THE COOPERATIVE BEING: HUMANITY AND THE SELFISH GENE

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Abstract

The notion of the selfish gene has been successfully deployed in the understanding of animal behaviour but is widely felt not to have full application at the human level. A lot of evidence and argument is here assembled in support of the comprehensive application of that theory to the human population. With a focus on genes giving rise to characteristically-human cooperation ('cooperative genes') it proves possible to situate a whole range of patterned behaviour and phenomena, even including celibacy, the use of contraception, and war, which at first glance seem to present insuperable difficulties. Crucially, the behaviour which tends to propagate the cooperative genes may be 'at cost' to the genes of some who may be party to the cooperation itself.

The account builds on the primary insight that cooperation itself gives rise to full human conceptualization of the external world and their own place in it as embodied beings. Cooperation thereby structures practical action and progressively impacts on fertility, mortality and migration; cooperation therefore furthers the continued existence and transmission of the genes which give rise to it. Human capacities underlying the ability to cooperate are also responsible for a vitally important long-term process - the

domestication of animals and plants; the geographical redistribution of such species means that the Earth is able to sustain a progressively larger human population.

A consideration of the implications of characteristically-human cooperation helps one to understand the difference between animal and human sexual behaviour, and to explain the emergence of kinship systems, involving the social recognition of blood ties: one is thereby enabled to bridge the gap between zoology and social anthropology. Cooperation is also the basic source of morality and hence of stabilizing regulation; at the same time it generates a bifurcation in respect of types of human understanding which explains the origin of religion. Significantly, however, the predominating influence of religions on fertility is such as to incline population firmly on an upward trajectory.

Competition between societies at one level of complexity tends to lead to societies of a greater level of complexity. The broader picture is not that various independent variables simply 'cause' growth in population but rather that various distinguishable elements – such as societal complexity, the rate of technological innovation (seen as evolutionary), food production, and population size and density - inter-affect each other. Perhaps the most strategic aspect of all is development or reshaping of the division and specialization of labour; crucially, that development tends to increase product while reducing the tendency for conflict to occur which may lead to violence.

Everywhere humans gain access to the means of their subsistence cooperatively, but how they organize to do so develops in patterned ways. In respect of prehistory and history,

that the same trends – towards food production, social complexity and urbanism – are found as independent developments in different parts of the globe points to the contribution of basic facets of human cooperative behaviour. The historically important phenomenon of empire tended to have positive implications for expansion of population. Larger and more stable political entities tend to emerge over extended time – states, empires, nation states – providing a more predictable and secure context within which populations may grow.

In complex societies, the built environment, writing and money contribute to sustaining and extending orderly cooperation. While rationality is generally exhibited within the range of human behaviour, the systematic adoption of a rational approach to life is grounded in the emergence of institutional forms. In connection with globalization, humans are proceeding to reconfigure the external world so as to maximize the possibilities for their own cooperation within it. Contrary to what might initially be thought, there are reasons for judging that the threat or experience of violence and war has played its part in creating the conditions for population growth. In addition, institutional change overtime has tended increasingly to realize a latent potential for cooperation without recourse to violence and war.

Significantly, the increases in population experienced in differing types of society have sometimes tended to exceed those anticipated from the theory of the demographic transition, but once one foregrounds the impact of cooperative genes, patterns become that much more explicable. The populations of western societies tend to be rising but the

overall demographic pattern can nevertheless be said to be substantially ‘at cost’ to the propagation of the genes of the majority of individuals who choose to limit their own fertility. The use of contraception and abortion in recent centuries is to be viewed as a means towards fertility objectives, but those objectives are substantially independent of the means. The interdependence of generations – notably in the early and later years of life - provides a basic link between mortality and fertility, but the needs of each generation promise to be best served if a (slightly) larger one is following it. The present sometimes ‘unwelcome’ migration into richer nations illustrates the persistent tendency in human experience for there to be re-distribution of the potential for population growth in space and in relation to economic resources which tends to keep overall population numbers on an upward trajectory.

In future the human gene pool will be intentionally reshaped increasing the likelihood of there being a large and growing population with a distribution of qualities which will enable them to cooperate even more effectively. The notion of the meme lacks explanatory power and cannot perform the role so far assigned to it. The position is that cooperative genes give rise to cooperative behaviour which tends to propagate the genes, while memes *inter alia* inhere in cooperative activity; hence the only satisfactory explanatory framework involves a single replicator. It is equally true to say that ‘humans are sometimes selfish’ and that ‘humans naturally create norms of behaviour tending to restrict or eliminate selfishness’. A whole range of phenomena may be understood as involving the working out of the partial ‘conflict of interest’ between cooperative and other genes e.g. theft by a gang, the U.K. National Health Service, and (even) the world’s

(possible) emerging political and economic structural form. The propagation of human cooperative genes is potentially ‘at cost’ to the propagation of any of the other genes of other life forms on this planet (and conceivably also elsewhere). That is the full measure of the extent to which these cooperative genes are selfish.

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Chapter 1: Human Cooperation and the Selfish Gene

Introduction

Darwin was unfamiliar with the notion of a gene. However, in the first half of the twentieth century the Darwinian theory of evolution and the new understanding of genetics were synthesized. Then building upon various other theoretical contributions (e.g. Williams, 1966) the notion of the selfish gene was introduced (Dawkins, 1976; see also 2006) and has since become highly influential (Grafen and Ridley, 2006). That theoretical development has proved to have considerable explanatory power by expressing a gene-centred view of evolution as opposed to the original organism-focused Darwinian approach. The notion assists understanding of such behaviour as one organism behaving in a seemingly selfless way in relation to another closely genetically-related one, the most familiar example being mammalian maternal behaviour in relation to her off-spring. The core idea is that genes which tend to get passed on are ones which have consequences which in turn 'serve the interests of the genes' in the sense of increasing the likelihood of their survival and further propagation. Thus the behaviour of a mother may sometimes be at risk to herself while nevertheless tending to increase the likelihood of those of her genes shared with her off-spring (one half) surviving.

It is essential to be clear what is meant by 'selfish' in this context: it is of the essence for subsequent argument and evidence. Emphatically, it does not mean that individuals with the genes would tend to act in selfish ways. Rather the idea is that the genes, in a certain sense, act only for themselves; their only 'interest' is in their own replication - to be passed on to the next generation. Should it be the case that, because of their action, some

other genes, e.g. those carried by other orgamisms, lose out by failing to replicate, that is simply an unfortunate-for-them consequence. Of course it is the case that genes do not 'want' or 'intend' anything, but it has turned out to be convenient and suggestive shorthand to focus on their selfishness in this specific sense. At root, what is being got at is the notion that genes that act in a particular way e.g. give rise to particular types of behaviour, are more likely to get passed on, even though this may be 'at cost' to other genes. They have, as it were, power as replicators.

This theoretical perspective which situates many aspects of animal behaviour is felt by many evolutionary biologists not to have application to human populations. This is partly because such phenomena as priestly celibacy or use of contraceptives are hardly behaviours which promulgate the genes of those involved. There is also the familiar orienting notion that in humans cultural evolution in some sense 'takes over' from biological evolution. Quite reasonably, it may initially be felt to be unpromising to attempt to subsume under a single explanatory concept, on the one hand patterns of animal behaviour which are sometimes properly to be characterized as stereotyped, and, on the other, patterns of human behaviour which may characterized as frequently rational and flexible. Certainly any move in this direction would need to acknowledge cultural variations but without 'culture' forming a primary explanatory concept. Nevertheless, this is an attempt to test the theory of the selfish gene in relation to the human population. It takes something of the form of a 'feasibility study', whereby the aim is to judge whether patterns in human life may be interpreted within that theoretical context.

It is envisaged that in the passage from the purely hominid to *homo sapiens,* genetic change took place so that *humans could (and subsequently did) cooperate using theory of mind* (which is not the case for virtually all purely animal interaction). What is being got at by reference to 'theory of mind' is the human ability to theorise how other humans' thought processes work e.g. to grasp their intentions and reasons for action. Since prior to this genetic change there would already have been patterned interaction between close blood relatives, it is important to make clear that, following the change, cooperation of the type indicated is possible between both those with and those without blood ties. Of course, the genetic change is taken to underpin human behaviour for all subsequent time. It must be noted that, while there have been attempts to understand cooperative behaviour in evolutionary terms, for instance by considering strategies giving rise to it (e.g. Axelrod, 1984), those approaching human behaviour utilizing the notion of the selfish gene have not focused their account - as is being done here - on the notion of genetic change giving rise to (characteristically) human cooperative behaviour. It is fully recognized that genetic change which is here encapsulated in a phrase will have occurred in stages over a long period of time. There may well be differences in relevant respects between such beings as *Australopithecus, Homo habilis,* and *Homo ergaster* (see Dawkins, 2010), pp. 196-7) which are germane to their survival and eventual extinction.

