PART IV: SOCIAL HISTORY

The next two chapters are about social history. The basic argument is that if Darwin was right about natural history (and he was) then Marx was right about social history. They both use the same explanatory framework. Each theory is an analogue of the other. Chapter 10 is about how we can use an evolutionary framework to understand social and cultural changes. And chapter 11 is about the implications of this theory for truth and ethics.

Chapter 10

Social Evolution

> Although *The Origin of Species* is developed in the crude English style, this is the book which contains the basis in natural history for our view.
> — Marx, *Letter to Engels*

10.1 Natural and Social History

Why does Darwin matter to anyone other than a professional biologist? The reason is that Darwin proved that we were not created in the image of God (which was the previous best theory) but are products of natural selection. He proved that we are not miraculous, in a religious sense, but that we are miraculous in a much more interesting, scientific, way.

However we must be careful to distinguish between what Darwin can explain and what he cannot. In general natural selection can only explain those traits that all members of a population have in common, not the differences between them. The commonalities will be due to selective pressures acting on populations over many generations, and the differences will be due to variations in the genetic make-up and developmental histories of individuals. For example, Darwin can explain why all humans have eyes but he cannot explain why *my* eyes are brown, which is due to my own particular genetic inheritance. Darwin can explain why all humans produce scars when their skin is cut but he cannot explain the scar on my chin, which was due to a surfing accident.

When we look at other animals we find that, in general, each species has a characteristic way of living. They form social groups, find their food and shelter, and raise their offspring in ways that are common throughout the species; and these patterns of behaviour are relatively static over the generations. But when we look at the thousands of distinct societies that humans have lived in over the last million years we see a vast variety. Some societies are vegan and others are cannibalistic. Some are violent and others are peaceful. Some are patriarchal and others are matriarchal. Some build palaces and cities while others do not build any permanent shelters at all. Some are rigidly divided into classes or castes, and others have no strict social hierarchies. Some force their children into labour or education outside the home from the age of six, while parents in others support and educate their offspring well into adulthood. Some are democratic, some are dictatorships, and some have virtually no social organisation at all. Some subsist by hunting and gathering in small bands, and others are organised into technologically-advanced empires that exploit the resource of

many continents.

Where did these differences come from? Are they dueto the effects of natural selection or to socialhistory? In chapter 8 I argued that only changes that are due tochanges in gene frequencies can be explained by the actions of naturalselection, and since humans form a distinct biological species (or, atleast, as distinct as any species ever is), with individuals more geneticallysimilar than they are distinct, then those traits that are due to naturalselection will *tend* to be those that are universal. But what on earthhas, for example, a stone-age hunter-gatherer got in common with a 21st Century computer tycoon? Well they have certain obvious biological similarities (two arms and legs, can suckle their young, and so on), they both use some form of language, are very good at learning and reasoning compared to other animals, and they are both (presumably) conscious. And that is about it. Darwin can explain the *natural* history of these human universals. All the rest, all the interesting fast-changed variety,must be explained by a theory of *social* history.

However there are two caveats that should be mentioned here. The first is that we have relatively little idea which psychological traits, if any, are universal and innate products of natural selection. This is the question that Evolutionary Psychology is attempting to answer. But the problem is that to determine whether a trait is universal and innate it is necessary to test a large enough sample of human subjects raised in a sufficiently wide range of social environments, from neolithic tribes to Western industrialised cities. Done properly this can yield fascinating insights into the common cognitive mechanisms that underlie our ability to form a wide variety of stable social groups — such as Cosmides and Tooby's investigation into our ability to detect social 'cheats' (Barkow, Cosmides, & Tooby, 1992). But even when a psychological trait is found to be universal this does not yet prove that it is innate. It is equally possible that it is what Dennett describes as a 'forced move in design space': 'so far as I know, in every culture known to anthropologists, the hunters throw their spears pointy-end-first, but this obviously doesn't establish that there is a pointy-end-first gene that approaches fixation in our species' (1995, p486). As I argued in section 8.3, in order to prove that a trait is amenable to adaptation by natural selection it is necessary to identify the brain mechanisms that are responsible for those traits and then discover whether development of those mechanisms is canalised and robust against environmental effects. Unfortunately we have barely begun to scratch the surface of these processes.

The second caveat is this. Natural selection does not usually have a direct impact on social history for the simple reason that the rate of reproduction of individuals is rarely correlated with genetic factors. The rate of reproduction of a Kenyan peasant is currently roughly twice that of a Western urban professional, for example, but this difference is due to social pressures not biological 'fitness'. Nonetheless, in some circumstances, genetic factors *can* play a significant role in history through their effects on rates of reproduction. The most important of these has been resistance to infectious disease. For example, the largest single factors in the defeat of the mighty Aztec and Inca empires by the Spanish Conquistadors were smallpox, tuberculosis, and measles. The pathogens for these diseases originally evolved from infections of Eurasian cattle, and over the millennia natural selection produced genetic resistance in Eurasian natives. Amerindians were not exposed to these pathogens until the Spanish invasions, and so had no chance to build up resistance. The result was fatal, both for individual Amerindians and their societies. The native population fell by 80% within 100 years, mostly due to Eurasian diseases, and Latin America

became a colony of Europe as a result.

But apart from such particular examples, social changes are rarely driven by changes in gene frequencies. They are not the result of natural selection, but social forces. In this chapter I argue that these social forces can be understood using an analogue of Darwin's theory of natural selection applied to the social domain.

Now on the face of it there is no *a priori* reason why a theory developed to explain biological evolution should have anything useful to tell us about the evolution of culture. The two domains are different and so surely different rules will apply? On the other hand Darwin's theory is completely general: as long as a system meets that conditions described in chapters 8 and 9, then adaptation will be the necessary consequence. Moreover natural selection is quite simply the best theory we have ever had at explaining the history of complex, highly structured, and reproducing systems; therefore if any aspect of cultural change fits a Darwinian framework then we may expect that the analytical rewards would be great.

The central issue in the philosophy of history is the relationship betweenideas and the material social environment. There are two extreme positions we can take. The first is a pluralist attitude usually attributed to Hegel, and the second is a reductionist attitude that is usually, though wrongly, attributed to Marx[1]. The Hegelian position is *ideological determinism*, according to which ideas are independent of the material world, and whose evolution is driven by their own internal dynamic. (Hegel also insisted on their steady progression towards some final goal, but you can be an ideological determinist without holding to this teleology). The not-Marxist position is *economic determinism*, according to which ideas are determined by the current state of the material social world. (The Orthodox Marxists, such as Stalin, also insisted that the materialstructures of society also undergo their own inexorable progress, but again this teleology is optional). In this chapter I defend a synthesis of these two caricatures — which I believe is closer to what Marx was 'really' getting at — and argue that ideas evolve through an an analogue of artificial selection such that they become adapted to a changing material social environment, even though they are not determined by it.

In the next two sections I argue that the evolution of ideas cannot beunderstood in isolation from the material social context. In section 10.4 Iargue that Marx's theory of history provides a way of understanding thiscontext that is analogous to Darwin's theory of natural selection. And in theremainder of the chapter I use this combination of Darwin and Marx to examineparticular aspects of the evolution of cultural traits.

10.2 Memes and Vehicles

One's theory of cultural evolution will depend on one's theory of biological evolution. For example Dawkins argues that natural selection is the result of the differential replication of genes. Some genes are better able to replicate in a particular phenotypic and environmental context — they will be fitter — and so they will spread more than others. Individuals or groups of organisms (vehicles) have no privileged conceptual or causal role in this picture. They are just the genes way

[1] It may plausibly be attributed to the orthodox Marxists of the Second International such as Kautsky and Plekhanov, Stalin, and Lenin (at least until the outbreak of the first world war forced him to revisit Hegel). But this is another question.

of making another gene. Dawkins also proposed an analogy with the social realm in which cultural entities (memes) play the role of genes. Some memes are better are reproducing in a particular social environment, and so will spread more than others. Persons, or larger social units, play no privileged causal role in this picture: they are just the meme's way of creating more memes.

In chapter 9 I argued that the underlying conceptual glitch with Dawkins' picture was what Sober called the counting problem: genetic replication, in itself, does not constitute successful reproduction. Fatter is not fitter. The same problem applies to the differential reproduction of memes. Suppose that an artist becomes obsessed with a particular idea and produces canvass after canvass of the same painting in his lonely garret, or that a monk becomes obsessed with repeating the same mantra in the seclusion of his cell. The meme is being replicated with every repetition but this process will not lead to it spreading: it will die with the artist or monk.

Dawkins solved the counting problem by measuring the spread of genes in terms of *germ line replication*, which he defines as those replicators that are 'potentially the ancestor of an indefinitely long line of descendants'. However the meaning of 'indefinite potential' is as undefined in cultural evolution as it is in biology. Through what process does a meme or gene gain the potential for immortality? The artist's canvasses may lay preserved and undiscovered in his garret long after his lonely death — like the cave paintings of Lascaux — but this does not, in itself, constitute success. There is more to becoming part of cultural evolution than just existing. Mere immortality is not enough for a meme (or for an artist): recognition is key. An unread book is just so much wood-pulp. An unheard speech is just hot vibrating air. In chapter 9 argued that a gene is only successfully (germ-line) replicated when it is carried by a new vehicle. And, in the same way, a meme is only successfully replicated when it lives on in the minds of others[2]. However it is not just individual minds that can carry memes, so too can larger social organisations such as religious organisations, media conglomerates, nations, classes, state structures, and so on. Each of these are capable of possessing memes, ideologies, or policies which they transmit to others, possibly even despite the particular views of their individual members. Thus the memes of the artist may impress their personal friends and colleagues, but they would be more effectively spread, and stand a better chance of surviving into posterity, if they were taken up by an influential gallery or magazine. In this case it would not matter if the individuals within those organisations did not think much of the artist's work, as long as the official policy of the organisation was to support them and so spread their memes.

