highly varied set of phenomena.

than individuals alone. This is possibly the first explicit appearance of the idea of a natural selection of institutions or social structures in the English language. There were several earlier applications of natural selection to social phenomena, but none of them so clearly made institutions the explicit units of selection.

The second scholar to write of institutions as units of selection was Thorstein Veblen. The British zoologist and philosopher Conwy Lloyd Morgan may have stimulated Veblen's thinking in this area, along with James, Peirce, and others.¹² By 1896, Morgan had accepted the arguments of August Weismann (1893) that acquired characters could not be inherited in the biological sphere. Rejecting Lamarck in favor of Weismann, he then asked, If human beings had evolved only slightly in genetic terms, then *what* had evolved in the last millennium or so when human achievements had been transformed beyond measure? His answer to the puzzle was as follows:

Evolution *has been transferred from the organism to the environment*. There must be increment somewhere, otherwise evolution is impossible. In social evolution on this view, the increment is by storage in the social environment to which each new generation adapts itself, with no increased native power of adaptation. In the written record, in social traditions, in the manifold inventions which make scientific and industrial progress possible, in the products of art, and the recorded examples of noble lives, we have an environment which is at the same time the product of mental evolution, and affords the condition of the development of each individual mind to-day. . . . [T]his transference of evolution from the individual to the environment may leave the *faculty* of the race at a standstill, while the *achievements* of the race are progressing by leaps and bounds. (Morgan 1896, 340)

He thus established the possibility of social evolution having a substance and a pace that was reducible neither to individuals nor to their biological attributes. Over and beyond the passive environment of biotic selection, information and knowledge involved a level of inheritance in their own right. Morgan argued that human biotic and mental capacities could not evolve so rapidly as to account for the evolution of human civilization.¹³

12. Circumstantial evidence exists that Veblen came into contact with Morgan in Chicago in 1896 (Dorfman 1934; Hodgson 2004a). In any case, Veblen's idea of the natural selection of institutions dates from this time, and he was later to cite Morgan in his work.

13. Morgan (1923) went on to contribute to the development of the philosophical idea of emergent properties. Emergentist philosophy itself reached its zenith in the 1920s, before positivist currents in philosophy swept it aside. It was not until the 1960s that emergentist ideas began to revive. Arguably, an emergentist philosophy is necessary to sustain a theory of evolution on multiple levels, including the social level (Blitz 1992; Hodgson 2004a; Okasha 2006).

As for Veblen, in a book review of a work by Antonio Labriola, he saw in the author's Marxism the doctrine that the "economic exigencies" of the industrial process "afford the definitive test of fitness in the adaptation of all human institutions by a process of selective elimination of the economically unfit" (1897, 390). But these were Veblen's words, not Labriola's. Veblen made the additional and substantial theoretical leap of applying the principle of selection to institutions and not merely to individuals or groups.

For Veblen, the institutional structure of society was not merely "the social environment," as Morgan had put it. Veblen indicated that the social environment consisted of institutional elements that were themselves, like organisms, subject to evolutionary processes of selection. Darwinism was interpreted not narrowly, in terms of individuals being selected in a fixed environment, but more broadly, in terms of individuals being selected in an environment that is changed in its interaction with those creative individuals. As Veblen put it: "The economic life history of the individual is a cumulative process of adaptation of means to ends that cumulatively change as the process goes on, both the agent and his environment being at any point the outcome of the last process." He concluded: "An evolutionary economics must be a theory of a process of cultural growth as determined by the economic interest, a theory of a cumulative sequence of economic institutions stated in terms of the process itself" (1898, 391, 393).

In a key passage in *The Theory of the Leisure Class*, Veblen (1899, 188) declared:

The life of man in society, just like the life of other species, is a struggle for existence, and therefore it is a process of selective adaptation. The evolution of social structure has been a process of natural selection of institutions. The progress which has been and is being made in human institutions and in human character may be set down, broadly, to a natural selection of the fittest habits of thought and to a process of enforced adaptation of individuals to an environment which has progressively changed with the growth of community and with the changing institutions under which men have lived. Institutions are not only themselves the result of a selective and adaptive process which shapes the prevailing or dominant types of spiritual attitude and aptitudes; they are at the same time special methods of life and human relations, and are therefore in their turn efficient factors of selection. So that the changing institutions in their turn make for a further selection of individuals endowed with the fittest temperament, and a further adaptation of individual temperament and habits to the changing environment through the formation of new institutions.

It was no accident that Darwin's phrases *natural selection* and *struggle for existence* appeared in this passage. Veblen wrote also in the same work of "the

law of natural selection, as applied to human institutions” (207). He became the second writer after the publication of *The Origin of Species* to apply Darwin’s principle of selection to the evolution of institutions. The decisive implication was that Darwinism could be applied to human society without necessarily reducing explanations of social phenomena to individual psychology or biology. As Veblen (1909, 300) wrote: “If . . . men universally acted not on the conventional grounds and values afforded by the fabric of institutions, but solely and directly on the grounds and values afforded by the unconventionalised propensities and aptitudes of hereditary human nature, then there would be no institutions and no culture.” He thus suggested that, if social or economic phenomena were determined exclusively by biological factors, then the concepts of institution and culture would be redundant. Culture and institutions are irreducible to biological factors alone. Veblen thus broke decisively from biological reductionism.