So, in what follows, an attempt is made to test the effective explanatory power of the application of the notion of the selfish gene to the human population focusing particularly on human genes giving rise to cooperation, or 'cooperative' genes as they may be called. Again, it is important fully to grasp what is involved in the notion that these cooperative

genes are selfish. In this connection it is misleading to rest one's attention on the idea indicated above of genetic change giving rise to cooperation followed by cultural evolution. No, without in any sense denying the reality of culture, the fundamental assertion to be made is (as would be the case for other genes of other species) that *the selfishness of the genes is manifested throughout all subsequent time* i.e. it is manifested no more or less through the actions of stone-age peoples than it is manifested through our actions today. It must also be stressed that one is concerned with the full range of types of human action, taking in both (what might be considered to be) the rational and the irrational. That a focus on cooperation may be indicative of a sound strategic approach is suggested by the observation that (with the exception of solitary Crusoe-like figures in special circumstances for temporary periods) *everywhere humans gain access to the means of their own subsistence cooperatively*; they need to cooperate in order to survive.

The fact that one is concerned with tendencies manifested throughout time has implications for the presentation of evidence and argument. Although extended consideration is here given to human development and change overtime, examples are sometimes presented in close conjunction that are drawn from different times or cultures. This assists exposition and no apology is needed since the search is for recurrent patterns. The first step is to clarify the characteristic and special nature of human cooperation. Detailed understanding of the various elements of, and potentialities flowing from, cooperation informs the argument of this and subsequent chapters. No claim is being made that all the elements and tendencies referred to below are somehow realized

immediately with the advent of characteristically-human cooperation; its content must be understood to be developing and, to an important extent, open-ended.

Cooperation

What is distinctive about human cooperative behaviour is that it typically involves grasping the intentionality of other parties in context and shaping one's own behaviour accordingly. This grasping of intentionality is what is being got at in references to operating with 'a theory of mind' (en.wikipedia.org/wiki/Theory_of_mind). (It appears that this is sometimes but rarely utilised at a purely animal level.) In terminology familiar to some sociologists and social psychologists one could also say human cooperative behaviour typically involves one person 'taking the role of' one or more others, a key idea of symbolic interactionism (Blumer, 1969). This means that, while interacting with others, one's behaviour is informed (in some sense through the use of the imagination) by an understanding of what those others are engaged in doing. In the context of cooperation coordination of activity is achieved by the individual parties each doing this. (It may also be assisted by conformity to such informal rules as not all talking at the same time.) Across the generality of situations, three important types of cooperation are (a) one party asking and another providing a response – which may or may not lead to further cooperation, (b) gossip (important for conveying information), and (c) the exchange (or trading) relationship.

It is manifestly the case that assisting another person even in a relatively simple task such as moving furniture involves grasping their intentionality. For instance, one infers that

the other person is heading for the front door or, alternatively, moves to correct their mistake as they wrongly head in the direction of a cupboard. It is indeed evident that in such tasks humans frequently, even continuously, monitor both the behaviour of other parties and their own behaviour; this amounts to doing something but then checking to see what has been done, followed by correction if necessary.

The full analysis of instances of cooperation is particularly complex when third parties are involved. Two people may cooperate as they do because of their shared understanding of the intentionality of a third person, or their cooperation may itself amount to cooperation with that person – as when children play together under the guidance or instruction of an adult. It is indeed routine for a cooperating individual to be simultaneously taking account of the intentions of two or more others in differentiated (as well as sometimes more generalized) ways. Strikingly too, humans may cooperatively act out a scene while understanding its meaning to on-lookers. The crucial development in human evolution may in fact be not so much simply the capacity for one-on-one cooperation as an isolated phenomenon, but rather cooperation which is systematically informed by understanding of the perspectives of third parties. Significantly, children normally exhibit the capacity to act in this way from an early age.

In respect of the generality of social interaction it may be the case – for instance, in a relatively fleeting encounter (for instance, where a stranger is given directions in a city) – that an individual's intention is grasped in relative isolation, but there are other cases where it is understood within a broader framework. In this connection there is a family

of related concepts to which intention belongs. Thus one may grasp an individual's reasons for action or their motivation; also, their beliefs. Understanding may shift from shorter-term to longer-term aspects as when it is asked whether a young man's intentions to a young woman are 'honourable'. Intentions may also be readily understood to change overtime, sometimes because the context changes.

Given the genetic change identified, it follows also that people present themselves to others in – calculated and less calculated - ways which increase or decrease the likelihood of subsequent cooperation. Plainly young adults dress and conduct themselves at public events in ways likely to attract a mate. People present themselves at job interviews in ways judged to make appointment more likely. Individuals, like actors, may be understood as performing for an audience. In this connection, information can be given intentionally or given *off*, where things are revealed unintentionally. (Goffman, 1959) Conduct is manifestly informed by 'taking the role of the other', just as it is when children in class seek either to avoid or to catch the teacher's eye. Importantly, too, the other parties to possible cooperation to varying degrees understand what is going on and may modify their own judgments and responses accordingly.

In grasping an individual's intention before and during an instance of cooperation there are differences depending upon whether or not face-to-face contact is involved. When it is, any of another party's observed behaviour up to that point is potentially relevant, but use of language in conjunction with facial expression is particularly important. In face-to-face situations, eye contact is generally critical in the initiation and maintenance of

cooperation (significantly, this is impaired in the condition of autism). When individuals approach and wish to pass each other on a path or pavement they sometimes seek to make eye-contact to assist in grasping intention and thereby avoid bumping into each other; by contrast, they may refrain from eye contact and treat the other person as a moving object to be avoided (just as one would a dog). Of course, it is the case that in a developed language an individual may straightforwardly express an intention (although, of course, particular assertions must not be taken as self-validating) but, fundamentally, it is actions – whether or not verbal or face-to-face in their character – which bear witness to it. Cooperation itself is fundamentally judged by the character of 'performance'.

Cooperation takes time and involves people being able to 'rely' on each other. Hence its continuation and completion typically depends on normative expectations whereby the parties feel they 'should' continue to play their own individual parts as should other participants. In a related way one may speak of someone cooperating to some extent or being uncooperative; particular individuals may be criticized as 'unreliable'. A cooperative relationship is a power relation. It may be between equals but it may be highly unequal.

Indeed it may be furthered on a non-consensual basis: cooperation between master and slave, for instance, is here called 'coerced cooperation'. So also could there be cooperation at the point of a gun; and where this occurs there is shared understanding of what is required between the parties. Given the aim of this study, reference to this type of cooperation is not a minor point of detail but is of the essence. The patterns in human

life would not remotely be as they are in the absence of coerced cooperation: consider, for instance, the apprehension of criminals and the operation of prisons. It is worth noting in passing that in ordinary conversation the word 'cooperation' tends more often to be used when the parties are acting (wholly) willingly; but its usage must not be so confined here.

Language use is here viewed as a particular type of cooperative activity, but it is quite rightly thought of as a rather special and strategic type. We are all only too familiar with purely communicative cooperation and the fact that communication tends to enter into or accompany virtually every other type of cooperation. The reader may even be led to reflect upon whether the emergence of language among our ancestors is itself to be directly associated with the emergence of the tendency to utilize theory of mind and to 'take the role of' the other i.e. that the tendencies develop in parallel; this may indeed be so, because language tends to assist imaginative understanding. It may be that we would only classify some utterance as (rudimentary) speech were we to feel that these other kinds of tendencies were implicitly involved. Nevertheless, for present purposes, one can note that there can be cooperation without any linguistic content or accompaniment (which could nevertheless, if required, be described i.e. represented linguistically), cooperation which has exclusively linguistic content and cooperation which involves both linguistic and non-linguistic elements.

Of course it is the case that the full range of types of cooperation with which we are familiar is only possible given the existence of language as a resource. In respect of

language as an institution it is worth pointing up at this stage that effective communication (a spoken exchange or writing subsequently read and understood) is based upon existing linguistic conventions and rules. Importantly, language is 'open-ended': sentences never formulated before may be meaningfully uttered; from rudimentary beginnings overtime vocabulary may be added and an initial use of the present indicative may be augmented by tenses and modalities. As a particular type of cooperation it too involves a normative order in that a language user is *committed* to something in front of others. (Searle, 2010, p.80) Some more detailed points regarding speech acts, language and cooperation are provided in Appendix 1.