The rate at which a meme spreads is its *fitness*, and when discussing the concept of fitness we have to distinguish two questions. The first is how to define and measure it: what does it mean to say that a gene (or meme) is fit? The second is to ask how particular genes (or memes) fulfill those criteria: what properties make a particular gene (or meme) fit? The answer to the first question is that the fitness of a gene is the ability of the class of vehicles that carry it (its *genotype*) to transmit to others. Genes are normally passed on by the reproduction of their vehicles, therefore fitness is usually operationally defined as the expected number of offspring of a individual member of a genotype. However, as we saw in section 9.4, what matters for the genes of a parasite is not the rate of reproduction of the vector *per se*, but the rate of transmission to a new host. Memes are more like infectious parasites than germ-line genes in this respect, since they too can spread

[2] Dennett also discusses this issue (1995, p349) but does not take it to its logical conclusion.

'horizontally' through a population of vehicles rather than just vertically through a reproductive lineage: the only way to give someone my brown hair is by giving birth to them, but I can give them my ideas and my bacteria by talking to them. Therefore if the definition of fitness is translated from genes to memes we find that it should be understood as the ability of the class of vehicles that carry it to transmit their memes to others.

Memes spread because their carriers are able to convince or persuade others to hold them. But some carriers are more persuasive than others. We are more likely to believe — i.e. accept the memes of — someone who we trust and respect. We are more likely to take notice of an artist whose previous work we enjoyed. Social organisations too can be more or less persuasive. An influential gallery is more likely to spread the work of an artist than an obscure one. Sociologists define this ability to spread memes as *ideological power*, and the concept of power is as central to sociology as force is to physics and natural selection is to population biology. In each discipline it is the concept that we use to explain *change*; the change in motion of a particle, the change in traits of organisms and, in the case of the social sciences, how we explain changes in people's social behaviour.

It may be useful at this point to develop an analogy that Dawkins (1993) draws between the spread of memes and the spread of computer viruses. One of the key problems that the designer of a virus faces is how to achieve effective transmission. The basic method is a form of memetic hitchhiking in which the virus is embedded in a set of files that contain useful data; when a user copies those files into their computer then the virus hitches a ride. However this is a rather haphazard method of infection that depends on the rate of individual transfers between computers, so hackers soon hit upon the idea of embedding the viruses in central resource locations that many users would access. In Europe until the late 1980s these central resources would usually be bulletin-board services (BBS) accessed *via* modems. The success of virus transmission would then depend on the popularity of the BBS: if it contained a lot of useful information that encouraged many downloads then the virus would spread rapidly. The most potent place to embed a virus today is an internet portal or search engine, or an application produced by a major software house. Even quite a 'dumb' virus placed in these locations can be very successful; consider, for example, the 'features' placed in Microsoft's code by disgruntled employees that produce derogatory messages about Bill Gates in response to certain obscure commands and key presses. 80% of PCs use Microsoft software and so carry these viruses. But the reason why they are so successful is not because they are intrinsically 'fit' — they are completely incapable of replicating themselves — but because they are carried by a vehicle that has the infosphere analogue of great ideological power. This is why advertisers buy banner space at popular web-sites: a meme carried by these vehicles will have a greater chance of spreading than one placed at a more obscure location.

The fitness of a meme is the ability of the class of vehicles that carry it to transmit their memes to others. This ability, as in the case of genetic fitness, is measured as the expected number of individual vehicles that they succeed in passing their memes/genes on to. This seems to directly contradict one the central tenets of Dawkins' account of memes:

> The most important point that Dawkins makes is that there is no necessary connection between a meme's replicative power, its *fitness* from *its* point of view, and its contribution to *our* fitness (by whatever standard we judge that). (Dennett, 1995, p363)

In other words a meme may spread simply because it is good at spreading — quite independently of the 'fitness' of those vehicles that carry them. The issue here depends on what we mean by 'our fitness'. If by 'our fitness' we mean our *biological* fitness then this is certainly true[3]. But if by 'our fitness' we mean our ideological power — i.e. our ability to transmit our ideas — then there is a necessary, even *analytic*, connection between memetic replication and the fitness of the social vehicles that carry them. (Though the question of precisely who benefits from memes, and in what sense, will be discussed below.)

10.3 Memes and Power

Fitness is the ability of a vehicle to pass its genes on to others, but it does not in itself *explain* that ability. In order to this we have to understand how those genes make the vehicles that carry them stronger or faster or more efficient, and so on. Similarly, the concept of ideological power describes the ability of a social vehicle to influence the memes of others, but in order to *explain* that ability we have to answer the second question of fitness, namely what properties makes a meme fit? Why do certain memes spread? In other words how do memes contribute to the ideological power of their carriers?

Ideas can contribute to ideological power in many ways. The most basic ideological role of a meme is the way in which it enables an individual to make sense of a common experience and communicate it clearly and convincingly to others. If an idea 'makes sense' then the person that carries it is 'sensible' and we take notice of what they say. Or ideologically influential memes may take the form of novel solutions to common problems, including advances in science and technology — the memes of flint tools, fire, agriculture, and industry spread through their evident potential to satisfy our material needs. Or memes can spread because of their ability to fulfill spiritual, aesthetic, or psychological needs. Thus the exercise of ideological power does not always involve foisting unwanted ideas on other people; it only requires that memes are transferred to heads that would not otherwise carry them. It is quite irrelevant whether or not those ideas are welcome.

Ideological power may come from the popularity of the transmitted memes themselves, but it can also stem from other sources of social power. Social power is defined generally as the ability of one social entity to affect the behaviour of another and, in addition to ideological power, Runciman (1998, ch4)[4] identifies two other forms of social power: *economic* power is the ability of one social unit to endow or deprive another of wealth, income, or resources; and *coercive* power is the ability of one social unit to exercise physical force over another. All these forms are interconnected and so, like physical energy, social power may be converted from one to another: economic power may enable one to buy arms, and so yield coercive power; coercive power may enable a nation to invade the oil fields of another, and so yield economic power; and both coercive and economic power enables one to take over television stations and so yield ideological power. All forms of power have to be taken into account when we are analysing the spread of memes in practice. For

[3] Though there are some exceptions. The reason why the meme of Catholicism spread to South America, for example, while the meme of sun-worship failed to infect Spain, is in large part due to the difference in mortality rates of their carriers.

[4] Runciman, following Weber, defines ideological power as that social power which stems from the ideological status of the social unit; but the current issue is the *effects* of social power. Its causes are discussed below.

example, in order to understand the evolution and spread of pop songs we must take into account the social dynamics of record companies, how they use their money and influence to get air-play, use advertising, associate their product with other ideological forces including fashion, sport, film, and politics, and so on. These tactics increase sales and profits, which can then be used to push more product in the future. Such explanations do not deny the role of the individual meme. Some pop songs are just plain catchy and so confer ideological influence on the artist; but the ideological power derived from the catchiness of an individual pop song is only one of the forces that play a role in shaping the evolution of popular culture. And unless we understand the role of all these social forces then the movements of the pop-charts remains a mystery.

Consider another example. Chong and Zanfarlin (1999) compare the spread of new technologies to the spread of infectious diseases. In particular they demonstrate, and explain, the existence of 'threshold' effects in which technologies only start to spread rapidly once a certain critical mass has been reached. This is a common characteristic of biological epidemics. For example, it is likely that the ancestors of HIV have been transmitted from monkeys to humans on many occasions. But it was not until the mid-20th Century, and the growth of a migrant labour force in African urban population centers, that a large and dense enough pool of infection was created sufficient to trigger an epidemic (Hooper & Hamilton, 1999). The disease had not necessarily become any more virulent but the change in conditions increased the ability of each host to infect others.

Chong and Zanfarlin argue that there are similar threshold effects in the case of new technologies. They find that the rate at which a superior new technology is adopted is not constant. Rather it depends on whether that superiority has been demonstrated by increasing the social (in this case, *economic*) power of those who currently adopt it; and this, in turn, may require an 'incubation' period in which the work-force is retrained, the work process is re-organised, and so on. Only once this stage has been passed will the new technology spread rapidly. Some technologies (such as non-qwerty keyboards or Betamax video) never reach this stage. They may be technologically superior but that superiority is never translated into social power, and so they fail to overcome the threshold.

In biological evolution there is only one force that matters, namely the force of selection acting on inherited characteristics. Of course other factors play a role, such as the impact of comets on the fate of dinosaurs or the impact of humans on natural habitats, but these exogenous forces only have an effect by defining the environment in which selection acts. Therefore *given* an environment then natural selection is an autonomous process. However one does not have to be a Marxist to notice that the evolution of culture is not autonomous from other, non-ideological, social forces. Payola has effects on the pop-charts and dictatorships can enforce ideologies. Maynard Smith (1961, p90) uses this fact to argue that historical processes cannot be analogous to natural selection:

> If it is true that any adequate theory of history must take into account all the causal connections [from material social environment to culture] then it follows that no formal analogy between historical and evolutionary processes as a whole is possible. In other words, I do not think that a helpful theory of history can be derived by starting from evolution theory and attempting to find historical analogues for the various entities and processes involved.

The effects of the material social environment on culture do not have strict analogies in natural selection, but they do have analogies in *artificial* selection. When a record company uses their economic power to push a particular record, or when a dictatorship uses its coercive power to enforce an ideology, they are acting like animal or plant breeders using their power of intervention to choose which traits will multiply and which will not. But, as Dennett argues (1997), artificial selection should be seen as a subcategory of natural selection rather than an alternative to it:

> The short legs of daschunds and the huge udders of Holsteins are just as much products of natural selection as the wings of the eagle; they just evolved in an environment that included a particular well-focussed selective pressure consisting of human agents. These phenotypes fall under the same laws of transmission genetics, the same replicator dynamics, as any others — as special and extreme cases in which the default 'randomness' or noisiness of selective pressure has been greatly reduced.

