3 Objections and explanations

> Encouraged by superficial notions of evolution,
> Which becomes, in the popular mind, a means of disowning the past.
>
> T. S. Eliot, 'The Dry Salvages' (1941)

While the promise appears of an evolutionary approach to the problem of structure and agency, there is continuing resistance to the intrusion of evolutionary or biological ideas in social theory. On the other hand, there is a minority of enthusiasts who seem to believe that biology can explain everything human. As Erkki Kilpinen (2000, p. 33) rightly remarks: 'Modern thought (post-modern, too, for that matter) tends to reduce action either to biology or to anything-but-biology: socio-biology and deconstructionism are today's Scylla and Charybdis.'

One extreme position is the notion that social and economic behaviour can be explained largely in terms of biological characteristics, such as genes. Such a sociobiological view is rejected here, for several reasons given in this book. Even in biological terms it is widely criticized. The other extreme position is that biology is largely irrelevant to the study of human society, and that social scientists may forever consider economies or societies as if they were separated from the ecosystem and the biotic world. This view is widespread among many sociologists and economists.

This book steers between these two extremes. Both extreme views neglect the interactions between humanity and nature; they constrain scientific enquiry by limiting investigation into the complex causal interactions between nature and human society. One view overrides the causal influence of the social environment. The other neglects that human beings, like other organisms, have evolved from other species, and that human capacities must be partly explained in evolutionary terms.

For much of the twentieth century, discussion by social scientists of biology or evolution was taboo. The horrifying, racist pseudo-biology of the Nazis helped to reinforce the academic view that biological ideas should be entirely separated from the social sciences. Consequently, since the

1920s, a large number of psychologists and social scientists have proclaimed that human behaviour is entirely a product of human culture or the social environment. But even if all relevant human behaviour could be explained entirely in cultural or environmental terms, this would not justify such a Berlin Wall between biology and the social sciences. There are many reasons for this, and we may consider just a few.

First, whether they are largely determined by nature or by nurture, human mental and physical capacities are bounded, and the explanation of their limits is a matter for the science of human evolution. Human beings are not infinitely malleable but rather special. An explanation of human abilities and limitations must involve an understanding of the human psyche, and how that has evolved.

Second, human beings interact with the ecosystem and other organisms. An understanding of how humans have evolved in interaction with their environment is not only an important topic for scientific enquiry in its own right, but also a vital means of preserving a sustainable ecosystem and limiting damage to the natural environment.

Third, science develops by the transfer of ideas and metaphors from one sphere to another. Just as the economist Thomas Robert Malthus inspired Charles Darwin, the social sciences can gain ideas and inspiration from biology. This does not mean that any or every idea in one sphere is useful in another. Neither does it mean that social and biological mechanisms are similar. The whole point about metaphors is that they are inexact. It simply means that some such ideas and metaphors can be inspirational, and for this reason the sciences should not be sealed off from one another.

Fourth, since the famous launch of sociobiology by Edward O. Wilson in 1975, a growing group of researchers have attempted to explain many human capacities and behaviours in evolutionary terms. This diverse and rapidly growing literature varies both in quality and in line of argument. Some researchers attempt to explain human and social phenomena entirely and crudely in terms of genes. This line of research neglects emergent properties and causal powers at the cultural and social level. Others see the evolution of human society partly in terms of units of information or 'memes' (Dawkins, 1976). This concept also has its problems, including a persistent vagueness concerning its meaning and its mechanisms of replication. Characteristically, these literatures have been impoverished by limited contact and conversation with social scientists. Fault lies on both sides. But by rejecting biology outright, many social theorists have been the more insular. Relatively few social scientists provide evidence that they understand much biology or evolutionary theory.

Partly as a result of inadequate dialogue from sociologists and social theorists, sociobiology has been led by amateurs in social theory. As interest in the interaction between the biotic and the social has grown outside mainstream social theory, we have seen the emergence of new extra-disciplinary research groups and networks, some of which claim no allegiance to sociobiology. There is a now almost an alternative social science, separate from the traditional disciplines of sociology and economics, and with little knowledge of its predecessors. As long as the more traditional social scientists remain with their heads in the sand, they will be ill equipped to deal with this emerging set of rival doctrines. Continuing insularity could mean both the impoverishment of the social sciences and the further development of erroneous or naïve versions of evolutionary social theory. To avoid these outcomes, it is essential that social theorists have an improved and less reactionary understanding of evolutionary theory, and that the new social evolutionists appreciate and understand the rich heritage of the social sciences.

It is appropriate at this point to address some additional misconceptions that have helped to divert social theorists from addressing some relevant insights from evolutionary theory. We confine ourselves to some prominent misconceptions and objections, with brief responses and counter-arguments. Later chapters of the present work will expand on some of these points.

Darwinism means neither optimization nor reductionism

Even in economics, where evolutionary ideas have become common, several misconceptions persist. The recent interest in evolutionary theories in economics derives largely from the works of Richard Nelson and Sidney Winter (1982), Kenneth Boulding (1981), Friedrich Hayek (1988) and a few others. There was a brief former flurry of interest in evolutionary themes, including works by Armen Alchian (1950) and Milton Friedman (1953). Still earlier, as discussed below in the present book, evolutionary ideas were found in economics in the 1880–1930 period.

We consider the interventions of Alchian and Friedman first, partly because they have been highly influential among mainstream economists. In different ways, both Alchian and Friedman used evolutionary theory to conflate explanations of economic processes onto one level of analysis. Alchian (1950) proposed that even if firms never actually attempted to maximize profits, 'evolutionary' processes of selection would ensure the survival of the more profitable enterprises. Friedman (1953) amended this, by seeing 'natural selection' as grounds for assuming that agents act 'as if' they maximize, whether or not they consciously do so. Both of these arguments have been subjected to detailed criticism. They rely on an overly simplistic concept of competition and fail to demonstrate that some kind of optimal behaviour does indeed result.[1]

1 E. Penrose (1952) pointed out that Alchian implausibly assumed that firms cannot know the conditions of survival but economists can. Friedman's evolutionary argument was criticized in Winter (1964), Boyd and Richerson (1980), Schaffer (1989), Hodgson (1994, 1999b) and Dutta and Radner (1999).

It is a serious misconception to see evolution as always leading to either static or optimal outcomes (Veblen, 1899a; Hodgson, 1993; Cohen and Stewart, 1994; J. Potts, 2000). Such results occur under restricted conditions only. In an open system, equilibria are always temporary. Some contrasting outcomes involve positive feedbacks and are highly sensitive to initial conditions. Possibly suboptimal phenomena such as lock-in and path dependence are now widely acknowledged.[2]

More generally, evolution does not drive towards some goal or destination. Instead it carries the baggage of its past, in a typically haphazard, ongoing process of adaptation and selection. It is important to dispense with all mistaken notions of evolution as an optimizing, goal-driven or necessarily progressive process. Darwin (1871, vol. 1, pp. 166–77) himself emphasized: 'we are apt to look at progress as the normal rule in human society; but history refutes this. … We must remember that progress is no invariable rule.'

But that is not the only prominent misconception. In addition, many social scientists react to the mention of 'evolution' or 'Darwinism' as an indication that the explanation of social phenomena is about to proceed in purely biological terms. They mistake these labels as inevitable indicators of an unavoidable biological reductionism in which social phenomena – from social culture to economic performance – are purportedly explained largely in terms of human genes.