It is indeed the case that a normative element inheres in cooperation of any type. When an instance of cooperation is in train, whether or not individual parties will follow through is typically in doubt or at issue. A whole vocabulary concerned with such matters as trust, promises, and reliability focuses on this key area. Thus it may be judged that in the generality of the human situation this is the crucible for the emergence of *morality*. Now the pattern of cooperation would not have evolved if there were not an overall tendency for cooperation to be successful; it is cooperation carried through which delivers the benefits. The key development in humans making this possible involves the process of 'internalisation': basically the person has come to feel they ought to be 'reliable' and, for instance, keep promises; we encourage this in children. Morality as such is of course bound up with how the scope of normative expectations becomes extended to wider populations. As it does so morality constitutes a source of stabilizing

regulation: the achievement of goals on a cooperative basis becomes more predictable. (A section of Chapter 2 gives extended consideration to morality.)

The existence of a normative element within cooperation has further significant implications. It means that humans can have reasons for action which are 'desire-independent'; they can choose to 'delay gratification'. By contrast, pre-human behaviour would be 'desire-dependent'. What is being got at here is that humans can work towards something which is not intrinsically desired, but is understood to be a step towards or means towards something else which is desired. It is also the origin of the phenomenon of *inhibition,* the pattern whereby an individual wants or desires something but refrains from its direct and immediate pursuance because of internalized constraint. Cooperation thus involves virtually from the outset means-ends orientation and a delayed gratification pattern. This is of course the essential character of much work in modern conditions where it is viewed as a way of earning a living. Humans can foresee what is needed to achieve a desired objective, can plan, and attempt to work through the various required stages, some or many of which are not desired intrinsically.

Finally, in this consideration of characteristically human cooperation, it is important to draw attention to some aspects of what may be termed 'role-playing'. The first is that cooperation directly opens the way to an almost indefinitely extended and highly flexible elaboration in the human division of labour, to be contrasted with the rudimentary and in a sense 'stereotyped' one observable in higher animals. The starting point for this is that human cooperation involves 'taking the role of the other' or grasping the intentionality of

the other party(ies) and shaping one's own behaviour accordingly. Broadly speaking, where individuals engage in doing this, they are also able to make a rudimentary effort at performing the contributions or roles of the other party(ies) themselves. Thus anyone who has been a pupil at school – as we all have - could have a rudimentary go at being a teacher or even the head-teacher. The fact that almost anyone can minimally act on the stage points in the same direction.

A further related phenomenon of considerable importance is that virtually any human being is able to dissemble and deceive others in a controlled way; it may well be that the vast majority of us have done this at various times. Humans lie to others and they also act in calculated ways intending that others make false inferences about them. Children may be observed to do both these things from an early age. The confidence trickster is one playing a special kind of role which provides spectacular evidence of the human capacity to act in ways which lead others to operate on the basis of a false set of assumptions.

It is also evident that in performing a new role one puts one's own distinctive creative interpretation on it, just as one does to a role on stage; it is not as though, in general, role performance is to be likened to a train moving on a track. Now, of course it is the case that certain roles require training and the acquisition of skill to enable one to perform them at all well, but these more specialized aspects are themselves typically imparted through a set of cooperative relationships in situations where there are already practitioners around. The elaboration of the division of labour evident in any society and

its massive elaboration in one like ours arise out of the phenomenon of characteristically human cooperation: no other essentially different additional capacity in humans needs to be postulated. Yet the phenomenon of the elaboration and specialization of labour is at the root of both simple and complex human societies. In Appendix 2 cooperation is carefully distinguished from coordination and co-action in social life; the contribution of 'collective actors' is also situated in relation to the main discussion.

Following this brief exploration of the nature of characteristically-human cooperation, the next step is to address the key issue as to the significance of the indicated genetic change within the context of the theory of the selfish gene i.e. to consider the precise implication of the notion that these cooperative genes may be considered as 'selfish'.

The importance of aggregates rather than individuals

It follows from the theory of the selfish gene that, in becoming established, new genes such as these give rise to behaviour which tends in the next and then subsequent generations to promulgate the new genes themselves (the influence of genes may hence be thought of as 'reflexive') i.e. in this case the genetic change would tend to give rise to a large and increasing population of people with the new 'cooperative' genes. As already indicated, it also follows from the theory that this tendency for new genes to give rise to behaviour tending to promulgate themselves may be 'at cost' to the promulgation of other genes: as has been stressed, this is what is meant by calling the genes 'selfish'.

It is envisaged that the above applies here i.e. that the promulgation of the new genes can be expected to be 'at cost' to the promulgation of other genes. In particular, since cooperation *always involves more than one person* an absolute expansion in the population of people able to cooperate may be accompanied by an associated failure to promulgate the genes of individuals or classes of people some of whom may be *party to the cooperation themselves.* (At the same time, there continue to be cooperative activities which do serve both 'cooperative' and other human genes e.g. people jointly hunting for food.) Fundamentally, *in respect of the new 'cooperative' genes, it is the overall growth in numbers of cooperating people which matters, while there may be identifiable others who 'lose out' as a consequence of that cooperation itself.* There may, for instance, be identifiable categories with reduced or zero fertility and others with higher mortality.

Example (a) For the longest period while they have been on the planet humans were hunters and gatherers. Taking a long view the population rose and they spread throughout the habitable continents. We are nevertheless told that hunting groups, 'have proved highly adept at population control…in preserving and developing desirable social characteristics, while endeavouring to prevent (often by forced celibacy) the passing on of any personal defects that might prevent a member playing a full part in his or her small community' (Barraclough, 1978, p.35). Population growth might indeed have been easier without those with personal defects, but it was nevertheless 'at cost' to the latter's genes.

Example (b) The first appearance of recognizable civilization was in southern Mesopotamia, where the population rose rapidly. It was nevertheless the case that, 'a Sumerian king and queen of the middle of the third millennium were followed to their tombs by their attendants who were then buried with them…' (Roberts, 1980, p.71) Population growth was evidently 'at cost' to the genes of attendants (which loss would depend more precisely on their age at death).

Example (c) The Roman Catholic Church has been a central institution in many societies and incorporates cooperative behaviour between those at the same or differing levels within a hierarchy. That church has encouraged growth in the human population e.g. by proscribing the use of manufactured contraceptives and suicide. The tendency to promote growth in numbers is nevertheless 'at cost' to the genes of the celibate priesthood.

Example (d) Ancient societies such as Greece and Rome were based on slavery yet their populations rose for extended periods. Within a slave-owning society the age-specific mortality rates and the overall mortality rate of the slaves may be expected to be higher than those of the slave-owners, yet there can be a tendency nevertheless for population numbers to rise. The overall growth in numbers is 'at cost' to the genes of some of the slaves.

The institution of slavery is - perhaps surprisingly - instructive for present purposes. In an unexpected way that institution – ubiquitous in antiquity – points up the significance

of cooperation, albeit coerced. Slaves tended to originate from those defeated in battle. They could have been killed but there is gain in product from putting them to work. They could be castrated or maimed, but, again, there can be a net gain from instead allowing them to breed, thereby providing a continuous supply of slaves. In connection with slavery cooperation is advanced while the mortality which could have followed defeat is reduced. Notably too, slavery is found in otherwise widely differing cultures and contexts.

To put the position generally, one can say that cooperation (which will be occurring simultaneously at differing levels within a complex society) tends to give rise to a growing population but also to differentials in the vital rates of fertility, mortality and migration between sub-populations which are governed by the nature of the cooperation itself. For instance, in advanced societies social class differentials in fertility and mortality substantially arise in this way - one source being the differentially hazardous nature of individual occupations.

The demographic patterns at the present time across vast swathes of the Earth's surface point firmly to the emphasis here on the importance of aggregates as against individuals. In Western societies, but also more widely, average family size is quite modest with most couples having four or fewer children. Individuals are evidently not generally acting in ways which maximize the likelihood of the promulgation of their own genes. Hence an attempt to account for behaviour by reference to the selfish gene on an individualized basis would plainly fail. However, once the move is made to foreground cooperative

genes observable patterns become explicable. Paradoxically, the overall world population is growing while most individuals are 'paying a cost' in terms of the loss of their own potential fertility.

Population and population growth

Of course it is the case that the population of the world is now vastly more than it was in the remote past. That is a relevant observation but it would be absurd for present purposes to rest one's case on it. Rather, in testing the applicability of the theory of the selfish gene, the main task becomes showing that the possession of the new 'cooperative' genes *tends* towards the promulgation of the genes themselves i.e. the phenomenon of human cooperation tends towards a large and steadily growing population. The emphasis on 'tends' is plainly important. Any such tendency necessarily expresses itself in the context of all manner of set-backs to population growth including the impact of such traditional enemies as plague and famine.

From the literature two main frameworks are available for explaining world population growth in causal terms. The first framework focuses on the means of subsistence. The population of the world cannot be greater than that which can provide itself with a minimal subsistence from the world's resources. As stressed, this is achieved cooperatively. Plainly, for most of the time humans have inhabited the planet, the vast majority have lived near a minimum level of subsistence, so significant population increase has only been possible when the means of subsistence could be increased proportionately.