Ritchie and Veblen died in 1903 and 1929, respectively. Their thinking was ahead of its time, and few of their contemporaries and followers pursued further the research agenda of extending Darwinian principles to social evolution, except for neglected figures such as Albert G. Keller (1915). All three of these thinkers made great strides toward realizing Darwin’s conjecture, but they also left a number of critical issues unaddressed. Despite rare extensions of Darwinian principles to the social sphere, it took much of the twentieth century before these issues again became priorities for social scientists.¹⁴

1.4. THE REJECTION OF DARWINISM

By the start of the First World War, the uncompleted project to apply Darwinian principles rigorously to social evolution was in deep trouble. At that time, Darwinian ideas in biology were widely criticized by biologists. While Darwin had become famous for providing scientific accreditation for the idea of human evolution from other species, his core theoretical ideas were poorly understood and found relatively few devotees (Bowler 1983, 1988). Darwin himself had no adequate explanation of the sources of variation in individuals or of the mechanisms of inheritance.

Critics of Darwin complained that natural selection could account for neither the origins of variations nor the presumed speed of evolution. Dar-

14. Other early extensions of Darwinian principles to social evolution include Petr Kropotkin (1902), James Mark Baldwin (1909), F. Stuart Chapin (1913), and Herbert William Conn (1914).

win's attempts to deal with these problems resulted in successive editions of *Origin* that were increasingly Lamarckian, in the sense of admitting the possible inheritance of acquired characters.

From the 1860s to the 1880s, support grew among biologists for Lamarckian doctrines. A strong group of Lamarckian biologists emerged in the United States under the leadership of Edward Drinker Cope and Alpheus Hyatt (Pfeifer 1965; Richardson and Kane 1988). On the whole, the American Lamarckians were vitalists, believing in the "life force" as the driver behind evolution. (But, notably, this doctrine is not found in Lamarck's own writings.)

Another challenge to Darwin's theory came from Sir William Thomson (later Lord Kelvin) in the 1860s. Using the classical laws of heat production and radiation, he calculated that the Earth had existed for a few million years. This was not enough time for the evolution of life and complex organic species to take place by natural selection. Unto his death, Darwin regarded this as the most serious objection to his theory. But Lord Kelvin was in error. He had neglected the heating effects of radioactive decay. Scientists now believe that the Earth has existed for about five billion years.

Further objections to Darwin's theory emerged. For example, it was argued that any favorable mutation in a population would be overwhelmed and diluted through the interbreeding of organisms; a beneficial mutation would not endure for long enough to be favored by natural selection (Jenkin 1867; Bennett 1870). The critics assumed that each offspring blended in some near-medial proportion the characteristics of its parents. We now know this assumption to be false. Blending inheritance can maintain variation as long as a large enough source of heritable dissimilarity exists. But, as a result of the Jenkin-Bennett criticism, Darwin was again forced to put more stress on the envisaged possibility of a Lamarckian inheritance of acquired characters, although he never abandoned his central principle of natural selection. In contrast, Herbert Spencer (1893) regarded the Jenkin-Bennett argument as one of the decisive objections to natural selection as a primary explanation of evolution.

Even Darwin's closest followers, Alfred Russel Wallace and Thomas Henry Huxley, had misgivings about his theory of selection. Wallace (1870) thought that natural selection could not explain the evolution of the highly complex human mind and turned to spiritualism for an answer. Having earned the nickname "Darwin's bulldog" for his forceful defense of Darwin, Huxley nevertheless was unconvinced that natural selection was the principal evolutionary mechanism (Kottler 1985). He also gave less empha-

sis than Darwin to the importance of adaptation. As Michael Ruse (1979, 223) put it: “But, for all his emotional identification with Darwin, Huxley put evolution first and natural selection second.” Also unlike Darwin, Huxley (1894, vol. 9) rejected the idea that Darwinian principles could apply to social evolution.

Samuel Butler (1878) published an influential attack on Darwin’s theory, arguing that natural selection could not account for the evolution of complex organisms. Quoting from secondhand sources rather than Lamarck himself, Butler developed a version of “Lamarckism” in which both “want or desire” and “inherited memory” aided the evolutionary process. Proposing that Darwinism reduced human beings to purposeless machines, he attempted to restore teleological causation to biology.

It eluded Butler that Darwin had attempted to explain human intentionality, not to belittle it. Yet this criticism of Darwin became popular. George Bernard Shaw (1921) repeated it in the famous preface to *Back to Methuselah*. Butler’s idiosyncratic doctrine that memory is inherited by offspring from parents would today find few adherents. But some of his other views survive. Many share his mistaken notion that Lamarck saw changes to organisms as resulting from their own volition. Also repeated today is the false idea that Darwin’s theory of natural selection depends on a view that human beings are purposeless automata.