In the appropriate artificial environment even sterile organisms — such as mules, wheat hybrids, or seedless fruits — can flourish. If we apply this argument back to the case of cultural evolution then exogenous forces — such as payola and police states — define the social environment in which certain memes prove more popular than others. The question of where these forces come from and how they change is therefore outside the remit of the theory of memetic evolution. But this is a limitation on the theory, not a counter-argument. We should not expect a theory of narrowly cultural evolution to explain the origin of police states any more than we would expect a theory of natural selection to explain the origins of comets or plant breeding stations. Memetics can only explain the evolution of ideas *given* a particular social environment. Memetics is a micro-theory of historical change that makes sense only in the context of processes described using a wider macro-theory. Marx supplied one such theory, and in the next section I place memetic evolution within the context of Marx's theory of history.

10.4 Marx's Theory of History

Two kinds of things are needed for humans to survive and reproduce. The first are material things: tools, fields, hand axes, offices, bricks, computers, and so on. These are what Marx called the *forces of production*. Second, they need the appropriate social organisation: there must be someone to reap and someone to sow, these people must communicate and discuss and organise and control the process of production; and they need ideas and inspiration and reasons for acting. These are what Marx called the *social relations of production*, of which memes are one part. The forces of production are the hardware of society and the relations of production are the software; and Marx's theory of history describes the dynamic of the relationship between the two.

The basic idea is very simple. If a social unit — an individual, or nation, tribe, corporation, or kin-group etc — develops new, more efficient, forces of production then they will gain more social power, their relations of production will prevail, and may be propagated to others. As Torrance puts it (1985, p392):

> It is in the interest of some producer units to make experimental mutations of existing production relations to accommodate new productive forces. Some of these succeed better in enabling reproductions of these forces. ... Those units with new production relations that most successfully reproduce the new productive forces will be most

> successful also in reproducing their new production relations. A probable result would be that since those producer units survive while others fail, the production relations they embody tend to supplant both older ones and new but less successful ones.

For example, consider the politics of Europe after the first world war. In 1914 most of Europe was ruled by various forms of monarchy, from the semi-feudal aristocracy of Russia to the constitutional monarchy of Britain. And each of these regimes were supported by variations of the ideological theme of 'God, King, and Country'. However after the war those countries that had seen their productive resources decimated — most notably Germany, Russia, and the Austro-Hungarian empire — were thrown into political upheaval, the monarchies were overthrown, and other social structures grew in their place: the Weimar republic in Germany, Kerensky's provisional government and the Soviets in Russia, and Bela Kun's republic in Budapest, respectively. And each of these regimes were supported by variations on the ideological themes of democracy, socialism, and peace. However none of these regimes were effectively able to develop the productive forces necessary to rebuild their countries. These societies collapsed, though the reasons were different in each case: the reparations written into the Treaty of Versailles, the continuing civil war in Russia, and the lack of political experience and organisation in the Hungarian communist party. As a result these social structures gave way in turn to totalitarian regimes that put the entire economy under centralised state control, each supported by the memes of extreme nationalism: Nazism in Germany, Stalin's doctrine of socialism in one country, and Horthy's White Terror in Hungary[5]. It was the fact that these ideologies supported regimes that could develop the productive forces of their respective countries that ensured their success.

None of these social changes were inevitable. The particular histories of each country were the result of social conflicts involving political parties, classes, armies, and millions of people acting of their own volition — i.e. conflicts and changes within the relations of production. However, the wishes of an individual (or larger organisation) can only effect social change to the extent that they can wield social power, and the material basis of social power is the forces of production. Relations of production are not determined by the forces of production, but nor are they autonomous from them. The relations of production are *adapted* to the task of developing the forces of production, just as biological traits are adapted to the task of the survival and reproduction of the organism. This is summed up in what Cohen (1978, p160) calls Marx's *Primacy Thesis*:

> We hold that the character of the forces *functionally* explains the character of the relations ... The favoured relations take this form: *the production relations are of kind R at time t because relations of kind R are suitable to the use and development of the productive forces given the development of the latter at t*.

Now the idea that societies are functionally organised in a way similar to living systems is hardly novel. It is a truism that runs from Plato to Radcliffe-Brown (1952) and Malinowski (1944). But such theories have often been viewed with suspicion by historians since simply noting that a social trait serves a social function is not yet an *explanation* of why that trait exists. To say that religion sustains a certain social order, for example, may be true but does not imply that religion

[5] Italy showed the same pattern of social development, from the *biennio rosso* of 1919–21 to the rise of the *Fascisti*. But the reason for the initial social turmoil was more the weakness of the Italian state, rather than the economic effects of the war *per se*.

exists *because* it sustains a certain social order. The existence of an entity (such as some element of the relations of production) can only be explained in terms of its effects (such as the development of the forces of production) if those effects have contributed to the persistence of that in entity in the past. Marx's theory of history fills this explanatory gap — just as Darwin did for biological functionalism — by arguing that those social relations that are best adapted to the development of the productive forces are more likely to prevail over those that are less well adapted (Carling, 1993). Functionalism as a way of making sense of social systems only works if we can use those functions to explain the existence — i.e. the historical origins — of the traits we are trying to understand[6]. The fact that functional organisation is a product of historical processes — rather than simply an empirical fact, as the functionalists claimed — has three important implications.

The first is that Marx provides the framework for functional explanations in sociology, just as Darwin provides the framework for functional explanation in biology. But is still up the empirical historian (or biologist) to investigate the details of each particular case. Social relations are adaptations for harnessing and developing the forces of production, not determined by them. Relations can not be simply 'read off' from forces, therefore it is necessary to understand the particular history of adaptation that produced the current situation. For example, Darwin showed that those Galapagos finches that were better able to exploit the food sources of the islands would survive, but it took empirical investigation to find out which shape of beak would achieve this. Similarly, Marx showed how those social relations of production that were best able to exploit the productive resources of German capitalism would prevail, but it is up to the historian to investigate the particular historical reasons — and historical accidents — that meant Weimar failed and Hitler succeeded.

Second, a false dichotomy is sometimes presented between explaining history in terms of the intentional acts of individuals and in functional terms. For example, suppose we wanted to claim that the function, Y, of the doctrine of Divine Right, X, is to strengthen the social position of the King, Z. Elster insists we can only use this function to explain the existence of the doctrine, if it is *unintended*:

> the fact that some part of the relations of production X has the function Y is only explanatory iff
>
> 1. Y is an effect of X
> 2. Y is beneficial for Z
> 3. *Y is unintended by the actors producing X*
> 4. Y — or at least the causal relation between X and Y — is unrecognised by the actors in Z
> 5. Y maintains X by a causal feedback loop passing through Z
>
> (1983, p57, emphasis added)

However, as Dennett points out (1990)(1998b), intentional explanations should be seen as a subset of functional explanations, rather than as a distinct category. It does not matter if the

[6]Though there is some debate as to the strength of this requirement — see (Elster, 1980) (Cohen, 1980) (Wright, Levine, & Sober, 1992, ch2) and (Callinicos, 1987, sec2.3).

doctrine of Divine Right was originally a devious plan concocted by an ambitious chief, or was the product of dumb generate-and-test; the effects on history will be the same in either case.

The third point is this. Darwin identified the conditions, the *mechanism*, that causes species to evolve. When those conditions are not met, i.e. when the mechanism fails, then evolution does not occur. Similarly, Marx identified the mechanism underlying social evolution, but sometimes that mechanism can fail. Thus neither Darwin's theory of evolution nor Marx's theory of history are *teleological* in Aristotle's sense. Neither natural nor social history are pulled along towards some determinate final goal *a la* Hegel or Stalin, rather they are pushed along by the mechanism of descent with modification. When that mechanism fails then history stalls. So, although it is true that social relations of production prevail because they are capable of harnessing and developing new forces of production, this does *not* imply that there will be a monotonic increase in the development of the productive forces, as Cohen and many other 'orthodox' historical materialists argue (Callinicos, 1987, p23).

One way in which natural or social evolution can stall is by interrupting the generation of new mutations. For example, selection for sex ratios in cattle has no effect because variations in this trait are not compatible with the rest of the developmental biology of the cow: i.e. sex ratio is not a *dissociable* trait (section 8.4). The underlying point here is that biological traits do not enter into competition as atomistic parts, rather they come grouped in whole organisms with the development of each trait dependent on many others. Particular traits may be very useful, but unless they are compatible with the rest of the organism then they cannot be selected for. The same process happens in social evolution. Social relations of production come grouped together in what Marx called *modes of production*. For example, it may be very useful for a society to have scientists, craftsmen, other cultural specialists. But you cannot just have scientists on their own. They also need other people to produce food for them, they need training, a wider culture that values learning, and so on. If a scientist were plonked down in, say, a hunter-gatherer society then they would not contribute anything useful; they would just starve.

In some circumstances modes of production can become what Marx described as 'fetters' on the further development of productive forces. For example, Brenner (1986) has argued that the social structures of feudal societies prevented economic competition between peasant producers: it was not worth their while developing new productive techniques since any extra surplus would simply be stolen by the lord. In such situations 'economic growth in agriculture will, by and large, take the form of the multiplication of units on already existing lines', while 'the long-term developmental trend will be toward stagnation, if not crisis' [p28]. This produced the recession of the feudal economy in Europe, and the stagnation of China from 1300 to 1800. A similar process also led to Japan's abandonment of guns:

> Firearms reached Japan in 1543, when Portuguese adventurers armed with harquebuses arrived on a Chinese cargo ship. The Japanese were so impressed by the new weapon that they commenced indigenous gun production, greatly improved gun technology, and by 1600 owned more and better guns than any other country in the world.
>
> But there were also factors working against the acceptance of firearms in Japan. The country has a numerous warrior class, the *samurai*, for whom swords rated as class symbols and works of art (and as means for subjugating the lower classes).