This framework directs attention to human ecology. Human societies are dependent upon other animals, on plant species, and on such features of the inanimate environment as water, air and temperature. Human ecology concerns the mutual relationships of human populations and their biological and physical environments. Within this framework an ecosystem refers to an aggregation of associated species of plants and animals together with the physical features of their habitat. The observable growth of world population would not have been possible without human beings making substantial changes within their ecosystem. Importantly, these changes could not have been simply quantitative i.e. our relationship to the environment is patently not a kind of multiplying up of the relationship of pre-literate peoples to theirs. Rather the way in which the human means of subsistence has kept abreast of growing population is through qualitative change in their ecosystem. Some use of this framework is made in the account of Chapter 7 of developments in prehistory and history.

The second framework for examining causes of population growth involves focusing on its two components, the birth rate and the death rate. For the world as a whole, the population increases when the birth rate exceeds the death rate and the greater the difference between the two, the higher will be the rate of growth. Within this framework attention is directed at the causal factors giving rise to changes in the birth and death rates. However, the unit of analysis when considering population growth may well not be the totality of the human population on Earth. A relevant unit consists of those drawn together within a cooperative framework which is indeed the case at the present time for

most of the world's population; but it was not so in the past. Where there is an isolated population, for instance, as might be the case for a pre-literate society or a civilization on part of a large continent, then it is to be expected from the theory that the population of that social entity is more likely to grow than decline in the longer term. From the point of view of the selfish gene that isolated population could represent the totality of the human population on Earth. More generally, of course, there are movements of populations and societies or civilizations often come to inter-affect one another; in this connection migratory movements require causal analysis.

So testing whether the theory applies involves examining whether in an isolated, or at least for purposes of analysis isolable, human group cooperation gives rise to a tendency for the population to increase. Of course, at the crudest level in the absence of migration this has to do with whether fertility tends to exceed mortality through extended time but some more detailed points may be noted. In this connection there may be important differences between patterns in the short- and in the long-term, the latter being of primary concern here. The shape of the population pyramid at particular times is important in the short-term. If, although the population is large, the pyramid is top heavy (i.e. the population is disproportionately elderly), numbers may be expected shortly to decline. The length of time between generations is also important; where this shortens the population will tend to rise. Then, focusing on migration, a population may tend to rise in association with expansion into unoccupied habitable space. In the human story this last phenomenon is of particular importance.

Indeed, an important basic piece of evidence that the theory here being advanced may apply concerns the fact that, at the stage when it consisted of hunters and gatherers, the human population increased in numbers as it spread relatively thinly throughout the habitable continents. As part of this, the first colonization of the Americas from Alaska to Patagonia in perhaps as little as 2000 years is a particularly striking phenomenon. (Diamond, 1998, pp. 37 and 47) The dispersal of the human population involved adapting to highly varied environments, made possible by cooperative activity in respect of such activities as hunting, provision of clothing and use of fire. In this connection it is sometimes said that hunter-gatherer populations grew just enough to push the limit of the *carrying capacity* of their way of life, where this phrase refers to the number of people that may be sustained in an area given its physical resources and the way people use them. (Sanderson, 1995; Miller, 2007; Weeks, 2008, p.32) Both increasing numbers and the dispersal are highly significant. As regards the latter, attention must be drawn to the fact that conditions on the Earth's surface vary and are subject to change in ways affecting the ability to sustain population: an ice-sheet may be advancing in one place, while elsewhere previously desiccated areas may be experiencing greater rainfall; some areas are prone to seismic activity, others not. *Were one constructing a model to maximize the possibilities for overall population growth one would build into it this tendency towards population dispersal.*

The slow but pervasive move to a more sedentary, agricultural way of life initiated the phase where resources were used intensively rather than extensively. It may be judged that with the onset of these newer life-style patterns the dispersed nature of the population

continued to favour the possibilities for overall growth. Indeed, it does so in respect of the present world population, for instance by helping to sustain large numbers as we face the problem of global warming. The point is that there are 'winners' and 'losers' from global warming (even though the latter may outnumber the former). Deserts may advance in certain regions while retreating in others; a Mediterranean climate may migrate northwards in the Northern hemisphere. It would further sustain population numbers were there to be – as is very likely - some cooperation between winners and losers. At the present time (but not necessarily in the future) it is indeed the case that the human population 'eggs' are all carried by 'island Earth', but at least one can say that the pattern of dispersal on the planet offers some support to overall numbers given some destruction of individual habitats.

In proceeding further the pattern of growth of the world's population must be noted. The broad assertion that may be made is that the size of the world population grew slowly in fits and starts up to the date of about 1750AD when it is reckoned to have totalled 764 million i.e. it tended to grow up to that date but the average rate of growth was low (Weeks, 2008, p.33). Two hundred years later - in 1950 - the figure was more than two and a half billion and in 1960 close to three billion, while in 2012 the world's population had come to exceed seven billion (en.wikipedia.org/wiki/World_population). The reason why the world population is increasing rapidly is, of course, because mortality has fallen sharply compared with earlier times while fertility has fallen somewhat less sharply. The pattern of more rapid growth of recent centuries is encapsulated in the notion that there has been a 'demographic transition' and theory relating to that notion is taken up in

Chapter 9. Importantly, to assert that there is a tendency for the overall numbers of cooperating people to rise is not to assert that there is any naturally given rate of increase. Rather the suggestion would be that there is a tendency for the rate to be positive and sustainable and in recent centuries a rate high by historical standards has been sustainable. Hence, it may be judged that, for present purposes, what is needed is an account linking human cooperation to a rather low average population growth rate up to (approximately) the mid-eighteenth century but a markedly higher one thereafter.

It is the work of subsequent chapters to develop such an account. Plainly one initial thought is that people cooperate because they achieve their various goals more effectively together than they could or would do separately and that this manifests itself in population growth. It may be judged, for instance, that cooperation in farming or in the use of particular farming methods produces more food enabling more mouths to be filled. Again, in respect of a modern society, it could be said that cooperation in industrial organizations yields higher incomes and overall economic growth which provide conditions for increases in population. These are, of course, highly relevant ideas and they are examined further later. However, there is also a need to understand how the advent of characteristically-human cooperation gives rise to more sophisticated and more productive ways of living in the first place; humans could conceivably have continued using the simplest technology while living in a tiny portion of the Earth's surface, but they did not do so. Again, it is clear that virtually from the outset people cooperate in a multiplicity of different contexts which vary greatly in the extent to which they appear to

link directly or indirectly to population. Hence to begin to provide a balanced or rounded account linking cooperation to population growth, the multi-faceted nature of human life must be grasped.

There is reason to judge that the impact of cooperation on population growth is not felt or achieved by some relatively simplistic 'direct action' but through the complexity of human life. For instance, it is vital that cooperation affects the very way in which the world is conceptualized and knowledge is acquired about it. Again, as we shall see, cooperation gives rise to morality which is not to be thought of as some interesting incidental aspect of human life but is in fact implicated in the underlying process linking cooperation to population growth. It is judged also that cooperation gives rise to religion which institution itself tends positively to impact on population. Despite the links being multifaceted, however, in what follows the aim is to clarify rather than mystify; the main effort is directed at laying bear and tracing the connections. In the next chapter some foundational elements are considered.

Chapter 2: Human Understanding, Values and Morality

At the heart of this study is the notion that 'cooperative genes' give rise to cooperative behaviour among humans which in turn propagates the genes. The central task is to show that the cooperative behaviour to which the new genes give rise has indeed tended to propagate the genes – through an increasing population. This chapter provides a necessary foundation for the account. To understand how populations come to grow one needs to inquire into the implications of cooperation for the way in which human beings understand the world and their own place in it; also how cooperation contributes to the way in which they explain to themselves what they observe and experience and then go on to put those explanations and understandings to further use.

It is of the essence that people relate to the physical world while also relating to each other. Indeed, a certain balance in this respect is (and must be) achieved within an overall way of life. Also important is the pattern whereby humans sometimes behave in eminently practical ways but they may also be observed to act on the basis of speculative thought. In particular, it is of importance to begin to understand how cooperation gives rise to religion. A further significant aspect is to examine how expanding patterns of cooperation are regulated and stabilized in ways which make it more effective and more predictable in respect of outcomes. This requires consideration of the origins and nature of morality. Human life has many aspects and elements which must be situated within an overall account concerned with how cooperation gives rise to population growth.

Conceptualizing the external world; the third person perspective

One can make progress by going back to basics and considering just what exactly does flow from the advent of characteristically-human cooperation. One needs to consider the implications of cooperation in practice, to identify potentialities which go beyond those which already exist at the animal level.