Partly because of the perceived limitations of Darwin’s theory, and partly because his “synthetic philosophy” explicitly covered several disciplines (including biology, psychology, sociology, and ethics), Spencer overshadowed Darwin in the period 1880–1900, and Darwinism was in partial eclipse in the scientific community. The particular emphasis on natural selection, and other detailed features of Darwin’s theory, had a restricted influence, even among scientists who embraced the general idea of evolution (Allen 1968; Bowler 1983, 1988; Sanderson 1990). Evolutionary discourse was, instead, dominated by Spencerian and other ideas of automatic progress or development, with the causal mechanisms inadequately explained.

The publication of August Weismann’s (1893) critique of the doctrine of acquired character inheritance turned the tide against Lamarckism and Spencerism in biology, but perceived problems with Darwinism remained. Even the emergence of Mendelian genetics in the early years of the twentieth century did not immediately rescue Darwinism. Indeed, Mendelian genetics and mechanisms such as mutation (De Vries 1909) were seen as alternatives rather than complements to Darwin’s ideas. It was not until the 1940s that the synthesis between Mendelian genetics and Darwinism was achieved.

To be extended to the social sciences, Darwinian ideas had to overcome the resistance of strong intellectual traditions that either minimized the application of common principles to both biology and the social sciences or saw those principles as being non-Darwinian in nature. The influential sociologist Émile Durkheim excluded both biological and psychological explanations from his theory. Karl Marx and Frederick Engels found “dialectics” in both nature and human society, but they declared that the scope of Darwinism was confined to biology (Singer 1999; Hodgson 2006a).

In the surge of nationalism before and during the First World War, phrases such as Spencer’s *survival of the fittest* and Darwin’s *struggle for existence* were given nationalist and racist associations. Vaguely Darwinian ideas were also bandied about to justify or illustrate all sorts of contradictory social and political stances, including nationalism, militarism, imperialism, free trade, individualism, socialism, and even pacifism (Himmelfarb 1959, 407).

In several countries, including Britain and the United States, there was a widespread repugnance among intellectuals toward the use of seemingly biological language to justify imperialism, nationalism, or war. These sentiments were fueled by the antagonism between the rival imperialist powers and the carnage of the First World War. Attempts to explain national or ethnic attributes in biological terms were rejected, and the very use of biological concepts or metaphors in the social sciences was shunned. For many, because of its biological associations, the very word *evolution* became taboo. This was the beginning of the “dark age” for evolutionism in the social sciences: “During this time evolutionism was severely criticized and came to be regarded as an outmoded approach that self-respecting scholars should no longer take seriously. . . . [E]ven the word ‘evolution’ came to be uttered at serious risk to one’s intellectual reputation” (Sanderson 1990, 2). Even before the war, in a book that originally appeared in German in 1911, Joseph Schumpeter (1934, 57) wrote: “The evolutionary idea is now discredited in our field.” Perhaps this mood explains why by 1908 Thorstein Veblen had changed the subtitle of his famous and reprinted *Theory of the Leisure Class* from *An Economic Study in the Evolution of Institutions* to *An Economic Study of Institutions*.¹⁵

The American philosopher and pacifist Ralph Barton Perry (1918) attacked notions of racial superiority and the idea that conflict was natural

15. But Schumpeter later revived his use of the word *evolution*. And Veblen’s commitment to the application of Darwinian ideas to the social sphere remained undiminished.

and beneficial. He also rejected all associations between biology and the social sciences. Darwinism was accused of a circularity of logic and a “strong tendency to favor the cruder and more violent forms of struggle, as being more unmistakably biological” (145).

But the use of the term *social Darwinism* was very rare, and—despite modern folklore—it was not then applied to Herbert Spencer or William Graham Sumner. Before the 1940s, the term was generally but infrequently used by leftist critics to describe a militarist, racist, or competitive individualist position that they opposed.¹⁶

A few years later, Talcott Parsons (see Parsons 1932, 325; and Parsons 1934, 524)—who was to become the most influential American sociologist of the twentieth century—conjured the demon of *social Darwinism* to help fix the supposed boundaries of good and bad sociology. He extended the usage of the term from its previous ideological associations to also include anyone who believed in the application of Darwinian concepts of variation and selection to social evolution. With this changed meaning, *social Darwinism* was applied, not only to doctrines of race struggle or war, but also to any application of Darwinism or related biological ideas to the study of human society.

In 1944, during the Nazi genocide and the Second World War, Hofstadter published the classic *Social Darwinism in American Thought*. For Hofstadter, social Darwinism was found in the use of key phrases such as *natural selection*, *struggle for existence*, and *survival of the fittest*. The term *social Darwinism* was used, not only as a general description of abuses of biology by the Nazis and others, but also as a means of sustaining the established separation between the social sciences and biology. This separation was also aided by the enduring influence of Marx and Durkheim in the social sciences.

The degree to which the tide had turned against Darwinian ideas can be judged by considering Veblen’s institutionalist followers in the interwar period. Veblen himself remained enormously influential. But even his closest followers were quick to abandon his Darwinian project. Veblen’s student Wesley Mitchell (1936, xlix) rejected Darwinism. The leading institutionalist, John R. Commons (1897, 1924, 1934), saw Darwinian principles as inappropriate when applied to economics. Clarence Ayres (1932, 95)—who emerged as the de facto leader of American institutionalism after the Second

16. There is now a huge literature on social Darwinism, and aspects of its meaning and history are still under dispute. See, e.g., Bannister (1979), Jones (1980), Bellomy (1984), and Hodgson (2004b, 2006a).