In fact, there is an ongoing discussion within biology itself as to the possibility of other additional units and levels of selection. Charles Darwin (1859, pp. 235–42) himself explained that sterile insects (such as worker ants) had evolved because integrated family communities (with sterile and non-sterile members) had themselves become whole units of selection. Concerning human society, Darwin (1859, pp. 422–3; 1871, vol. 1, pp. 59–61, 106) argued that natural selection operates upon the elements of language as well as on individuals. Darwin (1871, vol. 1, p. 166) also proposed that tribal groups with moral and other propensities that served the common good would be favoured by natural selection. Darwin seemed to endorse a version of group selection, and perhaps hinted at the natural selection of institutions, as well as the natural selection of individuals. Several modern biologists have argued that evolutionary selection occurs at higher levels: not simply on genes, but on individuals, groups and even species. Darwinian anthropologists such as Robert Boyd and Peter Richerson (1985) and William Durham (1991) have developed a two-level theory where there is transmission at the level of both culture and the genes.

Even Richard Dawkins, who attained fame with his hymn to genetic reductionism in *The Selfish Gene* (1976), proposed an additional level of

---

2 Gould (1980), David (1985, 1994, 2001), Dosi *et al.* (1988), Arthur (1989, 1994), North (1990), Hodgson (1993), H. P. Young (1996).

selection in the last chapter of this work, with his idea of a cultural 'meme'. It is difficult to propose cultural 'memes' and remain a genetic reductionist, because that would require an explanatory reduction of all memes to genes. Despite his genetic reductionist starting point, Dawkins was driven by the logic of his own argument to adopt multiple-level selection theory (Hull, 1980, 1981). Dawkins (1983, p. 422) thus wrote: '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.'[3]

Given that evolutionary selection can operate at the group and cultural levels, the invocation of evolutionary ideas in social science does not imply that explanations of social phenomena have to be, or can be, reduced to properties and changes at the level of the genes. There are other possible units of replication. Units such as habits, routines, customs and institutions themselves endure through time and replicate by imitation, even if their features are not sustained with the same fidelity as the coding in the DNA. There is variation even between similar units of these types, and the selection environment favours the survival of some over others. Emergent properties and causal relations at higher levels imply that the analysis of these higher-level selection processes cannot be explained entirely in terms of lower-level units. The processes and time-scales involved at higher levels may be so different from those at lower levels that much of the explanation of higher-level phenomena must be in higher-level terms.

Later chapters of this book will examine further the application of Darwinian principles to social theory. Several authors over the last 150 years have proposed that Darwinian evolution takes place within society, not simply metaphorically, analogically, or by extension of lower-level phenomena. Darwinian evolution literally takes place at the level of society itself, operating on social as well as biological units. The necessary conditions for Darwinian social evolution include the existence of varied replicating entities, and some differences in their capacities to survive in any given situation. These replicating entities might include social rules or routines. If Darwinian social evolution were shown to work at this level, it would not require the invocation of biological reductionism. Such a notion of replication on multiple levels permits accounts of social evolution involving social rather than biological elements. Darwin's theory implies neither global optimization nor biological reductionism (Hodgson, 1993; Khalil, 1997).

A wide variety of views have been gathered under the term 'Darwinism', including reactionary doctrines described as 'Social Darwinism' and

3 Multiple levels of evolution have also been considered by Lewontin (1970), Arnold and Fristrup (1982), Brandon and Burian (1984), Eldredge (1985), L. Buss (1987), Goertzel (1992), Depew and Weber (1995), Maynard Smith and Szathmáry (1995, 1999), Brandon (1996), Sober and Wilson (1998), L. Keller (1999), Kerr and Godfrey-Smith (2002) and Henrich (2004).

the genetic reductionism of today. It must be emphasized that the use of the term Darwinism here should not be taken to imply any of these things. The term 'Darwinian' is used here to describe the general and causal theory of evolution, involving variation, inheritance and selection, which is at the centre of the classic works by Darwin (1859, 1871). More details of the Darwinian theoretical core will be elaborated at a later stage.

The limits of sociobiology

As sociology has lost its consensus over core presuppositions, some sociologists have established formerly alien doctrines such as methodological individualism and individual utility maximization (Coleman, 1990). Strong antibodies would have repulsed these invaders in the 1940–80 period. But the crisis of modern sociology is so severe that doctrines as alien as biological reductionism have now established themselves within. The lure of reductionism is such that several economists (Becker, 1976; Hirshleifer, 1977, 1985; Tullock, 1979; Robson, 2001a, 2001b, 2002), and even some modern sociologists, have proposed that much human behaviour can be explained in terms of our genetic inheritance.

Joseph Lopreato and Timothy Crippen (1999) diagnose the crisis in modern sociology and creditably propose an injection of Darwinism. However, their recommendations come too close to a form of biological reductionism. Lopreato and Crippen (1999, p. 77) propose at some '*ultimate* level' that: 'Organisms tend to behave in ways that maximize their inclusive fitness.' But they ignore the work of Darwinian cultural evolutionists from Veblen (1899a, 1919a) to Boyd and Richerson (1985) who argue that when cultural transmission enters the picture such maximization of genetic fitness will typically be diverted or overlaid by other factors. Even if humans 'ultimately' behave in ways that maximize their inclusive genetic fitness, this tells us very little about variations in human behaviour, between different cultures or across short periods of time. It tells us something concerning survival, sexuality and reproduction, where some of the strongest instinctive pressures have evolved. Some very broad conclusions may be drawn concerning gender and family relations.[4]

But an infinite number of feasible social structures – and patterns of mating and childcare – could ensure the reproduction of the human species. Social theory is concerned with the explanations of differences within the broader set of possibilities. Furthermore, inclusive fitness theory tells us less about non-familial social structures, particularly those that have emerged only in the last few thousand years, and have not been subject to the same type or longevity of evolutionary selection pressure as those where sex and human reproduction are paramount. Human societies vary

4 See the extensive evidence cited in Lopreato and Crippen (1999).

culturally and institutionally through time and space. The lonely hour of 'ultimate' genetic determination never comes.

The leading sociobiologist Edward O. Wilson (1978, p. 167) declared:

> Can the cultural evolution of higher ethical values gain a direction and momentum of its own and completely replace genetic evolution? I think not. The genes hold culture on a leash.

What is wrong with this statement? No matter how much we may (rightly) insist that cultural evolution is (extremely) important, it would be absurd to suggest that it can 'completely replace genetic evolution'. The final sentence is more problematic. If it means that culture is determined by the genes and can be explained largely in terms of the genes, then it is false. But Wilson himself admitted that the leash is 'very long' (1978, p. 167). It is more appropriate to point out in response to Wilson that analysis at the genetic level is chronically limited as a basis for explaining detailed human behaviour. Wilson bypasses the task of explaining many varied actual and possible behaviours that lie within the ample limits of genetic restraint. The laws of gravity also hold culture and behaviour on a leash, but it would be absurd to conclude from this truism that we can largely explain human behaviour with the laws of physics. Human genetic constraints were established long ago in our evolution. While knowledge of these constraints is important, and they do tell us something about human behavioural dispositions and possibilities, on their own they explain little of our culture or behaviour in a modern complex society.

Wilson (1978, p. 153) admitted that human 'social evolution is obviously more cultural than genetic'. This is why his sociobiology is at best of highly limited use for social science. The task of social science is to explain particular behaviours or phenomena within the very wide zone provided by genetic and physical constraints. Social science examines further constraints and causal mechanisms, which themselves cannot be reduced solely to biological terms. The genes help to form the substrata of human nature. But they do not constitute human nature as a whole. Our genes tell us something of our fundamental human nature, as presented at our birth, but they tell us nothing of the specific and varied cultural contexts in which vital human dispositions are channelled and formed. In particular, through processes of socialization and learning, we develop a cognitive structure by which to interpret and respond to the data received by our senses. The initial basis of this structure is genetic, but subsequent neural development is much a result of our interactive experiences in a social and natural context. It is a major task of the social scientist to understand the implications of the cultural processes of socialization and learning for human behaviour and potential.