A basic point is that *full conceptualization of the external world – as a world (predominantly) consisting of objects which may undergo (or parts of which may undergo) change of relative position and which have weight/mass - does not occur at the purely animal level but arises in the context of human cooperative activity*. In using the notion of an 'object' in this (familiar) way it is of course already implied that a single object would give rise to different experiences e.g. it would look different from different positions; it could also undergo change of appearance as when seen in bright sunlight or at dusk. In partial justification of this key assertion, it is directly relevant to say that the utilization of *theory of mind* involves individuals interacting while imaginatively seeing or in other ways experiencing reality from the position of one or more other persons, which phenomenon has close affinities with the contribution of 'triangulation' in surveying. The conceptual isolation of time – which initially is purely serial - arises from the fact that there are patterns and correlations in the human experience of the changes in relative positions of objects or parts of objects e.g. when heavy objects fall from the same height they hit the ground after roughly the same interval; again, the multi-faceted changes associated with the occurrence of day and night are patterned and recurrent. Importantly, too, this conceptualization by humans of the external world includes an

understanding of their own place in it as embodied beings. When jointly engaged in practical activity, the actions of each party are shaped both by their understanding of the position of others and by their understanding of their own position; which positions are implicitly understood as located within the overall world of objects. In sum, cooperation of the type identified is interdependent with the utilisation of a shared view of an external world of objects. This also amounts to the adoption of *a third person point of view.*

To be absolutely precise, it is the combined use of (potentially) all the human senses in the context of human cooperative activity which gives rise to full conceptualization. In philosophical empiricist accounts there is sometimes a tendency to give undue emphasis to the sense of sight. The view taken here is that it is the sense of touch and the experience of resistance or weight (as when lifting) or of impulse when one is struck which is perhaps most fundamental; touching provides the interface between one's own body (which becomes understood as an object) and other objects (it being of the essence that one can touch with any part of the body or indeed with several parts at the same time). Also fundamental is coordination between the senses, as when the sensation of touching accompanies observation of touching.

Arising together with the conceptualization of a (changing) world of objects is (shared) knowledge of that world; communication using language acquires extensive and extendable content. No doubt the early view of the world is highly local but it is of the essence that it can potentially be extended and elaborated in space and time, the only real limits being those of a type with which we are familiar. Importantly, arising together

with the human conceptualization of time is the vital phenomenon of human foresight: from observations and memories of observations arise expectations regarding the future and a grasp of potentialities for action. Thus, awareness of the world together with human foresight informs *practical action* which may also lead, in its turn, to additional increments of knowledge. It is argued later that it is this incremental process which mediates between human cooperation and population growth.

To avoid confusion, one may situate the view being advanced here in relation to the notion of culture. This key notion basically refers to shared ideas and there is also material culture in the form of artifacts. It is vital fully to acknowledge that human cultures and the differing languages which are central to them may vary considerably from one society to another. Despite the existence of cultural variations between societies, however, the key assertion being made is that the conceptualization of the external world at an underlying basic level is shared among humans. A few examples may help. Suppose an individual accidentally stumbles over a tree trunk in the view of others; irrespective of cultural context, there will be an understanding that contact has occurred between that person and a physical object. So too is there understanding that a mother can lift her small child but not vice versa. Again, the general understanding (where it exists) that you can rely on not getting killed or injured when you dive into deep water is irrespective of culture. In this connection, while a river or the sea is not itself to be construed directly as a physical object its occupancy of space is directly understood by reference to adjacent physical objects (and objects including human beings may appear in it). Again, suppose some people are wandering around after getting lost during the

daytime in the Sahara Desert: irrespective of culture there will be an understanding that there is a bright burning light above them which we know as the Sun. In this connection, while the Sun is emphatically not itself immediately or directly understood to be a physical object, it is understood at a particular time to be in a direction specified by reference to physical objects e.g. coming over the horizon. Now of course it is the case that there are cultures where the Sun is viewed as a god and others where this is not the case, but that very state of affairs can help us to understand what is basic and shared and what may vary culturally.

Humans make and use tools. When using a stone tool one is 'relying' on the physicality of it. Also, where two hunters in a pre-literate society are crossing a river at a particular point they may well be relying on the fact that at that point their feet may be expected to touch the bottom as they walk across while their heads remain above the surface. That which may be relied upon in this sense constitutes the external world; it is also that which one encounters or 'comes up against'. In the context of cooperation two or more persons rely on elements of that world and, as already indicated, that joint reliance links directly to the emergence, development and utilization of a third person point of view. Information concerning these matters may thus be conveyed to others; indeed the experience of others of the depth of water at a point of a river may be confirmatory. Hence beliefs of this kind tend to expand until they can be said to exist as knowledge 'at large'. Each of us at any time may know things about the Earth's surface that no one else knows, but that can have the status of knowledge partly because it finds its place within the broader picture deriving from human experience at large. Nor is it being asserted that

the external world is ‘static’ or ‘fixed’; the common experience is that this is indeed not so; thus the river is shallow in the dry season and deep in the rainy season; but that observation is itself indicative of the way in which knowledge may expand. Importantly, the reality of the external world is being experienced, found to be familiar and to a degree confirmed throughout time; that confirmation is not to be thought of as achieved on a ‘once and for all’ basis. However, the experience of that reality in the long-term may be expected to be fully reflected in linguistic usage, which itself develops gradually overtime.

It is a commonplace idea to say that our way of life is dependent upon knowledge and knowledge acquisition. But the significance of a common understanding of an external world within which we are ourselves located is that one is provided with something to have knowledge about or perhaps, more accurately, a framework for emergent knowledge. Specific items of information have a wider context in space and potentially too in respect of time. If someone says there is an oasis six miles away it can help to define an objective that may be sought. There can be rules relating to space allocation and land use which we can all understand.

In respect of human conceptualization it is likely that there are some ‘natural kinds’ which would be evident cross-culturally. Other animals react to the presence of predators and prey, for instance, in much the same sorts of way however they are presented to the senses, which tendency would be expected to pass to the human level. Thus it is to be expected from the outset that humans everywhere would grasp rabbits, dogs and lions as

conceptual *gestalts*. Here is an example illustrating the central practical importance of conceptualizing the external world: seeing a lion may initiate a flight response but this tendency may be overcome once it is realized that the lion is behind bars – which 'fact' may be relied upon.

Of course it is the case that animals sense and react to what we understand to be objects in their environment e.g. a predator such as a lion, but they do not have a fully developed concept of either an object or a lion. In a bullfight the behaviour of the bull towards the matador and his cloak (essentially a moving surface rather than a moving solid object) derives its distinctive character from the bull's lack of full conceptualization of the external world. Again, animals have extended experience of a local area but they do not conceptualise how that area links to contiguous ones. Different animals may see the same object from (exactly) the same place but this is not publicly acknowledged; it does not give rise to a shared understanding among them. Although their behaviour may act as a signal to others, animals do not 'compare notes' regarding their experiences since this can only be done using language. Although they have memory, as compared with humans their behaviour is more immediately bound up with what is directly presented to the senses. Cooperation mediated by language *inter alia* enables humans to act in ways that are informed by their understanding of things remote in time and/or place. Despite their lack of full conceptualisation of the external world animals may, of course, be said to have knowledge of aspects of it and to be able to communicate information.

The perspectives of individual humans essentially derive from contexts of cooperation. It is important to affirm that humans adopt a third person point of view just as much when alone as when they are with others or cooperating. In this connection there can be confusion between considerations as to what is 'personal', 'private' or 'public'. For instance, suppose an individual is walking alone in total isolation, they still understand their circumstances to be ones which are in principle publicly observable. A person's bedroom may be a space no one else ever enters but they still understand the disposition of objects in it to be an objectively-given 'state of affairs'. Again, when someone is in pain, they understand it to be their pain rather than someone else's, but they also simultaneously believe that it is objectively the case that they are in pain i.e. its validity is understood to be in relation to the population at large.

On a rather different point, a capacity which humans possess and which distinguishes them from other animals is their ability comprehensively to copy i.e. to copy in any respect or any aspect. This is of the greatest value in practice since it enables them to duplicate what are judged to be effective ways of doing things. The point to be made at this stage is that this ability may steadily expand in scope given a context of human cooperation taken together with full conceptualization of the external world. For instance, copying (duplicating) a structure such as a tool or a shelter is feasible given full conceptualization of the world of objects, but it may reasonably be doubted whether this would be possible in (say) a world of sensations. The phenomenon of copying seems to be associated with the ability to adopt a third-person perspective arising out of cooperation. Even in respect of the (non-material) copying of a sound, which is involved

in language acquisition, the degree of success with which this is done may only really be judged from a third-person point of view.