World War—declared that Darwinism was generally flawed and outmoded (Jones 1995; Hodgson 2004a).

Overall, this severe and widespread reaction against Darwinism in the social sciences helps explain much of the lasting resistance to the project of generalizing Darwinism in this sphere. This resistance has been fueled by stubbornly enduring misunderstandings concerning the nature of Darwinism itself.

1.5. SLOW REVIVAL AND STUBBORN RESISTANCE

In the hostile intellectual environment of the 1930s and 1940s, the idea of Darwinian social evolution lay mostly dormant and undeveloped, until it began to be revived after the Second World War.

The famous archaeologist V. Gordon Childe (1951, 175–79) loosely considered both social institutions and technological innovations as units of selection. In his little book *Natural Selection of Political Forces*, Adolf A. Berle¹⁷ (1950, 17) proposed: “There exists a law of selection of political forces somewhat analogous to the law of selection of species in the world of biology.” Selection would change the frequencies of competing, organized political forces (e.g., socialism vs. liberalism). Berle’s book was favorably reviewed as an exposition of familiar ideas with an unfamiliar vocabulary—and then quickly forgotten.

Around this time, there was also a brief flurry of interest in Darwinian ideas in economics when Armen Alchian (1950) and Milton Friedman (1953) wrote briefly and without much in-depth analysis of the “natural selection” of firms in a competitive market. Alchian’s arguments were met by a powerfully skeptical article by Edith Penrose (1952). Later, Sidney Winter (1964) argued at length that Friedman’s conclusions could be drawn from an evolutionary and competitive process under very special conditions only. However, for both sides, this debate was mostly about the usefulness or otherwise of Darwinian analogies, not whether Darwinian principles could be applied more broadly to social or economic evolution.

In a classic essay that provides an enduring stimulus, Donald T. Campbell (1965, 24) argued that the appropriate template for social evolution is not biotic evolution but a more general process of evolution “for which

17. Berle and Means (1932) had previously used the term *evolution* to describe the historical development of corporate systems and the supporting legal institutions. But they did not explicitly characterize selection processes or elaborate on the details.

organic evolution is but one instance.” He emphasized the core Darwinian principles of “variation and selective retention” and argued that they apply to social as well as biotic evolution. Relevant in this process is not only variation between individuals but also variation between organizations. And selection can be both haphazard and deliberate.¹⁸

Particularly after the publication of Richard Nelson and Sidney Winter’s (1982) hugely influential book and allied works by Kenneth Boulding (1981), Friedrich Hayek (1967, 1988), and others, *evolution* became a voguish word in economics and other social sciences.¹⁹ *Evolutionary economics* became a fashionable label. But, generally, this did not signal any enthusiasm for the explicit application of Darwinian principles to social or economic evolution.

For example, Nelson and Winter (1982) mentioned Darwin only once in their book, preferring instead to describe their approach as *Lamarckian*. Ironically, however, the Darwinian principles of variation, inheritance, and selection are clearly manifest in their volume. They have inspired an entire generation of researchers deploying these core Darwinian principles in their work—but many dare not speak their name.

Although he embraced Darwinism more than others, Hayek (1973, 22–23) belittled its significance for his evolutionary theory: “Those eighteenth-century moral philosophers and the historical schools of law and language might well be described . . . as Darwinians before Darwin. . . . A nineteenth-century social theorist who needed Darwin to teach him the idea of evolution was not worth his salt.” This underestimates the importance of the specific contribution of Darwin, especially in terms of the principle of selection.²⁰

Despite the huge revival of evolutionary economics, many of its devo-

18. Campbell’s (1965) essay remains essential reading, but its message is not yet fully absorbed in the literature. For example, Lawson (2003) proposes a “PVRS [population-variation-retention-selection] model” of evolution as a novelty.

19. Tilly’s (1975) classic account of the evolution of European states evokes several Darwinian themes. But only recently have political scientists begun to discuss evolutionary ideas more openly (John 1999; Thelen 2004).

20. Hayek (1973, 23) hinted at generalized evolutionary principles. He distinguished between “the selection of individuals” and “that of institutions and practices” and between “the selection of innate . . . [and] culturally transmitted capacities of individuals.” He thus differentiated between the selection of biological and social entities and then proposed that “the basic conception of evolution is still the same in both fields.” But to complete the picture he should have highlighted that (according to his own account) “selection” is central to this “basic conception of evolution” and then acknowledged that the fully fledged principle of selection does not predate Darwin, unlike the vaguely defined “idea of evolution.”

tees remain skeptical about whether Darwinian ideas have any relevance to their field. Many retain evolutionary claims for their theory but reject Darwinism as inappropriate. Some wrongly equate Darwinism with narrowly individualistic, selfish, or antiooperative ideas that were not promoted by Darwin himself. Other critics address particular versions of Darwinism that claim that evolution is always a progressive or optimizing process. The critics then conclude that Darwinism is inappropriate in the social domain. They seem unaware of Darwin's (1871, 1:166) own words: "We are apt to look at progress as the normal rule in human society; but history refutes this." Darwin similarly insisted to Charles Lyell on 11 October 1859: "The theory of Natural Selection . . . implies no necessary tendency to progression" (Darwin 1887, 2:210). Despite this rejection of the inevitability of progress, Darwin believed that his evolutionary principles could be applied to human society.