We have to pay much more attention to levels of replication or selection above that of the gene. Human genetic evolution has taken place in a human cultural environment. *One consequence is that social selection can often override the pressures of genetic selection*. For example, the European physiognomy is much less suited than that of Aborignines to the Australian climate. European Australians suffer a much higher rate of skin cancer, for example. Yet European-type institutions dominate the continent. These institutions have been selected despite the unsuitedness of some European genes. The genetic advantage of the Aborigines in relation to the natural environment has been overridden by selection at the institutional level. The importance of additional levels of selection above that of the gene means that genes cannot tell the whole story.

These additional levels of replication or selection at the social level are not trivial. Taking Darwinism seriously at the cultural and institutional level means much more than 'memes' such as catch-phrases or pop songs. If there are replicators of information in the social domain, then they will be structured entities, acknowledging the structural and institutional nature of knowledge itself (Langlois, 2001). Darwinism at the social level involves the selection of different types of institutional structures, upon which the survival or prosperity of nations or populations (along with their genes) can sometimes depend. Evolution at the social level involves social relations and structures, and more than mere information of a social kind.

Wilson's highly limited concept of culture is symptomatic of the kind of problem that has appeared when biologists have entered the social domain, but with insufficient appreciation of social theory. For Wilson (1978, p. 78) 'cultural change is the statistical product of the separate behavioural responses of large numbers of human beings'. On the contrary, culture is not merely the average and variance of individual characteristics; it is also a system involving structured, interactive relationships between individuals. Consequently, culture is not reducible to the statistical properties of a mere aggregate of individuals; culture involves relations between individuals and emergent properties that are not reducible to individuals alone. That is what gives rise to higher levels of selection, above genes and the individual. Just as our genes loosely affect cultural possibilities, our culture has had an effect on our genetic endowment (Boyd and Richerson, 1985; Durham, 1991).

For much of the twentieth century, sociology rightly emphasized culture but wrongly ignored its biological and genetic limits and preconditions. At the other extreme, a small minority of social scientists have surrendered to sociobiology. In both cases, a careful articulation of the interactive relationship between the cultural and genetic aspects of humanity has been lacking. At both extremes, an adequate discourse on emergent properties and ontological levels has been absent. A major purpose of this book is to outline the achievements of Veblenian institutionalists, evolutionary theorists and emergentist philosophers in establishing a multiple-level evolutionary theory, where both social culture and human instincts are acknowledged.

Biology is not a means of legitimating universal market competition. Markets themselves are neither the universal solution to the problem of scarcity nor the exclusive domain of human competition (Hodgson, 2001c). Furthermore, competition itself is not universal in the biological sphere (Kropotkin, 1902; Lewontin, 1978; Augros and Stanciu, 1987; Sober and Wilson, 1998). Also some psychologists see evolution as a challenge to some versions of individual rationality (Cosmides and Tooby, 1994a, 1994b; Plotkin, 1994, 1997; Cummins and Allen, 1998).

While some social scientists relapse into reductionism, many sociologists resist any suggestion that the social sciences can learn from biology. They have been trained to believe that biology and psychology simply cannot be used to help explain social phenomena. Some will follow Durkheim (1982, pp. 32–3) in his *Rules of Sociological Method* of 1901 and 'separate the psychological domain from the social one' while separating the social from the biological as well. Many will react against past abuses of biology in social theory – when it has been called upon to support nationalism, imperialism, racism and sexism – and draw the mistaken conclusion that all biological explanations and metaphors have thus to be cast out of the discipline. They will ignore the fact that no reputable theory in biology gives any support whatsoever to any form of discrimination. Neither can we reasonably conclude from biology that our genes largely determine our fate. Even genetic reductionism has to admit that the social environment is an important determining factor, including in individual development.

The general resistance of sociologists to biology is both unjustified and deleterious. As a handful of authors have suggested, part of the disabling crisis of modern sociology is its inability to overcome its own compartmentalization from biology and other sciences. Instead of the language of compartmentalization and rejection, the pressing task is to give psychology and biology some appropriate and limited explanatory scope, restricted by the recognition of emergent properties at the social level, and enhanced by a revived and inclusive framework of social theory.[5]

Is self-organization an alternative to Darwinian evolution?

John Foster (1997) and Ulrich Witt (1997) have proposed that the theory of self-organization provides a basis for evolutionary thinking in economics.

5 Van den Berghe (1990), Halton (1995) and Lopreato and Crippen (1999) have addressed this crisis in sociological thought. Modern sociologists who have embraced evolutionary or even Darwinian ideas include Blute (1979, 1997), Runciman (1989, 1998), Kontopoulos (1993), Aldrich (1999) and Chattoe (2002). In particular, Hirst and Woolley (1982), Lenski and Lenski (1987) and Maryanski and Turner (1992) have argued that sociological studies should also take account of the physical environment and the biological inheritance of human beings. Influential organizational studies such as McKelvey (1982), G. Carroll (1984), Hannan and Freeman (1989), Singh (1990) and Hannan and Carroll (1992) have also been inspired by evolutionary biology.

Foster took the more extreme position, to argue that self-organization is a superior alternative to any 'biological analogy'. Foster (1997, p. 444) wrote:

> Once we abandon biological analogy in favour of an economic self-organization approach … then we are no longer interested in the microscopic details of selection mechanisms, but in the endogenous tendency for acquired knowledge and skills to interact to create increases in economic organization and complexity.

Foster has alluded to modern versions of such an approach, as in the works of Ilya Prigogine and Isabelle Stengers (1984), Daniel Brooks and E. O. Wiley (1988), David Depew and Bruce Weber (1995), Stuart Kauffman (1993, 1995), Weber and Depew (1996), Weber *et al.* (1989) and Jeffrey Wicken (1987).

Clearly, several of the above authors were critical of some presentations of Darwinian theory. For example, Depew and Weber (1995) noted the changing agendas and shifting emphases of Darwinian enquiry over the years. Others like Brooks and Wiley (1988), B. Weber *et al.* (1989) and Wicken (1987) were keen to generalize evolutionary explanations and integrate insights from thermodynamics such as the entropy law. Kauffman (1993) made a powerful argument that natural selection alone cannot explain the origin of complex organisms. Systems involving non-linear interactions involve a large number of possible states, most of which would have little survival value. Kauffman argued that processes of self-organization channel systems into more restrictive possibilities, some of which can have evolutionary benefits.

However, in contrast to Foster (1997), none of these modern authors cited above saw his argument as an alternative to Darwinian theory. Wicken (1987) wrote of 'extending the Darwinian paradigm', not exterminating it. Depew and Weber (1995) considered 'Darwinism evolving', not Darwinism abandoned. Weber and Depew (1996, p. 51) wrote:

> the very concept of natural selection should be reconceived in terms that bring out its dynamical relationships with chance and self-organization. In our view, Kauffman's recent work, as expressed in *The Origins of Order*, does just this.

Note here that what is involved is a revision of natural selection theory, not its negation. Kauffman (1995, p. 8) himself called for a 'revision of the Darwinian worldview' not its abandonment. As Kauffman (1993, p. 644) also related:

> I have tried to take steps toward characterizing the interaction of selection and self-organization. … Evolution is not just 'chance caught on

> the wing'. It is not just a tinkering of the ad hoc, of bricolage, of contraption. It is emergent order honored and honed by selection.