> Japanese warfare had previously involved single combats between *samurai* swordsmen, who stood in the open, made ritual speeches, and then took pride in fighting gracefully. Such behaviour became lethal in the presence of peasant soldiers ungracefully blasting away with guns. In addition, guns were a foreign invention and grew to be despised, as did other things foreign in Japan after 1600. The *samurai*-controlled government began by restricting gun production to a few cities, then introduced a requirement of a government license for producing a gun, then issued licenses only for guns produced for the government, and finally reduced government orders for guns, until Japan was almost without functional guns again. (Diamond, 1997, p257)

The manufacture of guns was not compatible with the samurai shogunate, and so they were repressed; they were not a dissociable element of the overall mode of production. But this entire mode of production could not persist in the face of foreign competition. In 1853 Japan's safety in isolation came to an end when Commander Perry's U.S. fleet arrived bristling with cannons. This threw Japanese society into a crisis. It obviously could not compete without adopting Western military technology, but this very technology was incompatible with the structures of traditional Japanese society. The result was that within 20 years the Japanese feudal order was comprehensively re-ordered by the Meiji Restoration, with new forces (and relations) of production imported from the most advanced models of the West: the legal system was re-organised along French lines, and the army according to the Prussian model; the primary education system was copied from Germany; agriculture, banking, universities, and the postal service were modelled on the systems of the U.S.; and railways, telegraphs, the textile industry, business methods, and the Navy were based on the British. Western costumes, diets, architectural styles, and hair fashions soon followed (Hobsbawm, 1962, ch8). The social relations of production — and memes — that were most compatible with the development of the productive forces spread, while those that were not perished.

10.5 Memes and Symbols

Where do we get our ideas? Where do our ideas come from? There are two obvious sources. We can get ideas from other people or we can think them up for ourselves. But where is the line between the two? In the *Meno*, for example, Plato attempts to demonstrate that a young slave boy can be induced to see a truth of geometry on the basis of his innate grasp of certain mathematical ideas. The teacher, like a midwife, merely has to 'draw the knowledge out'. However in some cases the birth can be so laboured as to make the process more like implantation. Where is the line between simply telling the student the answer and creating the environment in which they can work it out for themselves? All teachers will be familiar with this dilemma. Now it is not obvious that there is a principled distinction to be made here; however it is one that is vital for a robust notion of memetic inheritance.

The problem is how to distinguish the effects of evolution from the effects of a changing environment. For example, suppose we progressively add fertiliser to a field over a number of years and watch the yield of the crop steadily increase. This is just a common response to a changing environment, not evolution. A meme can spread for the same reasons. For example there is no *a priori* reason why the memes necessary for making stone hand-axes should have had a single origin and then spread through communication. In an environment that includes hard fractured rocks

and food-sources that need killing and butchering, then it would be no surprise if many different groups of *Homo sapiens* thought of stone axes for themselves. Thus the meme may have spread because of a common response to a common situation, rather than through communication. In biological terminology this is the problem of distinguishing between analogous and homologous traits, and it is solved by examining the genetic basis of those traits. For example, all insects and mammals have heads at one end, and it turns out that this is due to a common set of *homeobox* genes. Therefore this common trait must have been inherited from a common origin. The eyes of insects and mammals, on the other hand, evolved separately, as revealed by their distinct genetic basis. The same applies to the social domain: in order to be able to claim that the spread of an idea is due to memetic evolution rather than the effects of a common environment we need to identify the units of memetic inheritance. Those units are *symbols*. Symbols are the genes of cultural evolution.

Genes share two properties with symbols that enable them to play the role of units of inheritance. The first is that they are discrete and atomistic. As Maynard Smith (1989a, p108) observes

> Dawkin's meme concept has been criticised on the grounds that an 'atomic' theory of culture is necessarily wrong. This may well prove correct, although I am astonished at the confidence with which it is sometimes asserted. Animal bodies show a far higher degree of coherence and functional interrelationship than do human societies, and yet an essentially atomic theory of genetics has had a lot to say about the evolution of animal bodies.

The reason why an atomistic theory of genetic inheritance is so successful is that *genes* are atomistic: they are replicated base-pair by base-pair. Similarly, in order to claim that one token meme is inherited from another then they must, in some way, be 'the same'. And in order that two meme tokens can be 'the same' even when they are in two different contexts, then the form of those tokens must be individuated independently of those contexts: i.e. they must be realised in symbols.

The second property that makes genes suitable as units of inheritance is what Monod (1997) calls 'gratuity', i.e. the fact that there is no chemical necessity why particular DNA sequences should fulfill particular biological functions. Similarly, Saussure argued that what distinguishes symbolic language from other representations (like pictures, or 'natural icons' such as footprints in the snow) is that the elements of language are arbitrary. There is nothing inherent in the string of letters W-A-T-E-R (or the equivalent phonemes) that relate it to H_2O. If we find that two cultures represent water using similar pictograms, such as parallel wavy lines, then this may simply be a common response to an environmental stimulus. It is coincidence, not inheritance. But when we find the words *agua* and *aqua* in different European languages then this is good evidence that they share a common origin — i.e. that these are inherited memes. Consider another example. A common defence against an accusation of plagiarism is to insist that the similarity between the original work and the alleged copy is due to common inspiration, rather than memetic theft: it is no surprise that artists in similar conditions will come up with similar ideas. The usual way of separating between the two hypotheses is to match symbol strings. Two musicians may come up with similar ideas, but if they came up with identical sequences of notes then this would be more than coincidence. Teachers expect to find similar ideas in the essays of students who have

attended the same lecture course, but suspicions would be aroused if they contained the exact same sentences. The similarity of content may be explained by a common response to a common environment, but the similarity of *form* may not.

Symbols allow us to distinguish between memetic inheritance and the effects of a common environment. But is this is purely an epistemological distinction? Surely an idea could be transmitted from one head to another even though they were expressed in different symbols, and thus showed no definite evidence of transmission? This is true, but epistemological considerations may be as important as ontological ones in social systems. In other words, the fact that a meme is *seen* to be inherited may be more important than whether or not it is.

The evolution of culture depends on the ideological power of social vehicles, but that power is measured in the spread of symbols; thus the power of the vehicle becomes invested in the symbol. This is the importance of symbols in the broad sense, including trademarks, icons, uniforms, brand names, and slogans. Symbols do not just express or represent a commonly held idea, but they also make their inheritance explicit. It is for this reason that ritual is so important for organised, as opposed to personal, religion. One can show allegiance to God without ritual, but it is through ritual that one expresses allegiance to His representatives on earth. When you make the sign of the cross you are not just assenting to the general idea of the holy trinity, you are also making explicit your allegiance to the church of which the cross is a symbol. In many cases the ritual can become more important than the ideas of which they are supposed to be an expression. Even the Gideon Society makes sure its name is prominent in every bible it leaves in a hotel room. Their aim is not simply to spread the meme of the Word of God *per se*, but to make sure that they are acknowledged as the organisation that is doing the spreading.

The importance of symbols in differentiating memetic inheritance from other environmental effects can also be seen at work in copyright and patent laws. The memes that such coercive systems are designed to cover have direct economic benefits, and so their carriers have an interest in either preventing their replication or ensuring that replication results in some payment to the originator. This is why there has been such strong pressure from powerful individuals, corporations and nations to extend intellectual property rights across the globe.

The relationship between the carriers and originators of such controlled memes is akin to that of the workers and queens in colonies of eusocial insects. Queens pass on their genes to the workers of the colony but the latter are a genetic dead-end: only the queen can pass on her genes to a new generation. Therefore the function of the colony system is to ensure that the benefit derived from those genes accrues in the fitness of the queen, measured by her ability to pass them on to new colonies. The workers in the colony thus act ‘altruistically’ in order to increase the fitness of the queen. Similarly the owner of a copyrighted meme will pass it on to many users, but those users will be prevented by the terms of the agreement from passing it on to others in turn: they are a memetic dead-end. Therefore the function of the copyright system is to ensure that at least a portion of the benefit of the meme accrues to the originator, either in the form of direct economic payment or through an increase in their ideological power — hence copyright statements of the form ‘*X* asserts the right to be acknowledged as the author of this work’.

10.6 Lamarckian Inheritance and Signalling

It is often said that a fundamental difference between memetic and genetic inheritance is that the former is Lamarckian whilst the latter is not; i.e. we can pass on acquired memes, but acquired traits are not passed on through germ-line genes. However the situation is not as simple as all that.

The possibility of Lamarckian inheritance is often regarded as an anathema to the modern synthesis. Dawkins, for example, admits that he is *scared* of the possibility:

> I use the word 'scare' because, to be painfully honest, I can think of few things that would more devastate my world view that a demonstrated need to return to the theory of evolution that is traditionally attributed to Lamarck. It is one of the few contingencies for which I might offer to eat my hat. ...Naturally any scientist hopes that the truth, whatever it is, will out. But a scientist is also entitled to his innermost hopes as to what that truth will turn out to be — a revolution in one's own head is bound to be a painful experience. (1982, p164)

Why does Dawkins regard the possibility of Lamarckian inheritance as such a threat to his understanding of biological evolution? The reason is that Lamarckianism threatens the Central Dogma on which the Weismann diagram, and hence Dawkins' gene-centrism, rests (sections 9.1 and 9.3). If characteristics acquired by the vehicle through development were inherited then vehicles would play an ineliminable causal role in selection: they too would count as replicators, not just genes.

However it is interesting to note that Darwin himself — because he took organisms to be the units of selection — saw no fundamental contradiction between Lamarckianism and natural selection. Indeed he saw in Lamarckianism a possible solution to the problem of blending inheritance in which, in the absence of a discrete genetic mechanism, phenotypic variation in the population would tend to be blended out by sexual reproduction; but if acquired characteristics *were* inherited then variations in the environment would produce corresponding phenotypic variations in the population which would then be inherited. Darwin included this very possibility in the later editions of *The Origin of Species* (Desmond & Moore, 1992, p567). Thus Lamarckianism is a threat to gene-centrism, not the theory of natural selection *per se*[7]. Natural selection only requires 'descent with modification', and there is no *a priori* reason why Lamarck could not provide the mechanism of that descent.