The extent to which some social scientists have been immunized against Darwinism can be gauged by the hysterical reaction in some quarters against the rise of sociobiology in the 1970s, particularly after the publication of two books by Edward O. Wilson (1975, 1978). The Sociobiology Study Group of Science for the People entered the fray, declaring immediately that Wilson had opened the door to racism and other doctrines that it explicitly associated with social Darwinism (Allen et al. 1976). Wilson's views were caricatured as an attempt to explain all social phenomena in biological terms, whereas Wilson (1978, 153) in fact admitted some space for other explanations and declared that human "social evolution is obviously more cultural than genetic."

Whatever the validity or otherwise of Wilson's detailed views, it is clear that he has been misunderstood as an extreme biological reductionist. Wilson (1975, 1978) himself rejected the label *social Darwinism*. There is no evidence that he is a racist or a fascist. Furthermore, his passionate environmentalism does not align him with exponents of unbridled capitalist competition. The critical attack by social scientists on sociobiology provides abundant evidence of misquotation and gross misrepresentation, motivated by a deeply ingrained resistance to any incursion of Darwinian ideas into the social domain (Segerstråle 2000; Vandermassen 2005).

If Wilson is charged with the application of Darwinian ideas to social phenomena, then he stands condemned, along with Bagehot, Baldwin, Kropotkin, Ritchie, Veblen, and many modern writers who have also applied Darwinian principles of variation, selection, and inheritance to social or economic change. Alternatively, if he is charged with claiming to explain

human social phenomena *entirely* in biological terms, then he must be acquitted, partly on the grounds of his explicit and repeated claims to the contrary. But, if he is charged with exaggerating the possibility of using biology to explain human behavior, then there remains a case against him to be answered.

The evidence for the prosecution would involve the earlier claim that sociobiology predicts common behavioral patterns in tribal societies on the basis of shared human genes. But, despite the existence of several important universal features of all known societies (Brown 1991; Schwartz 1994), there is still enormous variation between cultures. Wilson (1998, 174) later admitted: “To a degree that may prove discomfoting to a diehard hereditarian, cultures have dispersed widely in their evolution under the epigenetic rules so far studied.”

Although the idea of generalizing core Darwinian principles in the social sciences has a long history, it has not proved popular. Resistance to abstract Darwinian ideas probably results from a general wariness on the part of social scientists of the importation of concepts from biology (Degler 1991), rather than from any adequately detailed critique of the proposal for a generalized Darwinism. Dismissals are typically brief. Some have centered on the true but irrelevant claim that the detailed mechanisms of social and biological evolution are very different. We explain why such critiques are off target below.

Some critics mistakenly conflate universal Darwinism with “genetic reductionism” or “ultra-Darwinism.”²¹ Although Dawkins is responsible for the term *universal Darwinism* and he is also associated with a gene-centered view of biological evolution, the idea of generalizing Darwinism is logically independent of whether a gene-centered view is appropriate in biology. Furthermore, generalized Darwinism does not claim that social or economic phenomena can be adequately and entirely explained in biological terms. It is not a version of biological reductionism.

Sometimes even Dawkins departs from the gene-centered view. In the final chapter of *The Selfish Gene*, he proposed the “meme” as a replicator and unit of selection at the cultural level. The genes no longer rule the roost alone: ideas or memes also compete among one another for survival.

21. Rose (1997) has a long chapter entitled “Universal Darwinism?” that very briefly (175–76) mentions memes and “neural Darwinism” (Edelman 1987), dismisses them without effective criticism, and then devotes its remaining twenty pages to biological issues that have no relevance to the claim that core Darwinian principles can be generalized to cover social entities and social evolution.

His argument that Darwinism consisted of general and powerful principles pulled Dawkins away from an exclusive stress on the gene as the unit of selection.

In two powerful essays, David Hull (1980, 1981) explored these tensions in Dawkins's work. He showed that, "in spite of himself" (Depew and Weber 1995, 384), Dawkins had implicitly endorsed the idea of selection on multiple levels, including the social as well as the biological. Dawkins (1983, 422) himself admitted: "It is also arguable that today selection operates on several levels, for instance the levels of the gene and the species or lineage, and perhaps some unit of cultural transmission." An important point here is that Dawkins's attempt to generalize Darwinism to the social and cultural domain led uncharacteristically but unavoidably to the nonreductionist proposition that selection processes operate on multiple levels.