The last sentence is worthy of reflection and emphasis. Kauffman did not conceive of his theory as an alternative to Darwinism (R. Lewin, 1992, pp. 42–3). On the contrary, once self-organized systems and subsystems emerge, natural selection does its work by sorting the more adapted from the less. Kauffman explained this in detail. Natural selection acts upon these self-organized structures once they emerge. Far from being an alternative to natural selection, self-organization requires it: in order to determine which self-organized units have survival value. As Gary Cziko (1995, p. 323) argued:

> the laws of physics acting on nonliving entities can lead to spontaneous complexity, but nothing in these laws can guarantee *adapted* complexity of the type seen in living organisms … Of all the complex systems and structures that may self-organize due to the forces of nature, there can be no assurance that all or any of them will be of use for the survival and reproduction of living organisms.

In a sense, Witt (1997, p. 489) was correct in his assertion that self-organization 'provides an abstract, general description of evolutionary processes' but natural selection is no less abstract, nor less general. Indeed, self-organization involves an ontogenetic evolutionary process, in that it addresses the development of a particular organism or structure. (In biology, ontogeny refers to the growth and development of single organisms, where the genetic material is given.) This does not rule out the possibility that ontogeny can also involve the natural selection of entities *within* the organism. For example, the growth of many organisms involves the natural selection of immunities, neural patterns and (often beneficial) bacteria in their gut (Edelman, 1987; Plotkin, 1994). Likewise, the growth of a firm may involve the internal selection of habits or routines (Nelson and Winter, 1982). Hence some descriptions of self-organizing processes involve some (phylogenetic) selection of constituent components of the emerging structure.

However, accounts of self-organization or ontogeny do not *necessarily* involve selection or phylogeny. By definition, phylogeny means the existence and evolution of a whole population, within which selection occurs. Hence natural selection is *always* phylogenetic as well as ontogenetic, in that it addresses the evolution of whole populations of organisms or structures, as well as the development of individual organisms. In general, ontogeny *may* incorporate phylogeny but does not necessarily do so (consider the examples in the preceding paragraph); but phylogeny *always* incorporates ontogeny.

Furthermore, from the point of view of the overall evolutionary process, complete evolutionary descriptions require a phylogenetic account of the selection of ontogenetically developing units. Hence while self-organization is important (and perhaps essential), it cannot provide a *complete* evolutionary description. This must involve phylogeny as well as ontogeny. If we are confined to ontogeny then our description of the overall evolutionary process is incomplete; it does not address the differential survival and fecundity of different (self-organized) structures or organisms. Consequently, self-organization may be an important part of evolution and ontogenetic development, but it cannot replace natural selection.

Self-organization theorists have shown how complex structures can emerge without design, but these structures are themselves subject to evolutionary selection. Some will survive longer and be more influential than others: selection will operate. We have every reason to see these issues as relevant to economic evolution. Conscious choices, competitive pressures, market forces or environmental constraints operate on technologies, institutions, regions and even whole economies. All of these contain self-organized structures, but this neither precludes nor demotes the role of evolutionary selection.

Yngve Ramstad (1994) also argued that biological analogies are inappropriate for economics. One of his reasons is based on the argument of John R. Commons that institutional evolution involves 'artificial' rather than 'natural' selection. This is critically discussed in Chapter 13 below, where it is established that artificial and natural selection are not mutually exclusive, and the former always relies on the latter; so we do not have to deal with this objection here.

The Lamarckian confusion

Many social scientists have described social evolution as 'Lamarckian'.[6] In fact, the relationship between Darwinism and Lamarckism is more complicated than many have assumed. One of the most important ideas in 'Lamarckism' – although it pre-dates the 1809 work of Jean-Baptiste de Lamarck by centuries – is the admission of the possibility of the inheritance of acquired characters. This idea was popularized by Lamarck and influentially endorsed by Auguste Comte and Herbert Spencer. The nineteenth-century Darwinians did not rule out the possibility of the inheritance of acquired characters. Even in the first edition of *Origin of Species*, Darwin (1859, pp. 82, 137, 209) himself endorsed this idea. Darwin never denied a

6 Among those that have made the claim that social evolution is Lamarckian are Popper (1972a), Hirshleifer (1977), Gould (1980), Simon (1981), McKelvey (1982), Medawar (1982), Nelson and Winter (1982), Gray (1984), Boyd and Richerson (1985), Hayek (1988), C. Freeman (1992), Metcalfe (1993) and Hodgson (1993). However, Boyd and Richerson (1985), Metcalfe (1998) and Hodgson (2001b) uphold that social evolution is *both* Darwinian and Lamarckian.

limited role for the inheritance of acquired characters and in his later life he gave it increasing rather than decreasing attention and approval. Hence Lamarckism (in this sense) and Darwin's doctrine are not necessarily mutually exclusive. We now know that the possibility of the inheritance of acquired characters is non-existent (or highly limited) at the level of genetic evolution. In contrast, it has been argued by many that acquired characters can be passed on and inherited in the social domain.[7]

Just as there are differences between Keynesianism and the doctrines of Keynes, and Marxism and the ideas of Marx, we must draw a distinction between Lamarckism and Lamarck's own views. Lamarck (like Darwin) was a philosophical materialist and saw intention or volition as rooted in material causes (Boesiger, 1974; Lamarck, 1984). Hence Lamarck did not see will or purpose as ultimate drivers of evolution. It was not Lamarck himself but later 'Lamarckians' that made unexplained will or purpose so central to a depiction of evolutionary change.[8]

But Lamarck and the Lamarckians had something important in common: they all believed in the inheritance of acquired characters. Hence there are grounds to define Lamarckism primarily in terms of the inheritance of acquired characters. Three working definitions of Darwinism, Lamarckism and Weismannism (or neo-Darwinism) are suggested in Table 3.1.

Two internal problems with the Lamarckian theory of the inheritance of acquired characters – even in the social sphere – are that we further require

Table 3.1 Definitions of Darwinism, Lamarckism and Weismannism

Term	***Definition***
Darwinism	A causal theory of evolution in complex or organic systems, involving the inheritance of genotypic instructions by individual units, a variation of genotypes, and a process of selection of the consequent phenotypes according to their fitness in their environment.[9]
Lamarckism	A doctrine admitting the possibility of the (genotypic) inheritance of acquired (phenotypic) characters by individual organisms in evolutionary processes.
Weismannism (or neo-Darwinism)	A doctrine denying the possibility of the (genotypic) inheritance of acquired (phenotypic) characters by individual organisms in evolutionary processes.

7 The idea that Lamarck's theory necessarily involves organisms willing their own adaptations probably originally emanates from a 1830 caricature of Lamarck's views by G. Cuvier (R. Richards, 1987, p. 63). It does not derive from Lamarck himself (Burkhardt, 1984, pp. xxx–xxxi).

8 The genotype is the genetic coding of an organism. The phenotype is the organism's behavioural propensities and manifest attributes. The phenotype is an outcome of the genotype and the organism's environment.

9 But even this proposition should be treated with extreme care. A problem is defining what we mean by a 'characteristic' in the social domain and what is to be treated, by contrast, as analogous to the gene (Hull, 1982; Hodgson, 2001b; Knudsen, 2001).

an explanation of (a) what inhibits or prevents injuries or other disadvantageous acquired characters from being inherited, and (b) why organisms seek to adapt to their environment. Lamarckism simply assumes that only advantageous acquired characters will be inherited. In addition, some Lamarckians presume a voluntarism of will, but the origin of this will itself remains unexplained. A causal explanation of why organisms strive for advantage or improvement is lacking.