There are plenty of biological processes which are pseudo-Lamarckian; i.e. in which acquired characteristics are inherited, though not through germ-line genes. Obvious examples include the viral and bacterial flora that we inherit from our mothers. Moreover these pseudo-Lamarckian processes have a significant effect on natural and artificial selection. Young calves, for example, are often treated with large doses of broad-spectrum antibiotics, which boost yield but often leave them with very weak immune systems. The inheritance of memes from our parents is strictly analogous to such biological pseudo-Lamarckian processes.

However there are also ways in which acquired characteristics can affect the germ-line, and so be Lamarckian in a stronger sense. Consider sexual selection. When an animal acquires a mate it is thereby acquiring a new part of its extended phenotype. Moreover in proactively *selecting* a mate it is thereby choosing a new pack of genes to shuffle into its germ-line. And this selection is based on the phenotypic effects of those genes: if their genes seem to improve the fitness of

[7] Thanks to Dan Dennett for this point.

the candidate mate, then it is likely to confer a similar benefit on future offspring. Thus sexual selection involves the directed inheritance of acquired characteristics.

Zahavi (1975)(1977) has argued that sexual selection is a special case of the more general phenomenon of the evolution of signalling. Animals cannot always judge the fitness of possible mates directly, therefore they select on the basis of other observable traits which thereby act as signals which advertise the availability of a fitness resource. However in all such signalling situations there is a pressure to cheat. If an animal invested in the signalling trait even though it was not actually fit then it would gain a reproductive benefit. If the density of cheaters reaches a certain point then the signalling system becomes effectively useless. Zahavi's solution is that if signalling traits are expensive to produce then only the fit can carry them. It takes a lot of energy to produce and carry a peacock's tail, therefore the males with the most impressive ones must be well-equipped in other, less directly observable, ways. Waste can be a signal of quality: if the production of signals involve a handicap, then honesty is enforced. Grafen (1990) has proven the stability of such handicap-signalling systems using game-theoretic techniques (Maynard Smith, 1982)(1991), and Bullock has generalised these results to less analytically-amenable situations using evolutionary simulations (1998).

Sexually-reproducing animals may choose who to acquire their germ-line genes from, and this leads to the evolution of expensive signalling systems. There is an exact analogy here with memetic evolution. We are selective about who we accept our memes from. We do not believe just anybody. Therefore there is a pressure on social vehicles to convince others of the fitness of their memes — i.e. their ability to confer social power on their possessor — which leads to the evolution of signalling systems. The function of these signals is to convince others of the value of the memes (or relations of production more generally) of those that produce them. The most obvious example of this is conspicuous consumption (Veblen, 1899). Social-evolutionarily speaking, the point of being rich is to gain social influence. Therefore there is no point in being rich if no one knows that you are. (Reclusive millionaires are an historical dead-end). One way to gain social influence from riches is to *demonstrate* that you are rich; and conspicuous consumption is a way of doing this that is hard to fake. The cold-war space race can be seen in the same light. The ability to send rockets into space was a way of honestly signalling the technological muscle of the superpowers in a situation in which their destructive muscle — i.e. their nuclear weapons — had to be kept secret. You can't fake a Sputnik or a moon landing. The purpose of this phenomenal waste of resources was not simply to let the world know of the power of the USA and USSR, but was to thereby to convince other nations to accept their memes and relations of production (i.e. to join the western free-market economies or to become part of the Soviet bloc, respectively).

The problem of honest signalling is acute for the advertising industry. It is not enough to tell the audience that 'Omo washes whiter' since they have no reason to believe that the advertiser is telling the truth. The obvious solution is to act as free-loaders on other signalling systems which the audience trust. Science, for example, has a reputation for honest signalling which is ultimately due to the peer-review process. It is hard to cheat in science (i.e. spread memes which do not accurately reflect empirical results) because the fitness of those memes may be independently tested. Therefore if a scientist (or at least someone in a white coat who looks like a scientist) tells the audience that Omo washes whiter then they are more likely to be believed.

Another form of honest signalling is style. It is hard to fake style since, almost by definition, to look stylish is to be stylish. Thus corporations who produce intellectual property (from computer games to fashion) will invest heavily in associating their products with style icons, either through product placement or through incorporating those styles into their advertisements, in an attempt to convince the audience of the ideological benefits of the meme-product. The advertised product hitchhikes on the success of its advertisement.

Sexual selection enables suitors to test the suitability of their prospective mates according to some visible criterion. However all teachers know the problem of setting tests: they end up testing the ability to pass tests, rather than the ability that the test was supposed to be a measure of. The same occurs in sexual selection. The peacock's tail originally evolved as an accurate measure of fitness. But once the peahen evolved to select on the basis of that criterion then it is in the interest of the peacock's genes to generate bigger tails, rather than increase 'underlying' fitness — i.e. its efficiency at finding resources, and so on. (Underlying fitness may be thought of as the fitness a genotype would have if the effects of sexual selection were factored out.) Similarly the space technology of the USSR ended up as the most advanced in the world, even while the rest of their military aerospace industry lagged behind. The signal was still honest — the USSR really did have the best space industry in the world — but it became misleading.

10.7 Memes and Adaptation

If memes are adaptations, then who are they adaptations for? Who do they benefit? Dawkins warns us that it is a mistake to assume that biological traits must benefit the organism that carry them, and argues instead that a trait must benefit the germ-line genes through which it is inherited. This is true but does not yet answer the question; it just generalises it. Germ-line genes are always germ-line genes *of* a lineage of reproducing vehicles, and unless we identify those vehicles then the question remains unanswered. Who benefits from the diarrhoea induced by cholera, for example? It is the parasite, not the host. They are the originator and propagator of the trait, and so they must be the beneficiary if anything is. The same problem occurs when determining who benefits from memes (i.e. who gains social power from them). Just because a person carries a meme does not in itself prove that is an adaptation *for* them. Again, the key is to discover the social *origins* of the trait. As Marx put it:

> The ideas of the ruling class are in every epoch the ruling ideas: i.e. the class which is the ruling *material* force of society is at the same time its ruling *intellectual* force. The class which has the means of material production at its disposal consequently also controls the means of mental production, so that the ideas of those who lack the means of mental production are on the whole subject to it. ... The individuals composing the ruling class possess among other things consciousness, and therefore think. Insofar, therefore, as they rule as a class and determine the extent and compass of an epoch, it is self-evident that they ... rule as thinkers, as producers of ideas, and regulate the production and distribution of ideas of their age. (1846, p64)

Now the power of this argument has often been overstated: the evolution of culture is not one big conspiracy by an omniscient and omnipotent ruling class. You can't fool all of the people all of the time. Nonetheless the dominant memes in society will *tend* to be those that maintain the

ideological power of those that most successfully utilise and control the productive forces, rather than those that increase the social power of all those that carry them. Who gains from the meme of patriotism, for example? *Dulce et decorum est pro patria mori*[8], but it was *dulce et decorum* for the rulers of our country, not for those individuals that died in the trenches.

The question of who benefits from a meme is an empirical question that can only be answered by examining who gains social power from its propagation. This may be the person who carries it. It may be the ruling class of a society. Or, in some cases, it may benefit nobody. For example, an office I worked in once became horribly obsessed with humming the theme from *The Dambusters*; a meme that I managed to infect a new office with when I changed jobs. No social vehicle benefited from this meme, it was just catchy; a meme that spread solely because it was good at spreading, like so much selfish DNA. It is a neutral mutation, as far as social fitness is concerned. Dennett (1999), following Dawkins, uses such examples to argue that:

> in the domain of memes, the ultimate beneficiary, the beneficiary in terms of which the final cost-benefit calculations must apply is: the meme itself, not its carriers. This is not to be heard as a bold empirical claim, ruling out (for instance) the role of individual human agents in devising, appreciating and securing the spread and prolongation of cultural items. As I have already noted, the traditional perspective on cultural evolution handsomely explains many of the patterns to be observed. My proposal is rather that we adopt a perspective or point of view from which a wide variety of different empirical claims can be compared, *including the traditional claims*, and the evidence for them considered in a neutral setting, a setting that does not prejudge these hot-button questions.

The question that the memes-eye perspective raises is which social vehicles, if any, benefit from a meme; and the yard-stick that it uses for measuring that benefit is the rate at which those vehicles are able to spread their memes, i.e. their social ideological power. But this is *not* equivalent to claiming that the ultimate beneficiary is the meme itself. The reason for introducing the Darwinian terminology of adaptive benefit is to ground functional explanations of social history. But a meme, on its own, plays no role in history. Memes only have effects through the activity of social agents. This activity may result in the further spread of those memes (i.e. the exercise of ideological power) but it may also have effects through the exercise of *other* forms of social power, including economic and coercive. Therefore the patterns of cultural evolution can, in general, only be explained by extending our Darwinian analysis to include those wider processes.

10.8 Conclusion

In chapters 8 and 9 I argued that Darwinian evolution occurs whenever genes are differentially replicated according to the fitness that they confer on the vehicles that carry them. The analogical process in the social domain occurs when cultural entities are differentially reproduced according to the ideological power of the social structures that carry them. However this ideological power may *also* stem from other forms of social power, including the economic and coercive. Therefore a Darwinian analysis of social history must go deeper than the level of memes, and should include

[8] 'It is sweet and honourable to die for one's country'. This was a British patriotic motto of the first world war, brilliantly satirised by Wilfred Owen in his poem of the same title.

the evolution of the relations and forces of production that define the environment in which memes themselves evolve.