Contrary to some critiques, the idea of generalizing Darwinism has little to do with biological metaphors or analogies. Instead of analogies, which are typically inexact and sometimes treacherous, generalized Darwinism relies on the claim of common abstract features in both the social and the biological world; it is essentially a contention of a degree of *ontological communality* at a high level of abstraction and not at the level of detail.²² This communality is captured by concepts such as replication and selection, which are defined as precisely and as meaningfully as possible but in a general and abstract sense.

What is the difference between analogy and generalization? Analogies take phenomena and processes in one domain as reference points for the study of similar phenomena or processes in another domain. Differences are regarded as disanalogies. Social evolution is clearly disanalogous to genetic evolution because of the very different entities and mechanisms of replication. By contrast, for example, the Keynesian "circular flow of income" may have some features analogous to those of hydraulic mechanisms, as illustrated by the famous Phillips Machine, which simulates money flows through water in transparent tubes (Barr 1988). Some theories of the business cycle use the analogy of a pendulum and deploy similar differential equations. These analogical claims are different from generalizations.

Generalization in science starts from a deliberately copious array of different phenomena and processes, without giving analytic priority to any of them. Where possible, scientists adduce shared principles. Given that the

22. Note that levels of abstraction are different in meaning from ontological levels. The former are levels within theories, the latter levels in the structures of reality. On Darwinian ontological commitments, see also Beinhocker (2006) and Stoelhorst (2008).

entities and processes involved are very different, these common principles will be fairly abstract and will not reflect detailed mechanisms unique to any particular domain. The very triumph of successful generalization is in the face of real and acknowledged differences at the level of detail.

For example, the laws of motion in physics apply equally to planets, rockets, and billiard balls, despite huge differences of size, composition, and shape. We can generalize across these domains because, at an abstract level, the same principles apply to all the phenomena, despite major differences in their features. In biology, and in the social sciences, the phenomena are so complex that scientists supplement general principles by auxiliary and particular explanations, thus differentiating these sciences from physics (Mayr 1985).

Critics of generalized Darwinism have often failed to distinguish between analogy and generalization, different levels of abstraction, and different domains of similarity or dissimilarity (Cordes 2006). The claim that social evolution and biological evolution are different at the level of detail is important and true but, ultimately, irrelevant to the project of generalizing Darwinism. Generalizing Darwinism does not rely on the mistaken idea that the mechanisms of evolution in the social and the biological worlds are similar in a substantive sense.

But the resistance to Darwinism in the social sciences cannot be entirely explained in terms of the misunderstandings of opponents. The basic argument, which has been sustained now for a century and a half, is that the core Darwinian principles of variation, inheritance, and selection apply to social as well as biological phenomena. Darwinism in biology has made major breakthroughs. But an adequate refinement of *general* Darwinian concepts such as selection, replication, and inheritance—in terms that could be applied to social or economic evolution without forcing it into a biological mold—has been lacking, at least until the final years of the twentieth century.²³ We subject them here to further refinement. The development of a generalized Darwinism has been hindered by internal underdevelopment as well as strong external resistance.

1.6. LOOKING FORWARD FROM THE PAST

The earlier literature cited above reveals several uncompleted tasks. First, absent in this literature were rigorous definitions of the core concepts of a

23. Notably Hull (1988), Sterelny, Smith, and Dickison (1996), Godfrey-Smith (2000b), Price (1995), and Sperber (2000). These contributions are discussed in later chapters.

generalized Darwinism, including variation, selection, and replication. Generally, mechanisms of selection were not discussed in much detail. Building on recent literature, we propose refinements and clarifications concerning these key concepts and mechanisms.

Among these we establish the importance of the distinction between replicator and interactor. Originally, Dawkins (1982) distinguished between replicators and their “vehicles,” where the genes are the replicators and the organisms their vehicles. Later writers, after David Hull (1980), often prefer the term *interactor* to *vehicle*, stressing not only the cohesive nature of the replicator-carrying unit but also the importance of its interaction with its environment.

Following Robert Brandon (1996, 125), the distinction between replicators and interactors “is best seen as a generalization of the traditional genotype-phenotype distinction.” Earlier writers discussed above failed to distinguish between the relatively cohesive entity that is actually being selected (the *phenotypes* or *interactors*) and the entities that replicate differentially as a result of selection (the *genotypes* or *replicators*). We offer refined definitions of these concepts in chapters 4, 6 and 7 below.²⁴

Another important characteristic of our argument is that it is not confined to a basic and ubiquitous cultural level of individual behavioral imitation: it also addresses the social institutions found in more complex human societies. We consider the nature of sociality and identify social units of replication or selection. Many of even the most sophisticated attempts to apply Darwinism to cultural evolution—including the work in dual inheritance or gene-culture “coevolution” by Robert Boyd and Peter Richerson (1985) and William Durham (1991)—regard ideas as the units of selection at the cultural level. Cultural evolution reduces to the selection sets of ideas, beliefs, or preferences on a single level. Little connection is made to the vast literature in social theory on social structures, roles, positions, and institutions. These are reducible neither to individuals nor to their ideas.