As Richard Dawkins (1983, 1986), Helena Cronin (1991), Henry Plotkin (1994) and others have pointed out, these gaping holes in Lamarckian theory have to be filled by a Darwinian or other explanation. Darwinian natural selection helps to explain how advantageous characters are favoured. Organisms seek to adapt to their environment in terms of the production of variations of genotype, leading to different behaviours, some of which involve successful adaptations. Upon these varieties, natural selection does its work. Even if acquired characters were inherited, natural selection would be required to ensure that the advantageous rather than the disadvantageous characters were passed on. Even if it is valid, then Lamarckism requires Darwinism as an explanatory crutch.

Insofar as organisms are purposeful, this capacity too has evolved through natural selection. Darwinism thus points to an evolutionary explanation of the very origin of will or purpose itself. Hence overall, Darwinism is a more general and powerful theory than Lamarckism. If social theory can be legitimately described as Lamarckism, in the sense of admitting the possibility of inheritance of acquired characters, then this Lamarckism must be nested within a Darwinian theory (Hodgson, 2001b; Knudsen, 2001).

Accordingly, Lamarckism is not an alternative to Darwinism, even in the social sphere. It is erroneous to see them as rivals because Lamarckism depends on Darwinian natural selection to complete its explanations. Even if we can talk of acquired characters being inherited in the social domain – and this idea itself is far from straightforward (Hull, 1982; Hodgson 2001b) – then this does not undermine the greater explanatory importance of Darwin's theory.

Darwinism does not exclude intentionality

Another frequent objection to the use of these ideas in social science is that Darwinian evolution is 'blind' and ignores the conscious intentions and plans of human individuals. Because intentionality is a vital concept for the social sciences, this may seem the most important objection, and thereby its rebuttal is vital. Famously, in response to Alchian (1950), Edith Penrose (1952) argued that Darwinian theories of evolution excluded the deliberative and calculative behaviour that was characteristic of human action in the economic sphere. However, this hard-and-fast distinction between humans and other organisms is difficult to reconcile with the fact that humans evolved gradually from other species. If conscious intentions are unique to humans, then when and how in evolutionary time were these cognitive privileges bestowed upon humanity? To avoid a religious or mystical answer, we have to assume that these cognitive attributes themselves evolved through time, and existed to some degree in pre-human species.

A crucial point emerges here. It is part and parcel of Darwin's underlying philosophy that all intention has itself to be explained by a causal process. This causal explanation has to show how the capacity to form intentions has itself gradually evolved in the human species, and also how individual intentions are formed in the psyche. For Darwin, natural selection is part of these causal explanations. There can be no first and 'uncaused cause'. However, the fact that intentions are somehow caused or determined does not mean that human agency is any less substantial or real (Vromen, 2001). Human intentions are part of social reality and social interactions involve human expectations concerning the intentions of others. None of these points is undermined by the recognition that intentions themselves are caused.

From a Darwinian philosophical perspective, all outcomes have to be explained in a linked causal process. There is no teleology or goal in nature. Everything must submit to a causal explanation in scientific terms. In his prescient essay on the impact of Darwinism on philosophy, John Dewey (1910a, p. 15) wrote: 'Interest shifts ... from an intelligence that shaped things once for all to the particular intelligences which things are even now shaping'. Instead of God creating everything, the Darwinian focus is on how everything, including human intelligence and intentionality, was created through evolution. Intentionality is still active and meaningful, but it too has evolved over millions of years. Likewise, in their textbook on biological evolution, Theodosius Dobzhansky *et al.* (1977, pp. 95–6) wrote:

> Purposefulness, or teleology, does not exist in nonliving nature. It is universal in the living world. … The origin of organic adaptedness, or internal teleology, is a fundamental, if not the most fundamental problem of biology. There are essentially two alternative approaches to this problem. One is explicitly or implicitly vitalistic. … However, … this is a pseudo-explanation; it simply takes for granted what is to be explained. The alternative approach is to regard teleology as a product of evolution by natural selection.

As Daniel Dennett (1995, p. 205) reported, Darwin turned the traditional doctrine of intentionality upside-down: 'intentionality doesn't come from on high; it percolates from below, from the initially mindless and pointless algorithmic processes that gradually acquire meaning and intelligence as they develop'.

Accordingly, Penrose (1952) and others were wrong to suggest that Darwinian theories of evolution necessarily excluded deliberative and calculative behaviour.[10] On the contrary, in the social context, deliberation and selection coexist. Furthermore, as Darwin insisted, intentions, calculations and preferences have themselves to be explained by the methods of science. Darwinism invokes both a theory of natural selection and a universal commitment to causal explanations. This brings us right back to the aforementioned central lacuna in modern social theory – the widespread and enduring failure to provide an adequate causal explanation of human intentionality and human motives.

It might be objected that there is more to human purposefulness than goal-driven behaviour. After all, ants and robots are purposeful in that sense. A key point about social interactions is that we gauge and impute the intentions of others, in order to understand and anticipate their behaviour. Social action is intersubjective and reflexive. It is very much about meanings, interpretations of meaning, and imputations of meaning to the behaviour of others. Regrettably, some enthusiasts of Darwinism have overlooked these issues. But there is nothing in Darwinism that rules out their inclusion. On the contrary, if interpretations of meaning and intention are causally efficacious, then there is a Darwinian imperative to understand their role. Furthermore, the capacities to think, interact and interpret have themselves evolved and must also be understood in evolutionary terms (Bogdan, 1997, 2000).

Some theorists of social evolution believe that the 'Lamarckian' is preferable to the 'Darwinian' label because the former preserves human intentionality. There is a deep irony here, because Lamarck himself, as noted above, was a philosophical materialist and saw human will as formed by material causes. No version of 'Lamarckism' offers an escape from the need to provide a causal explanation of intentionality.

Not only is there nothing in Darwinism that excludes or undermines the reality of human purposes and intentions, but also Darwinism itself, as explained in later chapters, promoted an emergentist tradition in philosophy that underlined the status and reality of human intentionality. In contrast, many so-called 'Lamarckians' broke from the materialism of Lamarck and proposed an unsustainable dualist ontological position where intentions arose mysteriously from the mind, themselves being incapable of causal explanation.

It might be objected that the explanation of human motives denies the reality of choice. This will be discussed further below. At this stage it is pointed out that causal determination of choices does not imply an absence of the subjective awareness of choice. Neither does it imply that choice is

---

10 In conversations with the present author before her death in 1996, Penrose had revised her opinion. She was deeply fascinated with evolutionary explanations of human consciousness, and did not take human deliberation as given or for granted.

unreal. Very small causal influences can have big effects and can thus cause the individual to act otherwise. Finally, the notion that choice or any other phenomenon is uncaused is unacceptable, for reasons explored later.

It is not being argued here that every theory or explanation in the social sciences has to include an explanation of all the motives or preferences of the individuals involved. No theory can explain everything. For some purposes and in some circumstances, it can be legitimate to take the purposes or preferences of the individuals involved as given. All theories involve abstractions. In some cases it can be legitimate to abstract from the influences on, and changes in, individual preferences and purposes. In which case, human intentions become the elemental forces in the particular theoretical explanation. But even in this case, the assumptions concerning human intentions should be consistent with what we know about human evolution and individual development. Furthermore, the use of a simplifying assumption in one theory does not rule out the need for another theory to explain those elements that are taken as constant or given. Intentions and preferences still have to be explained at some stage. Explanations of human motives should use resources from biology, psychology and anthropology, as well as from other social sciences.