Marx argued that relations of production survive and spread to the extent that they enable social vehicles utilise and develop the forces of production. This is the basis of a Darwinian mechanism in social evolution, and it makes functional explanations of society possible. Memes are one part of the relations of production and so they too will become adapted to the forces of production.

Chapter 11

The Good, The True, The Beautiful

> To preach morality is easy, but to provide a foundation for it is hard.
> — Schopenhauer, *The World as Will and Representation*

> The good, the true, the beautiful.
> These are the things that pay.
> — Anon, after Socrates

Philosophically speaking, Darwin solved two key problems. He not only naturalised functional explanation in biology but also naturalised *normativity*, i.e. he found a way of deriving normative properties from non-normative properties — oughts from is's. Darwin explained why hearts beat and also why hearts *ought* to beat. He found a way of determining what made a heart a *good* heart.

In the last chapter I argued that Marx discovered a mechanism underlying social evolution that is analogous to the mechanism that Darwin discovered underlying natural evolution; and showed how we can use this to naturalise functional explanations in sociology. In this chapter I explore whether it is also possible to use the same theory to naturalise social norms, such as our criteria of truth, goodness, and beauty. This is not intended to be a full treatment of the issue, but merely a pointer to where the theory may take us.

The norms that we use in everyday life, like other ideas, are a product of historical evolution. We have different criteria of what makes something true or beautiful or good than, say, a European peasant of the middle ages or a Japanese *samurai*. And the theory of social evolution outlined in the previous chapter implies that the dominant norms in society will tend to be those that maximise the social power of the dominant social vehicles. For example, the European peasant venerated the icons of the church as beautiful and holy because these ideas reinforced the feudal order, just as the Japanese *samurai* saw the swordsman's ritual as honourable and elegant compared to the ugly depravity of Western firearms. Our modern icons of beauty, on the other hand, are more likely to be those offered by Hollywood — indeed a great deal of money is invested in making sure that we do. And the Nazi's racist ideology served their interests well and as a result they were able to enforce it across much of Europe. Therefore might makes right (or good or beautiful) at least in a purely *de facto* sense. But this seems to imply that the ideas that we *ought* to have — including our

judgements of truth, beauty, and goodness — are those that would serve our own social interests. In other words the Nazi's were *right* to enforce their ideology because it was good *for them*.

In this chapter I counter, or rather *salve*, two objections to this evolutionary account of social norms. The first objection is based on the fact that there seems to be at least one concept of truth that is in some sense universal, eternal, and immune from the effects of social evolution; namely *science*. My response is that scientific norms are indeed fixed, but that this does not imply that they are independent of their social context. The second objection is that a Darwinian approach to social norms seems to advocate the most brutal kind of Nietzschean Social Darwinism based on the triumphant survival of the social fittest. My response uses the distinction between types of functional description outlined in chapter 7 and implies that social evolution may determine what the interests of social vehicles are — and so determine what their norms ought to be — but this still leaves it up to individual to decide whether they agree that those norms are good, and so whether they should ally themselves with those social vehicles.

11.1 Truth and Success

In chapters 5 and 6 I argued that words are deemed true if we can use them to successfully to interact with the world. But how do we judge success? If words are tools, as Wittgenstein put it, then what are they *for*? Millikan defines the success of a word in terms of its proper function which is derived, in turn, from the proper function of the system that produced it. But what is the proper function of our linguistic and cognitive abilities? What are *they* for? Presumably these faculties evolved because they increased the reproductive fitness of the vehicles that carried the germ-line genes for them, but how did they do this?

Millikan — along with most other philosophers of mind, from Popper onwards, who root meaning in evolution — argue that the evolutionary benefit of representations lies in their ability to accurately correspond to a state of the world. Papineau, for example, claims that 'we can say that the biological purpose of a given concept is to allow us to have certain beliefs, and the purpose of such beliefs is to be present when certain states of affairs obtain' (1984, p559). Millikan then rigorously demonstrates how this simple basic idea can be extended to cases in which the relationship between the word and the world is not one of simple correspondence, such as counterfactuals, universal quantifications, vacuous terms, negations, and so on.[1]

Now it is certainly plausible that animals' innate representational abilities evolved because of their ability to accurately correspond to the world. More accurate fly-detectors make for more successful frogs, for example. But the rules of the evolutionary game have now changed. Once the human brain evolved a particular set of linguistic abilities then a different sort of evolution started to happen, namely social evolution. And this new form of evolution defines new criteria of success. In chapter 10 I argued that, according to the new rules, the success of a social trait is judged by the way in which it contributes to the social power of the vehicles through which it is transmitted. Therefore we have no reason to assume that the proper function of language is accurate representation *per se*. The vocabulary of religion, for example, is well-adapted to its social environment. It fulfills its proper function of maintaining a particular social order, but

[1] In fact Millikan starts with complete indicative sentences as the basic unit of mapping onto the world, and then derives the proper functions of object terms from the roles that they play within the invariant structures of sentences.

does this make it true? Social evolution is capable of producing *false consciousness* (in Marx's terminology) in a way that is not possible for animals ruled solely by the Darwinian imperative.[2]

However Millikan argues that the advent of cultural evolution has not changed the underlying proper functions of our cognitive abilities: the rules of the game have not changed, it is just being played in a new way.

> It is reasonable to suppose that the brain structures we have recently been using in developing new space technology and elementary-particle physics have been operating in accordance with the very same general principles as when prehistoric man used them for more primitive ventures. They are no more performing new and different functions or operating in accordance with new and different principles nowadays than are the eyes when what they see is television screens and space shuttles. ... It is reasonable that the cognitive structures with which man is endowed were originally natures solution to some very simple demands made by man's evolutionary niche. But the solution nature stumbled on was a solution that cut to the very bone of the ontological structure of the world. (1989, p294)

Millikan also compares the human brain to a general purpose computer: it may be given a new program and inputs, but all its components will still be working according to their original design (as long as they are not broken). Thus its behaviour may change but not the function of its individual parts.

According to Millikan our cognitive faculties originally evolved to accurately represent the world and modern innovations have only extended the range of these abilities, not changed their essential function. Therefore when these modern brains produce memes, such as religion, which fail to map on to the world then they are failing to fulfill their ultimately biological function. However there are two problems with this argument.

The first is that Millikan is making a large assumption in claiming that the brain contains a fixed set of deep structures that follow the same rules in all environments. As I stressed in sections 4.1 and 5.3, changes in the environment of an agent may not just affect its behaviour, they may also change the way it works. Recall how the visual system of the horseshoe crab was affected by a change in its environment, such that it became effectively blind when removed from its natural conditions of nocturnal coastal water. The retina of the crab only works effectively in particular environments. Some modern social inputs can have similarly disastrous effects on the human brain. Think of the stress induced in an office worker by information overload, or the stupor of a couch potato. Modern environments do not just change the inputs to the brain's 'computer' but may also effectively break it, changing the rules by which it operates. In other cases we carefully control these novel inputs to produce responses that were not part of the original design, but are socially desirable in other ways. Think of the drug-induced reveries of the Romantic poets: evolution defines no function for such responses because hallucinogens were not part of our evolutionary environment. We can discover *new* functional properties by giving the brain new inputs.

The second problem is that entities can acquire novel functions 'from above' when they become part of larger systems that have their own proper functions. The function of bluebell flowers, for example, changed from attracting insects to attracting flowers when they were transplanted

[2] Though deception behaviour in primates is one possible exception.

into a greenhouse. In such cases the larger system can make use of properties that were previously epiphenomenal and adapt them to their own use. Similarly, our cognitive abilities may have evolved to accurately represent in the days, between 2.5 million and 100,000 years ago, when we had very little shared culture and acted as largely independent cognitive islands. Even then we may have possessed the ability to dream, lie, make up religions, program computers and so on, as an inevitable consequence of having a language faculty evolved for other reasons; but these by-products would have played little useful role in the context of hunter-gatherer bands with no social organisation or culture beyond the production of stone hand-axes. But once larger social organisations evolved and made culture possible around 50,000 years ago, then those previously non-functional abilities would have come into their own. Social structures that made use of these previously non-functional faculties would have succeeded at the expense of those that did not. These abilities became exaptations which were then selected as adaptations by *social* evolution, not biological. Thus the functional properties of the brain may change even whilst the biology remains 'essentially' the same.

There is an unfortunate tendency amongst the more enthusiastic evolutionary psychologists to tell a kind of extended Just So story. The usual adaptationist Just So story starts by noting a function that an inherited biological trait currently fulfills for an organism, and hypothesising that this explains its evolutionary origin. When done carefully this can be a powerful hypothesis generator, the starting point of useful empirical work in optimisation theory. However the extended Just So starts from an observed human behavioural trait — from homosexuality to soccer violence — and then assumes that this ability must have played a functional role during our ancient evolutionary history. However this conclusion is no more justified than supposing that bluebell flowers evolved to please us. The proper function of human cognitive abilities does not just depend on their own individual evolutionary histories, but also on the role that those abilities play within larger social structures. These structures have their own history of evolution, and hence their own proper functions, which are inherited by the psychological faculties of individuals that grow up within those structures. The argument that this socialisation cannot change the fundamental functional properties defined by biology is akin to arguing that if God (or Darwin) had intended to us to fly then He would have given us wings. The proper function of a pilot is to fly, but this is a function is defined by social evolution, not biology.

Millikan wants to define truth in terms of evolutionary success. But this is not sufficient, in itself, to ground truth in correspondence since social evolution (unlike, plausibly, biological evolution) does not necessarily favour accurate representation of the world. Some uses of language may succeed because they accurately correspond to a state of the world, but others may not. We therefore face two problems. The first is to differentiate those forms of language-use that depend on correspondence for their success, such as (hopefully) science, from those forms, such as religion, that do not. The second problem is that if science and religion are both, in an social-evolutionary sense, correct (i.e. capable of fulfilling proper functions for particular social vehicles) then why should be we use the former and not the latter? Rorty, and the other pragmatists, are happy to dismiss these problems as the remnants of a confused and naive realism. But many of us are not so sanguine, and think that these problems can be, and deserve to be, answered. I discussed the first problem in chapters 5 and 6, and the second is discussed in the next two sections.