Human understanding

With the advent of characteristically-human cooperation, in what ways do humans come to understand and explain aspects of their situation and environment? It can be suggested that conceptualization would consist of two primary strands which are clearly discernible in our thinking today. As stressed earlier, there would be a development of concepts relating to the understanding of human behaviour utilising theory of mind; such notions as purposes and reasons would be fore-grounded. For instance, it might be understood that one person injured another because of sexual jealousy. Now this strand of concepts only even begins to come into play for the first time during a period when humans are already active in an established, patterned way in the non-human environment, perhaps most obviously as they gain access to food and water. The second strand consists of concepts, employed for instance in this latter type of context, which do not involve implicit reference to theory of mind. The identification of berries which are poisonous is an example. In other cases there is understanding of how a human being works as 'a physical system'. For instance, when drinking water, use may be made of cupped hands to lift water towards the mouth. The relevant understanding is: in this connection the palms need to be concave upwards and with the fingers kept close together. (Plainly a parent would teach their child to do it this way.)

It must be stressed that the use of either strand of concepts goes considerably beyond simply an apprehension through the senses of what occurs in a particular instance. As already stressed, in respect of the first strand, the concepts are employed to grasp intentionality and other aspects of what may be termed the 'meaning' of the behaviour (e.g. that it is 'jealous') i.e. that which, in a sense, lies 'behind' observable physical behaviour. In respect of the second strand, too, additional conceptual understanding is involved: as when in the example above, water is observed to fall from the hands *because* the fingers became separated.

Proceeding further, in connection with the conceptual bifurcation, two differing kinds of explanation may be provided involving purposive (or personal) causation and non-purposive (or non-personal) causation. The first involves explanation by reference to such considerations as reasons or purposes while the second hinges on empirical generalisations of various types. Thus there is a difference between saying of an adult that she poured the dirty water into the ground because she no longer needed it, and saying of a young child that the water fell from his hands because his hands and fingers were separated. This last explanation points towards (or derives from) the generalisation that water that is not held within a continuous cupped surface falls to the ground, or at any rate to a lower level. With respect to the practice of preliterate peoples it is quite correct to view an implicit generalisation of this type as proto-scientific in its character.

In connection with explanation the time dimension is (typically) implicitly or explicitly involved. Human understandings in which the two types of explanation come into play

also arise after the event. Thus where the countryside is drenched it may be inferred that it has rained recently. The other case – involving purposive causation - is particularly important because of the complexity of the ways in which outcomes ramify. Thus given prior familiarity with bows and arrows, where an individual unexpectedly comes upon a – possibly abandoned - bow and sheaf of arrows, its purpose together with the fact that it has human creators/designers may be readily appreciated. However, in the absence of such familiarity, a priori it may not be possible for an individual to judge its nature or provide an appropriate type of explanation for its existence. There is even further complexity because human purposive activities have unanticipated consequences, making it even harder to judge the appropriateness of each type of explanation, either separately or in combination.

A further concept which may usefully be highlighted at this stage is that of power (related also to 'strength'). This plays a part in both types of explanation. In respect of the first type it is correct to say that while purposes, intentions and so on may be manifested in behaviour, in and of themselves they are non-material: the exercise of human powers is needed so that empirically-defined objectives may be achieved. In the explanation of human activity this contribution of human powers is being acknowledged, either implicitly or explicitly. The powers may be physical or non-physical (as with memory) but the focus here is on the former. We recognize, for instance, that when a physical rescue is being undertaken a mother may lift her small child but not vice versa. Thus, in respect of explanation by reference to purposive causation, there is recognition of the contribution made by potentially variable powers, in this case that of physical strength.

But in the case of the second type of explanation too there is typically at least implicit acknowledgement of the contribution of power. Consider for instance the difference between saying a man died because a tree collapsed and hit him on the head and saying he died because a leaf hit him on the head; we would readily accept the former explanation but not the latter.

It is important to note a contrast which arises from the conceptual bifurcation and, associated with it, the two differing kinds of explanation. In respect of non-purposive causation, the general position is that the explanation is of a type understandable in principle by humanity as a whole. Thus to explain that particular berries are poisonous, or that water is failing to pass through a pipe because one section of it is angled uphill, is to provide an explanation in principle understandable by anyone; indeed, if it is true, it is true irrespective of culture. On the other hand, with respect to purposive causation the content of the explanation varies considerably and in a more open-ended fashion; indeed, it is as variable as is the varying character of human purposes, with the consequence that it may not be, in the same sense, understandable by anyone. This last may well be true, for instance, where the explanation concerns a way in which humans are relating to each other. Where it is explained that someone bows down because they are in the presence of the king, this is only readily understood by someone who understands the significance of bowing and the notion of kingship. A way of putting this is to say that non-purposive explanation tends towards universalism, while purposive explanation, although typically alluding to patterns of behaviour, nevertheless tends towards particularism.

Arising out of the conceptual bifurcation, people understand each other and each other's behaviour in two different ways. Consider, for instance, the universal phenomenon of aging and the physical and behavioural changes which tend to accompany it. In observing others we understand them to be children, elderly people and so on. However, we simultaneously understand who they are while understanding their purposes and those of others orienting towards them. The same person is an elderly lady and Queen Elizabeth II.

An important objective of this section is to situate in an initial way the phenomenon of religion. One is now in a position to identify a key source of this ubiquitous phenomenon. Consider the point that in the early circumstances of mankind there is conceptual bifurcation. Supposing one asks: is there at the same time understanding of the precise scope and limits of application of each set of concepts? In respect of that stage of human development surely the answer is negative. At the risk of being pedantic it is worth spelling out that we are able to do so today because of our greater conceptual resources and resources of knowledge (although in actuality many people might struggle to order their ideas on what is a difficult topic). The suggestion is that religion tends to arise in the early circumstances of mankind because explanation by reference to the strand involving reasons and purposes is being applied in contexts where we would expect to use the other type of explanation. In a related way it may also be asserted that the line of demarcation between the contexts of application of the two types of explanation could well differ as between two early social groups. (In this connection the reader might even be inclined to speculate as to whether people might once have existed

who used the former – purposive explanation - while making no use at all of the latter type of explanation. A reason why that is unlikely is because the latter type figures, for instance, in the sort of way already illustrated in connection with access to food and drink, an activity which necessarily preceded the initial utilization of theory of mind.)

A further consideration is germane to the emergence of religion. Above it was noted that considerations of power enter at least implicitly into both types of explanation. However, the power that manifestly belongs within the second type of explanation can be vastly greater than that entering into the first, since human physical powers are so slight relative to those of natural phenomena. Yet humans depend upon those phenomena for their very survival. Hence there is a motive and therefore a tendency for them to try to 'come to grips' with natural phenomena using concepts associated with the purposive explanation and understanding of human behaviour. This is why religion tends to be anthropomorphising in the sense that concepts derivative from humans and their behaviour tend to be attributed more widely e.g. to gods and spirits. To take a (hackneyed) example, when rains follow a long period of drought it may be that this is explained by reference to a purposive agent answering the prayers of the population. There is even a faint whiff of these types of conceptual issues in the way even today we seek to understand the problem of climate change by reference to (a) natural rhythms in the internal workings and motion of the earth and the sun, (b) the unintended consequences of human purposive behaviour, and (c) the idea of an 'Act of God'. Further sources of religion are considered in chapter 5.

Magic is sometimes distinguished from religion through the idea that the former is to be understood (simply) as a quasi-technology. It therefore probably has its origins within the context of non-purposive causation. Consideration of a couple of examples may be suggestive: first, an outcome at a distance is understood to be 'produced' by the firing of an arrow from a bow; secondly, it may be believed that lightning 'produces' thunder, given that they occur in the same context and one sometimes follows the other. In both examples correlation is involved but only in the former case is it the exercise of human agency which gives rise to the cause (release of arrow) which produces the 'effect'. (N.B. No reference is here being made to human purposes.) Hence, considering the generality of contexts where non-purposive explanation comes into play, some involve *human agency* generating a cause which produces an effect while others do not. A further example of the former would be the human lighting of a fire which causes meat to cook. Again, the crucial point may be lack of clarity as to the appropriate line of demarcation between the two: hence the belief that humans can so act as to 'cause' effects where we judge it to be impossible. Regarding the point that magic, it might be claimed, is only sometimes effective, it is relevant to say that we still accept the explanation that aspirin causes a headache to disappear despite the fact that this is not invariably the case. (No doubt in some instances where supposedly magical effects are produced in a person, psycho-somatic factors are involved.)

The main point to arise from this section concerns the bifurcation which must be expected to be present in the thinking and manifested in the actions of early humans, as it is in our own. The implications of that bifurcation bear on religion but they ramify more

generally throughout human life; often both types of explanation are combined in the understanding of events within a single context. Although it is being asserted that both types of understanding are involved from an early stage, of course there is no implication that any particular explanation or understanding is notably sophisticated.