The ambiguous bogeys of mechanism and determinism

Some social scientists may object that the argument here is 'mechanistic' or 'deterministic'. The social sciences are satiated with rebuttals of 'mechanistic' and 'deterministic' doctrines, but these words are themselves rarely and poorly defined. Others, in contrast, enthusiastically take up the idea that human beings are 'mere machines', as a warrant for their version of scientific enquiry. Their opponents see such 'mere machines' statements as sufficient condemnation of the approaches involved. Yet rarely is the 'mere machines' idea clarified and explored further. Both enthusiasts and critics fail to adequately define their terms.

Consider the words of Richard Dawkins (1976, pp. x, 2, 21–5), who described humans as 'survival machines', 'machines created by our genes' or 'robot vehicles blindly programmed' to preserve their genes. These phrases are designed to shock. But all shock and explanatory value is lost when it is realized that Dawkins did not explain adequately what he meant by a machine. He would admit that humans have consciousness and purpose, but provided minimal exploration of the meaning of these terms. Yet he also repeatedly ascribed 'ruthless' will and purposefulness to the 'selfish gene'. Dawkins denuded the human individual of purposefulness, but only by repeatedly ascribing intentionality to the genes. For him, genes are purposeful but humans are mere machines. But he failed to explain the difference. A consequence is that the concept of intentionality is undermined. With both enthusiasts and opponents of 'mechanistic' doctrines, rhetoric triumphs over substance.

Among those social scientists that emphasize consciousness and choice, things are only slightly better. Economists typically make a song and dance about choice. But only the maverick economists reflect upon its substance and definition (Shackle, 1961, 1976; Buchanan, 1969; Loasby, 1976; T. Lawson, 1997). Sociologists write of human agency and self-reflection, but the underlying presuppositions are inadequately explored.

To proceed further, some definitions must be attempted. A provisional definition of a 'mechanism' is a structure involving causal connections but lacking an adequate capacity for self-reflection and intentionality. A minimal feature of intentionality is the capacity to prefigure a goal in conscious thought. Leaving further important questions on one side, it is already clear, with this rough definition of a mechanism, that the Darwinian theoretical approach embraced here is not mechanistic. This is because Darwinism does not deny intentionality, at least in the sense of the existence of consciousness and prefiguration. Darwinism simply asserts that human intentionality is itself caused, and in turn it requires some causal explanation.

In contrast, despite its verbal emphasis on 'choice', much of mainstream economics is mechanistic in the sense of lacking adequate notions of human self-reflection, intelligence, intentionality or will. This is because human agents are often modelled as automata, with limited cognitive or learning capacities, reacting crudely to stimuli from their environment that are somehow unambiguous. Furthermore, some mainstream economists claim that the same basic model of human agency, based on utility maximization, also applies to lower organisms, including 'honeybees, ants and schooling fish' (Landa, 1999, p. 95), or even bacteria (Tullock, 1994). This simply confirms the observation that the degree of intelligence and self-reflection found in human beings is not encompassed by a standard and allegedly ubiquitous utility function. To overcome the limitations of 'mechanistic' models of human agency, significant attention must be given to factors such as the number and complexity of stimuli, cognitive processes, interpretative ambiguity, and so on (Bandura, 1986; Hodgson, 1988; Simon *et al.*, 1992; Witt, 2000; Loasby, 2001; Vanberg, 2002).

Other writers see the term mechanistic as denoting something very different, such as an emphasis on quantitative rather than qualitative factors of change. Again, the approach adopted in the present work is not mechanistic, even in this alternative sense. Both qualitative as well as quantitative changes are emphasized here. Still other writers associate 'mechanistic' with an atomistic ontology, in which entities are said to possess qualities independently of their relations with other entities. Others use the term 'mechanistic' to describe systems whose functional specification denies variation or diversity in the functional parameters. But again, the approach adopted here is not mechanistic in any of these senses.

The Darwinian ideas that every event is caused, and that even human motivations have to be subjected to causal explanation, will provoke in some quarters the accusation of 'determinism'. This too is misleading and at least in some senses mistaken. The very word 'determinism' connotes a confusing multiplicity of meanings. Essentially, there are at least three different versions of 'determinism', as briefly described below.

1 **Predictability Determinism.** Determinism is sometimes defined as the epistemological doctrine that 'any event can be rationally predicted, with any desired degree of precision, if we are given a sufficiently precise description of past events, together with all the laws of nature' (Popper, 1982, pp. 1–2).
2 **Regularity Determinism.** A different definition of determinism is the notion that any given set of circumstances and state of the world must lead to a *unique* outcome: 'given *A*, *B* must occur' (Blanshard, 1958, p. 20). Regularity determinism involves a denial of randomness and chance in the universe. This is an ontological rather than an epistemological notion: it says nothing about what we may be able to know or predict.
3 **The Principle of Determinacy.** Another definition of determinism is the notion that *every event has a cause* (Urmston, 1989). This is again an ontological statement about the world, otherwise known in philosophy as 'the principle of universal causation' or 'ubiquity determinism'. As Mario Bunge (1959, p. 26) put it, the 'principle of determinacy' means: 'Everything is determined in accordance with laws by something else'.

These crucial differences require that the ambiguous word 'determinism' be defined whenever it is used. The principle of determinacy is central to Darwinism and is adopted here.[11] But the other two versions are rejected. There is nothing in Darwinism that involves any commitment to the first two versions of determinism. Furthermore, these three versions of determinism are logically independent: one does not flow from the other. Predictability determinism – the dream of Laplace – is itself countered by the realization of analytical and computational limits in the face of complexity, and even of the limits of mathematics itself (Gödel's Proof), and more recently by theories of computability, chaos and complexity. There are nonlinear systems with such a high degree of sensitivity to initial conditions that no amount of accurate measurement of the appropriate parameter values can provide a sufficiently accurate prediction (the Butterfly Effect). Predictability in the human domain is also confounded by the logical problem of predicting future knowledge or creativity. If prediction led us to

11 Note the difference with Hodgson (1993) where I was equivocal over the adoption of the principle of determinacy. I was then needlessly worried that this principle might be incompatible with free will and genuine choice. Bunge (1959), Bhaskar (1975), Earman (1986) and Auyang (1998) have rightly argued that predictability determinism is quite different from the principle of determinacy.

know future knowledge, then it would be present knowledge, not knowledge confined to the future (Popper, 1960, 1982).

The principle of determinacy does not mean that the future is inevitable, at least in the sense of unavoidable. As Dennett (2003) pointed out, knowledge of causal determination enhances rather than diminishes the possibility of avoiding an outcome. Determinacy does not mean inevitability.

The principle of determinacy does not rule out the possibility of statistical determination, where effects are stochastic but with regular statistical properties. Statistical laws are still laws. If outcomes were statistically determined, and statistical determination was not merely apparent but real, then the second proposition – regularity determinism – would strictly and generally be false. But the third proposition would not be undermined.

Even if determination is not statistical but links one set of causes with one set of effects, then there are still objections to regularity determinism. Roy Bhaskar (1975) rightly rejected regularity determinism on the grounds that it would work only if it were confined to a closed system, and most systems are in fact open. The possibility of exogenous disturbances undermines regularity determinism in specific systems.