11.2 Scientific Objectivism

The diarrhoea induced by cholera is bad for the patient but good for the cholera bacterium. Similarly, the Nazi's ideology was good for them but bad for their victims. In other words, if we use evolution to define norms for traits, then those norms will be only be defined relative to the vehicle through which that trait is transmitted. However there seems to be at least one example of a social trait which is not so relative, namely the norm of *scientific truth*. It does not seem possible that a society — be it English, Hindi, or Martian — could understand the claim that, say, a hydrogen atom has only one electron, and not agree that it were true. Properly scientific facts must be true in, and *for*, all cultures. And since the truth of the claim is the same in all social contexts, then surely its truth must be independent of them? There may not be an objective fact of the matter about whether, say, the Mona Lisa is a good painting, but surely there are facts of the matter about science? How can this scientific objectivism be squared with an evolutionary account of norms?

The solution to this problem goes back to the fact that lay at the heart of the discussion in chapter 3, namely that all descriptions presuppose a bias about what makes them correct, and descriptions of the world are only considered scientifically correct because they meet certain criteria. In chapter 3 I discussed what these criteria should be, but the important point here is that if a description does not meet those criteria then it is not a *wrong* scientific description, rather it is not a scientific description *at all*. For example, if a Chinese doctor describes the effects of kidney stones in terms of blocked *chi* then this is not an alternative scientific diagnosis, rather it is an alternative *to* a scientific diagnosis. The Chinese doctor may be as proficient as the Western physician at curing the patient, but this does not necessarily make their description of the symptoms any more scientific.

Now the biases that define science are not accidental whims, but are themselves products of social evolution. Why, for example, is there such emphasis on successful prediction as the hallmark of a correct scientific theory? The reason is that science is big business. It takes a lot of resources to train, pay, and motivate the staff, and build the physical infrastructure necessary to do scientific experiments. If a social vehicle, such as a nation or corporation, were to devote that many resources to science and not get an appreciable return, then it would soon be overtaken but others that were more successful. And the bottom line of an 'appreciable return' is the development of the productive forces: i.e. new ways for humans to interact and intervene in nature, and so control it for their benefit. The result is a constant pressure on science to develop memes that successfully predict the outcome of natural processes, and new technologies that exhibit useful and predictable behaviour.

Note that this argument does not require or imply that all individual scientists are driven by the desire for profit or social power. Indeed professional scientists tend to be amongst the *least* commercially-minded people I know. But the fact remains that unless the results of scientific enquiry somehow contribute to the development of the productive forces of a social vehicle then that social vehicle will, sooner or later, be unable to afford such unproductive luxuries and those scientists will be out of a job. Given this competitive context then it is hard to imagine a society that is prepared and able to make a substantial commitment to science, and yet ignore the results of its experiments. The result is that in all societies in which it is possible to form a scientific claim, such as 'hydrogen atoms have a single electron', then this claim will be considered true. But this does

not imply that the truth of the claim is *independent* of that social context, as the objectivists assume, but that the social relations of production necessary to formulate the claim will simultaneously be those that define a norm of success in which it is considered true. If a society refused to accept such claims then it would not be possible for them to develop the technology to formulate them. The scientific objectivists make the reductionist mistake, identified in chapter 2, that the fact that a property of an entity is constant in various contexts does *not* imply that it is *independent* of those contexts. Similarly, just because the truth of a scientific description is the same in all societies that are able to form it, this does not mean that that truth of that claim is independent of the norms that those societies define. Thus the norms of science can be simultaneously both products of society *and* in a sense universal.

However, strong ideological and social pressures can, in some cases, produce a situation in which institutions commit resources to a scientific infrastructure and yet deny its results. Consider the Nazi's racial science, which condemned quantum mechanics as 'Jewish science'; or Soviet Lysenkoism which defended extreme Lamarkianism as being more ideologically progressive than the reactionary laws of Mendel. But practical needs soon overcome social prejudices. The Nazi's eventually adopted 'Jewish' science for their own atom bomb project; and the Soviet Union imported wheat strains developed using American genetics. The Catholic Church persecuted Gallileo, but sanctioned the use of navigational charts based on a heliocentric astronomy when marine exploration was in their interests.

The history of the theory of natural selection is itself an object lesson in the effects of such social pressures on science. Darwin himself was driven by a spirit of pure enquiry, flavoured by the religion of the time. However the voyage of *The Beagle* that provided him with such rich empirical evidence was funded by the British Admiralty to survey and map the South American coastline with an eye to furthering British imperial interests in the region. Darwin also relied on the experience of plant breeders, whose practice had grown from a largely hit-and-miss affair to a much more rigorous and well-organised discipline following the growth of capitalist agriculture from the enclosures onwards. A further crucial element in the development of the theory of natural selection was the inspiration provided by Malthus' writings on the problems that urban population growth created for industrial capitalism.

After Darwin the next crucial advances in evolutionary theory came with the modern synthesis and the work of the early population geneticists. Much of this work, such as Fisher's statistical ANOVA technique, was the result of further progress in industrial agriculture. Two other developments from around this time should be noted. The first is the rise of Social Darwinism, which consciously used natural selection as an ideological justification of free-market capitalism. The second is the development of theories of human eugenics in both the US and Europe, which tried to use genetics as a crude form of social control. These attempts failed, partly because eugenics was discredited by the discovery of the concentration camps, but also because it didn't work: it was based on an incorrect theory of the basis of differences in human cognitive development.

Since 1953 the bulk of scientific funding in the field of evolution has been dedicated to molecular genetics, culminating in the multi-billion dollar Human Genome Project which has been promoted as holding out the promise of a 'blueprint for human biology'. Of course it will do nothing of the sort, though it will enable biotech companies to patent particular DNA sequences for their

own use, as well as allowing the health insurance industry to more accurately locate genetic markers for potentially expensive inherited conditions.

However this does not mean that natural selection is a 'pro-capitalist' theory. Rather it only implies that without this social and economic foundation it is unlikely that the theory would have developed as quickly, or been accepted as widely, as it has. This is because the norms that make a scientific theory true — i.e. its empirical accuracy and predictivity — are simultaneously those that make that theory useful in a competitive social market. But it is still possible to hold those norms to be valid while decrying the uses to which that science is put.

11.3 Ethical Relativism

Consider the *myc* gene in a cell of an MMTV-infected mouse. If the gene produces a virulent tumour then the mouse will die, and the cell with it, but the gene may live on through the replication of the virus. There is thus a choice of vehicle lineages through which the *myc* can replicate into the future, with the success of one possibly being antagonistic to the success of others. Of course this is a choice only in a metaphorical sense; the actual outcome is not an act of free will by the *myc* DNA, but depends on various random factors. Individual humans are faced with the same choice, but in our case it is not metaphorical. We too are potentially members of many different social vehicles, and so we can choose who to ally ourselves with. Are we just out for ourselves, or are we also concerned with the fate of our family? What about our friends, or the company we work for, our ethnic group, gender, nation, or class? Are you a good company man, a family man, a man's man, a man of science, a union man, or your own man? The choice is yours. And unlike DNA we make such choices with at least some element of free will.

Marx, for example, was born into a comfortable German bourgeois family, but his life ended in poverty in London after a life spent furthering the interests, as he saw them, of the European working class. Sylvia Pankhurst could have become a dutiful Edwardian wife, but choose to devote her life to the working women of the East End of London. Martin Luther King could have remained an anonymous Southern preacher, but he saw his duty more widely. At each point in their lives these people were faced with the question 'whose side are you on', and they made their choice according to whose interests they thought were good. Ethical relativism at the level of social vehicles does not imply ethical determinism at the level of individuals. The nature of social evolution may determine what the interests of various social vehicles are, but it is up to us whether we agree that those interests constitute a good thing; i.e. whether those interests should also be our interests. Of course most of us are not Martin Luther Kings or Sylvia Pankhursts. We do not see our lives as part of some great social battle between opposing forces; rather we just try to get on and do the right thing in our own personal way. We rarely judge right and wrong on the basis of the interests of the social vehicle that our actions serve. But although we do not usually judge our actions in this way, history does. The ethics of our actions cannot be judged in isolation from the impact that they have on social evolution, any more than the behaviour of animals can be judged in isolation from the impact that they have on biological evolution.

This argument depends on the distinction, drawn in chapter 7, between two kinds of functional analysis. Teleological, or Proper, functions are determined by the history of an entity and its ancestors. Therefore it is held by an entity in virtue of the class of entities that it is part of: the Proper

function of a bluebell flower, *as* a member of the species, is to attract insects; the Proper function of the *myc* of the mouse, *as* a cellular proto-oncogene, is to aid growth; the Proper function of Marx, *as* a member of the German bourgeoisie, was to run the family business; the Proper function of Sylvia Pankhurst, *as* an Edwardian middle class woman was to marry well and have many children; the Proper function of Martin Luther King, *as* a relatively prosperous southern preacher, was to not stir up trouble. But *consequentialist* functions are a way of judging the actions of individuals according to the role that they play within a larger system: the consequentialist function of the transplanted bluebell, *as* a part of a commercial garden, is to attract customers; the consequentialist function of the *myc* in a tumour is to aid replication of the MMTV virus; the consequentialist function of Marx, *as* a part of the European socialist movement, was to provide a theoretical understanding of the strengths and weaknesses of capitalism; and so on. Teleology relativises functions to historically-defined classes (Preston, 1998, p236). Consequentialism relativises functions to systems.