What makes an entity social and more than a common attribute of a number of individuals? Because of structured interactive relations between individuals, properties emerge at the social level that are irreducible to indi-

24. Some colleagues working in this area have proposed alternative terms to *replicator*, by including *instructor* and *codex*. While these have their merits, we see little benefit and some demerit in departing from a word that has now become well established in the philosophy of biology. Furthermore, the notion of “replicator dynamics” is now widely utilized in economic theory. We are unaware of any serious alternative to the term *interactor*. Hence, we follow Hull and what is now a conventional view in adopting the replicator-interactor terminology.

viduals alone. These involve social structures (generally relations between individuals) and sometimes social positions (with specific roles—e.g., sales manager or president—that are irreducible to the properties of their incumbents).

Despite earlier important statements of the “natural selection of institutions,” the concept of social structure has hitherto been inadequately incorporated in a Darwinian evolutionary framework. Remarkably little progress has been made to date in identifying what social institutions or structures are units of replication or selection. We must either follow up the hints of Ritchie, Veblen, and others in a more rigorous manner or show that such social units of replication or selection are unviable. Ducking the issue is unacceptable.²⁵

Recent careful analytic work on group selection is relevant here.²⁶ This establishes the special conditions under which groups may emerge as units of selection in biological as well as social evolution. But pointing to groups as possible units of selection is not enough. It must be shown that groups are sufficiently cohesive to be selected and differentially replicated as entities. Furthermore, the factors that give rise to relatively cohesive groups themselves must be explained.

Clearly, human sociality involves more than the anthill or the beehive. In particular, it relies on language and culture, with intersubjective interpretations of intention and meaning (Bogdan 2000). These complex causal interactions are the basis of emergent social properties. These must be described, analyzed, and placed within a theory of social evolution. To establish the essence of human sociality and place it in an evolutionary framework, an intensive and detailed dialogue must be created between evolutionary and social theory.

Our aim is to consolidate the suggestions of Ritchie (1896), Veblen (1899), and Keller (1915) concerning social units of selection, but with the significant additional benefit of modern developments in social theory, sociology,

25. On the concept of social structure, see Kontopoulos (1993), Archer (1995), and Weissman (2000). Fracchia and Lewontin (1999) argue that Darwinism does not apply to social evolution. They claim that theories of cultural evolution lack an adequate concept of social structure, treating populations rather as aggregates. But they do not show that a Darwinian approach to social evolution would necessarily exclude an adequate treatment of social structures. A multilevel Darwinian approach (with group selection) would require a notion of social structure to explain how groups or structured populations are maintained.

26. For discussions of group selection, see Boyd and Richerson (1985), Hodgson (1993), Campbell (1994), Sober and Wilson (1998), Bergstrom (2002, 2003), Wilson (2002), Henrich (2004), Okasha (2006), Wilson and Wilson (2007), and chapter 7 below.

psychology, anthropology, and the philosophy of science. This work would connect with a substantial body of literature in organization science and evolutionary economics that has proposed social replicators such as routines and suggested viable mechanisms of selection.²⁷ Although envisaged more than a century ago, the possibility of a Darwinian and evolutionary social science is now in prospect.

1.7. SCOPE AND OUTLINE OF THIS WORK

The overall aim of this work is to generalize the core Darwinian principles to cover social evolution, including the development and selection of organizations and other institutions.²⁸ We show how Darwinism can guide and enhance research in economics and other social sciences.

This project to generalize Darwinism is outlined in chapter 2. We start with a sketch of the kind of world to which Darwinian principles apply. Such worlds are described as *complex population systems* in which multiple (intentional or nonintentional), varied entities interact with their environment and each other. These entities face immediately scarce resources and struggle to survive, whether through conflict or cooperation. They adapt and can pass on information to others, through replication or imitation. We show that the principles of variation, inheritance, and selection apply unavoidably to such systems. Complex population systems are found in both the natural and the social domains. Social examples include populations of businesses, states, and other organizations.

In reply to other evolutionary theorists who try to omit or submerge one or more of the core Darwinian principles, we maintain that they are demonstrably obliged to use them all to complete their theoretical explanations. The compulsive logic of complex population systems is Darwinian.

Darwinism is an overarching theoretical framework, rather than a complete theory encompassing all the details. Darwinism is a metatheory that applies to a very broad range of empirical phenomena because it excludes much detail. Huge differences in the detailed mechanisms of variation, inheritance, and selection exist, not only between the biological and the social worlds, but also within these two spheres themselves.

27. The literature in question includes McKelvey (1982), Nelson and Winter (1982), Nelson (1995), Aldrich (1999), and Becker (2008).

28. Contrary to a popular interpretation that has created immense confusion, Douglass North admits that organizations and business firms are institutions. See Hodgson (2006c), where North's own words are quoted on this point. We treat the set of firms as a subset of the set of organizations, which, in turn, is a subset of the set of institutions.

Chapter 3 considers a number of objections to the overall argument. Critics have suggested alternatives to Darwinism as general frameworks to understand social as well as biological evolution. It is shown that neither self-organization theory nor artificial selection offers an adequate overall theoretical framework for understanding the evolution of complex population systems. It is also argued that the Darwinian framework neither excludes nor belittles the phenomenon of intentionality, which is more important in the human domain.