Would regularity determinism apply to the universe as a whole? Given that the universe is interconnected and systems are open, the regularity 'given *A*, *B* must occur' could not be specified *A* corresponded to a complete description of all the possible influences on *B*, from throughout the universe. In practice, the statement 'given *A*, *B* must occur' will itself be indescribable in its massive scope and complexity. Strictly, with unlimited interconnectedness, the 'given *A*, *B* must occur' statement will only pertain if *A* is a complete description of the state of the universe. The idea of regularity determinism cannot apply to any limited description of the world, and complete descriptions are unattainable. Consequently, even if regularity determinism applied to the universe as a whole, it would offer little epistemological guidance for science.

Having rejected or disabled the first two versions of determinism, the (third) principle of determinacy is retained. Indeed, it is a necessary foundation for science. A theological definition of a miracle is something that happens without a scientifically explicable cause. If science admits the possibility of an event without a cause, then it has abandoned its own mission. We can retain a broad view of the nature of science, but the quest for meaning and explanation is indispensable to any version of the scientific enterprise. Of course, we cannot prove the unfeasibility of an uncaused cause. In general, proofs of causality, or of its absence, are impossible. But science is nevertheless obliged to search for causal explanations, and determinacy must thus be assumed. In many circumstances, prediction will be impossible. Nevertheless, the quest for some kind of causal explanation must remain. To behold a first and uncaused cause is to issue licence at that point to abandon the quest.

Darwinism is thus incompatible with the idea of George Shackle (1976) that human intentionality is an 'uncaused cause'. A problem with Shackle's position is that it involves an investigatory closure. Once we affirm an 'uncaused cause' we say that science should explain this much, but no more. We may move so far down the causal chain, but no further. We arrive at a causal and explanatory roadblock, policed by the adherents of the 'uncaused cause'. Admittedly, all ontological commitments involve dogma in the sense that they cannot be directly verified by experience. But the principle of determinacy is preferable to the 'uncaused cause' in that it does not place dogmatic bounds on the scope of scientific enquiry and explanation. The preferable ontological commitment is one that rules out miracles and denies any no-go zones for science. The roadblock must be opened, even if the road ahead is treacherous and complex.[12]

How can a first and 'uncaused cause' be compatible with the recognition that other outcomes are caused? How is this special causal void to be explained? Is it ubiquitous to nature, or does it lurk merely in a mammalian neural system? Or is it unique to humans? How can evolution explain its sudden appearance?

The uncaused cause is sometimes defended as the requirement of real choice. If our choices are determined, how could we have acted otherwise? Choice may be seen to lack substance if there was no alternative. But crucially, two situations of choice are never identical in all details. Even if two situations are very similar, we could act differently because of slight influences with sufficiently magnified effects. For instance, the very fact that we are reflecting upon the possibility of 'acting otherwise' may be sufficient for us to make a different choice. A multiplicity of conflicting causal influences acts upon our decisions, with complex feedbacks and interactions. In some cases, our own deliberations can have big effects. Complexity, emergence and sensitivity can make choice real, despite the fact that it is determined.

Dewey (1894, pp. 338–9) notably responded to the proposition of an uncaused ego with the insistence that 'it becomes necessary to find a cause for this preference of one alternative over the other'. He continued: 'when I am told that freedom consists in the ability of an independent ego to choose between alternatives, and that the reference to the *ego* meets the scientific demand with reference to the principle of causation, I feel as if I were being gratuitously fooled with'. For Dewey, in full Darwinian spirit, the need for causal explanation could not be abandoned.

Some authors argue that if our will is determined then we can hardly be held responsible for our choices and our actions. It is alleged that as a result

12 My own position has changed on this issue. Hodgson (1993) failed to decisively reject the notion of an uncaused cause. However, I also noted that chaos theory suggests that even if the world is deterministic, it may appear as entirely spontaneous and free. I now believe that the admission of the possibility of an uncaused cause is not only unnecessary but also untenable, for the reasons given here.

of such 'determinism' there can be no basis for morality or law. Two brief responses are appropriate here. First, if our will is determined, then moral pressure and legal sanctions still can have an effect on our actions. Consequently, there is no ground for abandoning morality or law. Second, even if, on the contrary, our will was an 'uncaused cause', then we would be no more responsible for the capricious and spontaneous processes that led to our actions. The 'uncaused cause' adds nothing extra to the importance of morality or law. They are important in any case.

For example, a philosophically minded murderer might claim that his decision to pull the trigger of his gun was caused by events beyond his control. Another might claim that her intention to murder appeared spontaneously (or uncaused) in her mind. The first murderer is just as responsible for the murder as the second. In both cases the prosecution would argue that the (caused or uncaused) inclination to kill should have been resisted by the murderer, so that the murder did not take place. The principle of determinacy does not diminish the burden of individual responsibility.[13]

The position adopted here does not rule out some notions of novelty, nor even of 'free will'. A number of philosophers – including the Greek scholastics, David Hume and Jean-Paul Sartre – have argued that an idea of free will is compatible with the principle of determinacy. In philosophy, this position is known as 'compatibilism'. It upholds that even if our choices are determined then that does not rule out the reality of the process of choice. It is beyond the scope of this work to establish the possibility of compatibilism. I simply note that the Darwinian position stated here admits ground for the 'compatibilist' argument that 'choice' and 'free will' can be reconciled with the proposition that every event is determined. The human will is a real cause, but it is a proximate rather than an ultimate cause (Mayr, 1982).[14]

If novelty simply refers to unpredicted outcomes then we have no difficulty admitting such possibilities, even if every event is caused. We now know from chaos theory that even if every event is determined, the world is still often unpredictable. Randomness and apparent indeterminacy remain. Novelty may be caused, but it will often appear as entirely spontaneous and free. Prior causes always exist, but the complexity of the system may make them especially difficult to identify. In open, complex, non-linear systems all sorts of novelties are possible. What are ruled out of the picture are novel effects that do not themselves obey actual scientific laws.[15]

13 For a discussion of related ethical themes, in the context of Darwinism, see J. Richards (2000).

14 On compatibilism see Sterba and Kourany (1981), Dennett (1984), Honderich (1993) and Vromen (2001).

15 On the compatibility of novelty with the principle of determinacy see Bunge (1959, ch. 8). Vromen (2001) rightly argues that evolutionary theory cannot be rejected on the grounds that it fails to predict novelty. If novelty involves unpredictability then it is unpredictable by *any* theory.

A note on causation

Aristotle identified four types of causality: the formal, material, efficient and final. His notion of 'cause' was somewhat broader than the modern meaning. It included assertions of the origin, nature, form and material constitution of a phenomenon. In much modern usage, a narrower sense of the word is invoked: causes are always taken to mean the specific factors leading to an effect. As Jochen Runde (1998, p. 154) put it: 'a cause of an event [includes] anything that contributes, or makes a difference, to the realization of that event in one or more of its aspects'.

Within this narrower and more dynamic meaning of 'cause', two of Aristotle's categories remain: 'efficient' and 'final' causality. Efficient causality is similar to the concept of causality in the modern natural sciences. The word 'efficient' here does not necessarily refer to an optimal (or any other particular type of) outcome. It simply means capable of having an effect. Final causality, or 'sufficient reason', is teleological in character: it is directed by an intention, purpose or aim. Hence, within this narrower notion of a cause, Aristotle promoted a causal dualism. Much later, René Descartes retained a similar division, with his dualistic separation of physical matter from the independent, volitional and supposedly immaterial human soul.[16]

This distinction persists in modern thought, where the natural sciences embrace descriptions of cause and effect involving matter and energy, and the social sciences find their causal fuel in human intentions, purposes or beliefs. The compartmentalization of the natural from the social sciences encourages a form of dualism with two different conceptions of cause.[17]

Here the attempt at reconciliation proceeds in materialist terms. The modern natural sciences admit no cause that does not involve the rearrangement or transformation of physical matter or energy. We may call this the 'materialist condition of causality'.[18] According to this view, all causes involve movements of matter and transfers of energy or momentum, as a necessary but not sufficient condition of it being a cause.