Rationality, values and interests

From the outset humans may be judged to act sometimes in *rational* ways, in the sense that they are endowed with reason, just as they act in other ways e.g. emotionally, as in a fit of temper; one may add that this is further to (particularly higher) animals themselves exhibiting a kind of proto-rationality. The scope of application of rationality is interdependent with what is known. A demonstration of rationality of approach in respect of practical activity directed at empirically defined objectives would be as follows: where anthropologists have encountered pre-literate peoples accustomed to using stone or bone tools for cutting and sharpening and have then acquainted them with the use of steel tools, the people concerned relatively quickly appreciate the power and value of the latter tools and wish to add them to their tool-kit. A primary way in which the scope of rationality tends to become extended is through the understanding of what may be adopted as a means to other objectives: there is an expansion in those ways of acting which are desire-independent.

In this connection the types of shared understanding indicated in the previous section and increments therein are of the essence. Action which is judged rational in the sense that appropriate or effective means are used to reach a given objective is, among other things,

action informed by those types of understanding. Should you wish to assist another person it is rational to take the fullest account of that person's own purposes; should you wish not to go hungry you would be wise to take account of the food sources understood to be available locally and the identification of what is or is not poisonous. Plainly it could be judged rational to pray for rain. In this regard it is not an observer's judgment as to effectiveness which counts: a correct judgment of rationality is essentially made taking the fullest account of the perspectives of the person(s) concerned. However, it is also the case that where an increment in pertinent knowledge or understanding takes place, it is rational to modify behaviour to take account of it.

Cooperation also comes to define and express shared *values.* At the purely animal level there are sources of gratification, discomfort and pain. At the human level – to take an example - food, particular foods and the skills needed to gain access to them become valued. Arising out of experience, the adoption of a rational approach will tend implicitly to be valued, through the understanding that it tends to be effective. It is not just the skills of particular individuals which are valued but, associated with this, those persons may themselves be personally esteemed. From the outset, the valuation of individuals to an important degree derives from their prowess *relative* to that of others. Again, where several people exhibit and usefully deploy the same valued skill, they may effectively occupy a valued status.

In Chapter 1 the normative element inhering in cooperative activity is pointed up i.e. the feeling the parties have that they ought, or are obliged, to contribute. This links intimately

to the emergence and contribution of values. In connection with cooperation certain tendencies will tend to become valued in respect of parties to it: the tendencies to be reliable, truthful, considerate and helpful. In addition, behaviour which *anticipates a need for cooperation* will come to be valued. This is the context in which to see the parable of the Good Samaritan. It is not difficult for people to see that anybody could find themselves in a situation where they would be more than grateful for that type of intervention in their own lives. The net result is that Good-Samaritan-type behaviour is highly valued, although many would perhaps fall short of it in their own behaviour, because of the various inconveniences and 'costs' involved. Indeed it is not too much to claim that the fundamentally new element in life flowing from characteristically human cooperation is the normative, given that normative expectations inhere in it and it also comes to define and express shared values. To an important degree, in tracking – as one is attempting to do in this study - the implications of the developing structure of cooperation, one is simultaneously tracing the patterned changes in respect of values and norms.

Interests are also defined. It is revealing that in modern English this word is used in two connected ways: to refer to that in which one is interested; to refer to what is in one's interests. The link has to do with the fact that one will tend, among other things, to be interested in that which is in one's interests; however, the former concerns the individual's outlook or orientation, while the latter is rather more concerned with an objective state of affairs. Putting it very generally it may also be said that it is in one's interest or in the joint interest to access that which is valued. From the outset the interests

of cooperating individuals may be understood in some respects to differ (which may lead to breakdown), and differ also from their joint interests, providing an endless possible source of disputes. Most obviously, there can be argument over the division of 'the spoils' i.e. the product of cooperation where there is one. The tendency of humans to cooperate is matched only by their tendency to squabble. With defined values and interests there are also identifiable *reasons* for action. For instance, an individual may seek to acquire a particular skill in order to be able to achieve a valued status. In human life a powerful structuring principle is the tendency for individuals to appreciate and strive for the esteem of their fellows. It makes more widespread the motivation towards acquiring and deploying skills and capacities which generally facilitate the achievement of valued ends. In connection with the structuring of behaviour it is also the case that humans are able to formulate and understand *rules* with which they may or may not comply. Activity structured by values, reasons and rules taking place within a substantially cooperative context stems from human foresight and itself gives rise to both shared and individual memories. This makes highly pertinent Tallis's (2013, p.7) assertion that, 'our lives are lived as explicit narratives that go beyond mere organic continuation' (2013, p.7).

Again putting it very generally, it in people's interests to acquire knowledge pertinent to their concerns and involvements, both actual and potential. Characteristically human cooperation itself has a direct bearing upon the tendency for knowledge and understanding to spread. In this regard it is of the essence, as noted earlier, that humans provide their own subsistence cooperatively as opposed to their doing so on an individual

basis. The latter could conceivably occur in the absence of information flow, while the former cannot. The point is that cooperation necessarily yields information about what other parties are doing and what leads to successful and unsuccessful cooperation. For instance, where cooperation with one party tends to have a better outcome than cooperation with another, this would be known and, quite possibly in addition, the reasons for it. Of course, there are many situations where humans might be secretive. However, for information to be a source of power and influence implies that for at least some of the time the information must be utilized or imparted. There is also the motivational consideration that doing so may be a route to being more highly esteemed. The implication is that where particular human beings acquire greater significant knowledge about the environment – including the disposition of resources - or about the skills needed to utilize resources, it will tend by various means to spread, which emphatically is not to say that all those around will have equal access to it. A patterned phenomenon - again, cross-cultural in its nature - whereby information is diffused, which also bears witness to the value placed on it, is gossip.

Morality

It is judged that the normative element inhering in cooperation is a basic source for the emergence of *morality*, the primary type of social regulation and integration, which assists us in the achievement of valued objectives. It is important to see how this arises. A useful starting point is to note that when cooperating one typically 'relies' upon the other parties, but there can never be certainty that they will comply or 'deliver'; indeed, one may decide not to comply oneself. When relying voluntarily on someone else one

typically behaves – at least initially – as if they will behave in the expected way (there is a forward time reference), but one may be disappointed. A whole vocabulary concerned with such matters as trust, reliability, promises, assurances, and the notion of traitorous behaviour is used in our ordinary parlance to refer to this key area. Yet the pattern of cooperation would not have evolved if there were not an overall tendency for cooperation to be successful; it is cooperation carried through which delivers the benefits. Most of the time people do make a real effort to cooperate. Now, as already implied, the key development in humans making this possible consists of the process of 'internalisation': basically, an individual has come to feel they should be 'reliable', 'keep promises' and so on; we encourage this in children. Of course, as we know, there can be 'external' sanctions but cooperation would never be as widespread as it is without this 'internal' element. It does not follow that one cannot act against internalized normative expectations, but one is then likely to feel 'rotten about it'.

As one would expect, morality is very much concerned with how normative expectations become broader in their application. In this connection, attention may usefully be directed at three-person situations. Individuals are able to judge when another person is in a similar position to themselves and how a third party behaves towards that other person as well as towards themselves (involved in each case is 'taking the role of the other'). Hence a judgement may be made as to whether 'equal cases are being treated equally'. This is the source of the fundamental moral notions of fairness and unfairness. It is significant that young children quickly develop a clear sense of fairness and

unfairness in respect of adult behaviour. Where this notion emerges locally it is quite apparent that it could expand to be shared within a local community or more widely.

So cooperation involves normative expectations but the character of the expectations is subtle and needs further clarification. When one is cooperating with another it is of the essence that the unexpected may happen. How to respond? The preparedness of each party to provide 'help' is a main pattern. Suppose the other person has slipped on the floor, one may help them up. Not just this but one might reasonably be expected to note when the other person is heading for trouble – again through 'taking the role of the other' – and intervene or forewarn them. However, if they fall over six times, one may give up, thinking them unreasonably clumsy or careless. Again, when engaged in a task a 'reasonable amount of effort' may be called for, but what is a reasonable amount? Given considerations of fairness, it may sometimes be implied that both or all parties should be trying 'equally hard', but where differing tasks are involved the extent to which they do so may be hard to judge. Clearly the relation may break down where the other party judges one's effort to be insufficient. What is apparent is that the obligations underpinning cooperation vary with the role playing situation but are often subtle and diffuse; they may only be revealed when protest follows their perceived violation. Indeed, reflecting on life generally, one can see that it is punctuated by episodes where there is a breakdown of cooperation, often accompanied by quarrelling or recriminations.