The familiar objection that social evolution is Lamarckian, rather than Darwinian, is considered in chapter 4. While the convinced reader may wish to skip the litany of objections in the preceding chapter, chapter 4 should not be passed over because it also contains some important constructive points. Richard Dawkins (1983) established that, even if the Lamarckian inheritance of acquired characters did occur, the Darwinian principle of selection would still be required to complete the evolutionary explanation. Following David Hull (1982), the very concept of Lamarckism depends on a distinction between genotype (or replicator) and phenotype (or interactor). Without these, the Lamarckian claim concerning the inheritance of acquired characteristics carries little meaning.

Some possible ways in which such inheritance can occur in the social domain are considered, including the replication of habits (which is another important concept raised in chapter 4). In each case, it is shown that the label *Lamarckian* is misleading. Ironically, it is more appropriate for genotypes and organisms in the biological sphere, but it is in the biological domain that Lamarckian inheritance is widely regarded as limited or absent.

Two following chapters are devoted to the refinement of the key Darwinian concepts of selection and inheritance (or replication). Chapter 5 clarifies the idea of selection and considers some of its different forms. We show that selection processes can be subdivided into different types, including subset selection and successor selection. The concept of diffusion is contrasted with selection; diffusion is regarded as a type of inheritance where a copy of a replicator is established in a second interactor, but without the copying of interactors. We also consider the relation between fitness and selection. In cases in which the evolutionary dynamics leave population outcomes unrelated to fitness, these are instances of drift.

Chapter 6 focuses on the replicator concept. We argue that there are different types of replicators. Generative replicators are special because they have the potential to enhance the complexity of the system. As well as genes in biology, there are examples of generative replicators in the social sphere. For an overview of some key concepts and processes, see figure 1.1.

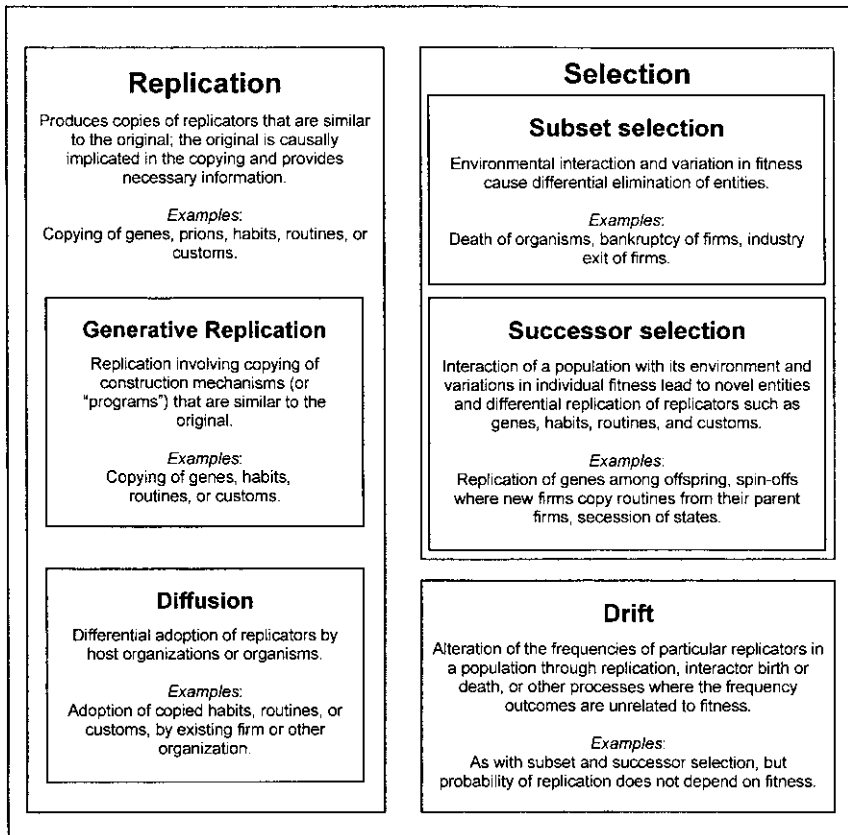


FIGURE 1.1. Darwinian evolutionary processes in nature and society.

One of the aims of chapter 7 is to refine the definition of *interactor*. When group selection occurs, the groups are interactors. A review of group selection and the interactor concept leads to a methodology for establishing multiple levels of selection. This leads to an account in chapter 8 of some of the major informational transitions in social evolution, including the emergence of language, custom, law, and institutionalized science and technology.

While separate chapters are devoted to selection and replication, no single chapter has variation as its primary theme. This is not because we regard the existence and sources of variation as unimportant. On the contrary, understanding the roles and sources of novelty and innovation in social evolution is one of the most important tasks ahead. The reason why it has no separate chapter is that, among the Darwinian trinity of variation,

selection, and inheritance, variation is the easiest of the three concepts to define in general terms. Yet, by contrast, at a less abstract and more detailed level, and especially in the social sciences, innovation and novelty are among the most difficult phenomena to explain.

The development of the Darwinian conceptual framework in a manner that can be applied to social and economic evolution is the principal aim of this work. In the final chapter, we summarize our outline of a Darwinian conceptual framework for the social sciences and set out an agenda for future research.