Consider another example. What is the function — i.e. the meaning — of terms such as 'Nigger', 'Queer', or 'Bitch'? These are traditionally terms of abuse, and so this is their Proper function, but more recently there have been attempts to 'reclaim' these terms, to turn them into positive affirmations of identity, just as the term 'Black' was transformed in the late 1960's. At the moment these terms are Janus-like, with two distinct meanings. The first meaning is the traditional one, determined by their historical origins. But when these terms are used in specific social situations to challenge accepted stereotypes then they acquire a new function defined by their consequences rather than their origins.

The two notions of function serve different purposes. The first explains why things are like they are, and the second explains how they affect the future. Therefore if we want to use functions to judge our actions, rather than determine our historically-determined purpose, then we should use the consequentialist form.

If history judges our actions according to the effects that they have on social evolution, then it is not possible to justify an action on the basis that it is directed to some utopian ideal. The 18th Century socialist Charles Fourier, for example, dreamt of a future society, called Harmony, based on social units, or Phalansteries, each of exactly 1,620 people. Phalansteries would subsist primarily on agriculture with the members changing their occupations every few hours and, according to Fourier's theory of 'attractive labour', co-operating fully to achieve their collective desires. Fourier also argued that in Harmony the seas would be made of lemonade. He even went so far as to advertise for investors in his project, making himself available at a particular Parisian cafe at a certain hour every day. Unsurprisingly, nobody came. Harmony is certainly a beautiful dream, but as an ethical philosophy and a guide to action it is strictly irrational. To believe in a good that cannot be achieved through the mechanism of social evolution is at best utopian. Utopias may be used as a powerful critique of existing society, but they cannot be used as the rational basis for ethical choices.

Similarly, if it were shown that the dictatorships of Stalin and Mao were the inevitable consequence of the libertarian socialist ideas of Marx, Lenin and Trotsky, then the only logical conclusion would be to reject those ideas — no matter how well-meant they might be. (But, for the record, I should state that no such necessary and inevitable link has been shown to my satisfaction.)

But this seems to ignore precisely the question that most exercises moral philosophers, namely how to make the choice between the conflicting interests of conflicting social vehicles. How do we decide which side we should be on? Are there any rational methods, such as Kant's categorical imperative or Mill's utilitarianism, that can decide the matter from first principles, and so tell us which Good is the True Good? The obvious retort to any such proposal is that if someone did not happen to agree with those principles then, although we may think that person morally wrong, they would not necessarily be *irrational*. Rorty argues that there are *no* purely rational ways of making ethical decisions; i.e. ways that do not themselves presuppose certain value-laden assumptions. His conclusion is that the only rational strategy for the ethical relativist is to *recognise* the relativism of their ethics, and so defend a liberal democracy in which everyone else has their ethical voice too (1991c)[3]. Without a 'free and open encounter' of opinions, in Milton's phrase, then the resulting ethical decisions will not be based on the exercise of informed free will, but on ignorance; and if informed free will is a logical pre-requisite of an ethical decision, then democracy is a pre-requisite of a rationally moral society — a position also held in various forms by Popper, Dewey, Habermas, and Pierce.

Democracy also plays an epistemological role. In section 6.4 I argued that it is not possible to transcend our own view of the world, but that it is possible to transcend the views of others by taking the third-person perspective towards them. Moreover they can transcend us. Therefore together we can transcend ourselves. This process starts from early childhood when we start to learn concepts and ways of seeing the world from others. This is not necessarily indoctrination, rather we may test the various alternatives against our own experience and go with those that seem to fit. And as we learn from others so they learn from us. Literacy further amplifies this process as it expands the pool of peers from our immediate personal contacts to those further removed in space and time. If learning always involves a process of generate and test then democratic interaction simultaneously expands the pool of generated possibilities, increases the rate of testing, and hastens the spread of those good ideas that pass the test.

It seems to me that Rorty's defence of democracy as a pre-requisite of rational morality is correct. But there is a problem. Rorty's ideal democracy is, roughly speaking, a point half-way between the New Deal-era US and modern Sweden. But he is more aware than most that the modern US is on a trajectory away from this modest utopia, not towards it. He describes contemporary US democratic politics (with both a small and a big 'D') as a choice between 'terrified silence and cynical lies', observes a growing gap between the rich and the poor, and foresees a time when the super-rich 25% are effectively democratically insulated from the rest of the population by a largely ineffectual intellectual class who are more concerned with cultural debates than the effects of harsh economic realities[4]:

> It will be in the interest of the international super-rich to keep our class relatively prosperous and happy. For they need people who can pretend to be the political class of each of the individual nation-states. For the sake of keeping the proles quiet, the super-rich will have to keep up the pretense that national politics might someday make a difference. Since economic decisions are their prerogative, they will encourage

[3] Though it should be noted that Rorty would not describe his position as 'relativist' since, according to him, relativism is only an affliction of someone who assumes the possibility of realism.

[4] Putnam agrees with this picture (1998), but reckons the size of the minority is just 5%.

> politicians of both the Left and the Right to specialise in cultural issues. The aim will be to keep the mind of the proles elsewhere — to keep the bottom 75 per cent of the world's population busy with ethnic and religious hostilities, and with debates about sexual mores. (1998)

The reason for this decline in democracy is not hard to find. Democracy itself is a social relation of production that is subject to evolution. And, like other social relations, it becomes adapted to the prevailing social forces. In a liberal, or 'bourgeois', democracy based on a free market economy (i.e. one in which all men are free to eat in the Ritz or sleep under bridges) there is no free market of ideas. We all have our ethical voice which we can express, once every four years, through the ballot box; but the rich and powerful have much louder voices than the rest of us and are quite capable of using them to further their own interests. This need not be done through Machiavellian guile, but through the dumb generate-and-test of a Darwinian process. If a powerful social vehicle is unable to use its ideological power to protect its own interests then it will be replaced by others that can. The dependence of successive US presidents on the funding of big business is not (just) due to a lack of moral fibre, but due to social evolution: either their policies become adapted to the prevailing social and economic forces, or they will be succeeded by others that are.

If a belief in a full and healthy democracy is rational, then what is the rational way of achieving that end? What principles could we use to form a strategy? Putnam recalls discussing this with Rorty, who 'looked quite shocked, and replied, "I don't think good politics need principles. What is needs is *stories*" '. But although stories are valuable, they are not enough on their own. It is worth recalling how democracy in the US got this far (a similar picture could be told for all the major democratic nations, but we will stick to Rorty's home ground). The growth of democracy in the US was the result of three major conflicts: the war of independence, the civil war, and the civil rights movement. Try to imagine what the US would be like today if a combination of the British Monarchy, the Confederacy, and Goldwater had won. Democracy won each of these battles, not because it had the best stories — though it did have some powerful dreams — but because there was a side in each of these conflicts that (1) was able to physically and/or politically defeat their opponents, and (2) had a material interest in democracy. The conclusion is simple. If Rorty's belief in democracy is to be the basis of a rational ethical philosophy, rather than a mild utopia, then the principle he must adopt is to identify a social vehicle that possesses those two properties today, and ally himself with it. Marx argued that the working class formed such a social group, and looked to them for the ethical future of humanity — though whether or not he was correct is, strictly speaking, another question.

11.4 Conclusion

I have covered a lot of ground in this thesis. In the first two chapters I discussed some very general points about how science understands the world. I then applied these general arguments to the particular case of the relationship between agents and their environment. This led, in chapters 7 to 9, to a discussion of how we understand evolution through natural selection. And in the last two chapters I applied these arguments to the evolution of human societies and culture — of which science is a product. The aim has been to produce a coherent whole, in which the later arguments

flow naturally from the initial ones. But I left one loose end, and it is now time to tie it up.

In chapter 2 I discussed the various biases that underlie scientific descriptions — simplicity, predictivity, explanation, and so on. I pointed out that the dominant bias, both in scientific practice and in scientific philosophy, is predictivity. And in section 11.2 above I suggested that this bias was the result of specific social pressures. In short, if you want to control nature for your own benefit then you will want your science to be predictive. Simplicity, elegance, and so on, may be all very nice but they are not *useful* in this sense. But in chapter 3 I defended an alternative bias, that of *naturalisation*. Why?

Predictivity, as a descriptive bias, rests on the assumption that there is a fundamental constancy — a lawful regularity — in the pattern that we are describing, that has existed up to now and will persist into the future. According to this bias the job of science is to find those constancies. If we are only interested in the natural world then this would not be much of a problem, but the same attitude also is often applied to the patterns we see in society. If we look around the world today — or, indeed, those societies recorded in history — we see gross inequality, endemic violence, and an awful lot of despair. And it is very tempting to assume that this pattern is fixed in the human condition, that it is somehow inevitable, and that all attempts to change it are doomed to fail. Popper dedicated *The Poverty of Historicism* to 'the countless men and women of all creeds or nations or races who fell victims to the fascist and communist belief in Inexorable Laws of Historical Destiny'. This is a fine sentiment for a book that is ostensibly about the philosophy of science. But perhaps we should add to this list a dedication to the victims of the belief that poverty, inequality, and oppression are Natural and Inevitable parts of the human condition.

However all the great revolutions in science have involved realising that entities which were previously thought to be fixed and 'God-given' were in fact inconstant: species, planetary orbits, inertial mass, gravitational mass, space-time, atomic nucleii, continents, and aristocracies. However these revolutions did not replace an assumption of constancy with one of random change, but with a more precious ability to *explain* those changes through an understanding of the forces underlying the patterns that were previously thought to be constant. In other words, naturalising a phenomenon allows us to understand under what conditions it will persist, and under what conditions it will change. Darwin's theory of natural selection succeeded in explaining both constancy and change in the natural world by uncovering the mechanism underlying the observed patterns and, as I tried to argue in the previous chapter, Marx's theory of history can do the same for the social world. Only by doing this can we understand how even the most apparently universal and fixed social traits may, possibly, be changed.

Marx's epitaph was that 'the philosophers have only interpreted the world, the point however is to change it'. If this is true then surely the point of philosophy is to understand the world in such a way as to *enable* us to change it?