---

16 See Bunge (1980) and Stich (1983, 1996).

17 Mainstream sociology has typically taken it for granted, or even by definition, that 'action' is motivated by reasons based on beliefs. Others have criticized the adoption of such a 'folk psychology' that explains human action wholly in these terms. The critics point out that such explanations are a mere gloss on a much more complex neurophysiological reality. These dualistic and 'mind-first' explanations of human behaviour are unable to explain adequately such phenomena as sleep, memory, learning, mental illness, or the effects of chemicals or drugs on our perceptions or actions (Bunge, 1980; Stich, 1983; P. M. Churchland, 1984, 1989; P. S. Churchland, 1986; A. Rosenberg, 1995, 1998; Kilpinen, 2000).

18 Aristotle's concept of 'material cause' was quite different. It referred to the material make-up of an object as part of the explanation of its nature. There is a striking lack of consensus, even among philosophically inclined social scientists, over the terms involved here. An alternative to imposing the 'materialist condition of causality' would be to use Aristotle's phrase 'efficient causality'. But the intention here is to escape from the Aristotelian causal framework. Furthermore, 'efficient' can easily be misunderstood, especially by economists.

In philosophy, the precise definition and logical form of a causal statement is highly complex and still unresolved (Sosa and Tooley, 1993; Salmon, 1998). The 'materialist' condition imposed here, however, is to some degree independent of this philosophical debate. Although, at least at the social level, we cannot understand causality completely in terms of identifiable material relations, all relevant causal relations involve movements of matter and transfers of energy or momentum. In physics and elsewhere, causes are not fully understood, but all causes satisfy this materialist condition of matter–energy transfer.

Intentions can satisfy the materialist condition of causality if intentions are understood as involving transfers of matter or energy, including at the neural level. Indeed, any action or communication involves movements of matter and transfers of energy or momentum. Notwithstanding the fact that they are caused, intentions themselves are causes. Intentions are real but do not require an entirely different kind of causality. The causes and effects of intentions have to be explained, in terms that include the important role of mental prefiguration and judgement. They are special causal mechanisms but not an entirely separate (teleological) fundamental type of cause.

The fact that the sciences are still saddled – well over two millennia after Aristotle – with more than one version of causality, is rarely a subject for discussion. The wall between the natural and the social sciences has averted us from this question. Yet when dialogue does occur between the biologist and the social scientist then the problem emerges.

The development of quantum physics – particularly in the so-called Copenhagen interpretation – has sometimes prompted a rejection of causal explanation in the terms outlined here. However, statistical determination, as expressed in probabilities, does not imply the absence of a cause. Charles Sanders Peirce gave the name 'tychism' to the doctrine of the probabilistic nature of causation. However, even if outcomes are stochastic, statistical determination is still involved. Statistical determination or tychism does not mean indeterminacy. Quantum physics does not necessarily lead to an abandonment of some standard principles of causal determination (Bunge, 1959).

Quantum physics may be consistent with a non-statistical version of causal determination. We may not be able to offer precise predictions of the motion of subatomic particles simply because of our ignorance of all the causes that bear upon them. As Bertold Brecht had a character explain in his play *Me-Ti*: 'Their movements are difficult to predict, or cannot be predicted, only because there are too many determinations, not because there are none.' The same may be true of the subatomic quanta. Albert Einstein and others were concerned about the abandonment of strict causation by the quantum physicist for some form of stochasticity, and remarked that he could not believe 'in a God who plays dice'. Einstein retained faith 'in complete law and order'. Consequently, Einstein *et al.* (1935) argued that explanations of quantum phenomena had to be completed by the addition of 'hidden variables' (Salmon, 1998). This issue remains controversial in physics (Cushing, 1994).

Determined, non-linear systems can simulate stochastic behaviour. Ian Stewart (1989) has thus conjectured that chaos theory can thereby bridge the gulf between the apparent randomness of the quanta and the operation of causal laws. The throw of a die leads to apparently random effects, but that does not rule out the outcome being a unique result of a specific combination of prior circumstances and events. Similarly, random number generators in computers use multiplication and numerical truncation to generate a series of (pseudo-)random numbers. Apparent stochastic behaviour may be an aggregate outcome of non-probabilistic causal processes operating at lower, micro levels.

However, for the purposes of this book, no ruling is necessary, or will be made, over the admissibility or otherwise of statistical or stochastic determination. The minimum core ontological position maintained and defended here involves the principle of determinacy or universal causation (proposition three above), and a commitment to a singular overall type of materialist causality that can connect diverse domains. The principle of statistical determination is ruled neither out nor in. The rise of chaos and complexity theory, has given a recent fillip to Einstein's proposition that strict rather than statistical determination is everywhere at work. But it is not necessary to take a position on this here.

Forward to the past

The previous chapter pointed to an evolutionary approach, in which the transformation of agents as well as structures is explained. The case is made that this approach should be Darwinian, in that social phenomena are also subject to principles of variation, replication and selection. This evolutionary and Darwinian approach to social theory recognizes emergent properties in the social domain and does not attempt to explain the social in entirely biological terms. It does not see evolution as an optimizing or teleological process. Evolution occurs on multiple levels, including the social as well as the biological. It emphatically includes human intentionality but sees its emergence as subject to a causal and evolutionary explanation. Human agency is a cause, but it is a cause in turn that has to be explained. Darwinism involves more than variation, replication and selection – it invokes an unrelenting search for causal explanations.

Remarkably, such an approach to social theory was partly developed in the 1890s, particularly in the United States, but also drawing on publications from Germany, Britain and France. The works of a connected group of British thinkers including Charles Darwin, Thomas Henry Huxley, George Henry Lewes and Conwy Lloyd Morgan were of particular importance. Within a few years, all of the ideas described in the preceding paragraph were present. Yet this extraordinary episode in American social theory is largely neglected by the social theorists of today.

One of the principal authors of this Darwinian transformation of social theory in America was Thorstein Veblen. His work synthesized the evolutionary theory of Darwin, the instinct–habit psychology of William James and William McDougall, and the pragmatist philosophy of James and Charles Sanders Peirce. Fatefully, however, Veblen did not build up his insights into a systematic and comprehensive treatise. Nevertheless, Veblen's works were widely cited, and he influenced a number of other important thinkers. The evolution and nature of this brilliant, neglected but incomplete synthesis is explored below.

However, as explained in Parts III and IV, the intellectual environment of American academia began to change rapidly and substantially after 1914. In philosophy, pragmatism was displaced by positivism, and instinct–habit psychology was replaced by behaviourism. Meanwhile, the inheritors of Veblen's legacy failed, partly because of the less favourable intellectual environment in the interwar period, to complete a theoretical system for institutional economics.

Remarkably, however, the present philosophical and psychological environment is more conducive to the revival and development of the original, Veblenian project. This book is an attempt to contribute to this task.

The next two chapters examine some key issues that are related to Veblenian thought. One chapter discusses the impact of Darwinian and Spencerian evolutionary ideas on psychology and the social sciences. The other addresses the concept of emergence and some of its implications. Chapters 6 to 10 will focus more specifically on Veblen's contribution.