Once the network of cooperative relationships is dense the obligation to provide help may move from something inhering in a particular instance of cooperation or a particular

relationship to a more general obligation understood to apply on a wider basis in life. As is often pointed out, *reciprocity* is a key underlying principle: just as I might need help from people I encounter so could they from me; why should there be an obligation on them, if not on me? The idea of reciprocity may partly be viewed as an extension in time and place of the principle of fairness. Consider also that just as one could assist a partner who had fallen over there may be a passer-by who is nearer and could move to assist them: so is there a general obligation, for instance, to be kind and helpful. Significantly too, one may sometimes be generous but one also notices 'breaking points' in one's own generosity. In relation to a charitable appeal many might supply 50p but rather few more than £2000; of course, their means differ which is a significant factor. In all areas there develop notions of what can 'reasonably' be expected. Importantly, there are natural variations in the extent to which people have internalized a sense of obligation and differences in the way it might be expressed; some people are more 'suspicious' of others, some more credulous. For good reasons we think of some people as 'mean' and others as 'generous'. Some people might fairly be characterized as particularly altruistic: they fall at the end of a continuum. This is the context within which to see altruism – which has frequently been felt to present a problem for selfish gene accounts of human behaviour. This argument is perfectly compatible with there being large differences in average generosity between societies, as is widely reported.

It must be acknowledged that within this account morality plays a secondary and dependent role in that what is being asserted is that it is the need for, and realization of, the benefits of cooperation which give rise to it. Constituting as it does a distinctive,

central element inhering in human behaviour, it might at first be thought that morality could develop as some kind of independent, autonomous cultural element. Certainly it may be observed to undergo change within society as well as differ from one society to another, there may also be expansion or contraction in its perceived scope, but it is judged here that its fundamental role is still to contribute to patterns of behaviour propagating the cooperative genes. Importantly, in virtually any human context there is extensive immoral and amoral behaviour, alongside conformity to moral rules. Nevertheless in sum the extent to which human beings at large conform to moral rules is broadly commensurable with the extent to which they benefit from cooperation (which is, of course, not to say they benefit equally). In Appendix 3 the related phenomena of empathy, torture and coerced compliance are examined and situated in relation to the main argument.

Summarizing conclusion

The topic of this chapter has been the implications of characteristically-human cooperation and its developing nature. Cooperation gives rise to understandings but it in turn arises out of them and is informed by them. Strategically important are full conceptualization of the external world and the adoption of a third person perspective. Also strategic – and arising out of theory of mind - is the tendency towards bifurcation in respect of types of explanation or understanding: there can be explanation by reference to purposive (or personal) causation or explanation by reference to non-purposive (or non-personal) causation. An important suggestion is that religion tends to arise in the

early circumstances of mankind because explanation of the former type – involving, for instance, reasons and purposes - is being applied in contexts where we have come to use explanations of the latter type. This, in its turn, bears upon the structuring of rational action; it could be rational, for instance, to dam a stream to store fresh-water, but also rational to ask or pray for rain.

As fundamentally, cooperation – which itself has a core normative element – gives rise to, and also expresses, values and interests; it is also the source of the fundamental socially regulative pattern, morality. The existence of these elements makes individual and cooperative behaviour within a locality more understandable and predictable; there is a patterning of objectives whose achievement tends thereby to become more likely. In the next chapter some implications for population are at the centre of attention.

Chapter 3: Important Factors in the Growth of Population

Practical action impacting on the vital processes

The next stage in this study is to consider, in a general way, the implications of the changes identified so far and arising out of cooperative activity for population growth. Important is the point that, following the genetic change under consideration, there is the adoption of a shared third person point of view, and human action becomes less bound up with what is directly presented to the senses than is the case at the animal level. Shared knowledge of the external world together with foresight inform practical action. The scope of shared knowledge may be understood through the idea that initially implicitly, but progressively, there is grasp of the spatial-dimensionality of the physical world. There can, for instance, be use of signs and symbols with corresponding directional and relational implications (as with an arrow drawn in dust); there can also be two and three-dimensional representations and models of physical reality. That a doll may be used to represent a human figure is indicative of the conceptual grasp of space quite apart from considerations to do with the context of its use, which might be that of sympathetic magic. Combined with this there is an incipient notion of cause and effect arising from the human ability to change the external world directly through their own actions (as when food is conveyed to the mouth and consumed). There is understanding that something thrown alters a given state of affairs at a distance.

The full conceptualization of physical reality informs actions taken in respect of it: humans are thereby empowered. Of strategic importance is the point that they acquire knowledge of their surroundings which can be conveyed to others. This can develop to

the point where one would say people possess an implicit ‘map’ of their locality, or one which might be explicitly represented in a drawing. At an early stage, differing highly local sections of ‘map’ may in effect be ‘stitched together’. Access is thereby gained to an extendable ‘map’, perhaps initially crude but one to which more detail may be added and which may cover an ever greater area; the developing picture will also contain information relating to the vertical dimension. The understanding of surroundings is also four-dimensional in the sense that there is an early grasp of serial time and patterns of diurnal and annual change. The joint grasp of space and time is reflected when it is asserted, for instance, that by travelling in a particular direction one will not get to a specific place until tomorrow. Humans as moveable bodily forms (and existing through time as a process) may be delineated within the ‘map’; the human body may itself be ‘mapped’ (on the surface and internally).

Practical action in respect of all three vital processes is thereby shaped. There is observation of how pregnancy leads to the birth of a baby, giving rise to the possibility of practical action leading to abortion and infanticide. Initially there is no grasp of the link between penetrative sex and subsequent child-bearing but some understanding of this may develop, given the correlational pattern. Where there is understanding there can be action arising out of it as with *coitus interruptus*. The growth in understanding leads to control being exercised over fertility given understanding of likely future circumstance e.g. of the diminishing or, alternatively, increasing availability of food supplies. (This is illustrated for the tribal society of Tikopia in Chapter 6.) *The main way in which*

cooperation impacts on fertility is through a pattern of (gradually) increasing control informed by foresight.

Despite the central importance of cooperation, it remains the case that much human behaviour simultaneously serves (in a certain sense) the 'interests' of both the new 'cooperative' genes and the other human genes. This would be true of most behaviours which tend to reduce injury and mortality and it links directly to the pattern whereby long-life is valued across societies. In this context the understanding of the external world tends to reduce morbidity and mortality. In coming to know which seeds, roots and leaves may be eaten in their locality, humans are simultaneously acquiring knowledge of those which are poisonous. They also come to know the whereabouts of dangerous currents in streams and the sea and seek to avoid them. At an early stage there is some rudimentary medical knowledge such as the recognition that dock leaves ease the pain caused by stinging nettles.

In respect of this kind of knowledge, it is of significance that it is, in a certain sense, egalitarian in its implications: it applies to people and their bodies irrespective of social status or access to resources. Across the generality of societies there is likely to be implicit recognition that people's needs are similar in this regard, even when the extent to which they are met is highly unequal. Again, when there is accretion of medical knowledge at any point within a society there is a clear sense in which it could be said to be in the general interest for it to be widely disseminated. On a further point, where there is any understanding at all that a condition is infectious it has the consequence that the

perceived interests of differing sections of a population become more bound up (just as the upper classes in Victorian Britain could not afford to be indifferent to the diseases particularly affecting the poor).

Of course it is the case, however, that until relatively recently in human history the phenomenon of infection was poorly understood; we understand now how people's actions and non-actions in the past contributed unintentionally to the spread of disease and thereby to increased morbidity and mortality. It was the case, for instance, that during the centuries of European expansion, the diseases (such as measles) which Europeans took with them to other continents and islands resulted in great mortality among the aboriginal inhabitants. However, this important fact must be correctly situated within the context of this study: for one person to infect another in the ordinary unintentional way is not an instance of cooperation between them. The thesis being evaluated here is that cooperation tended to give rise to population growth. Specifically in relation to medicine that cooperation did indeed tend in that direction is more obviously true once one comes on to consider the institutionalization of specific roles such as doctor or healer; but to refer here to institutionalization is to anticipate later discussion.

As knowledge grows there are associated changes in human attention and the implicit understanding of how further to acquire new knowledge. To illustrate: in coming to understand that one or two plants are poisonous there may be enhanced understanding of the potentiality for this to be the case for other, as yet unknown, plants. Also, from a

modern perspective we would tend to say it would ‘make sense’ for particular individuals first to sample new varieties in small quantities to judge the effects; then if there are no ill-effects others could consume somewhat larger quantities. However, that this constitutes a sound approach is itself something that needs to be learnt: it is not known a priori. Hence advances in knowledge are interdependent with advances in the understanding of the means to acquire knowledge. Of course, consideration of this example makes clear that those groups which make these advances sooner, other things being equal, are more likely to flourish and survive. The adoption of elements of what would widely be thought to be a scientific approach will have survival value. It has often been claimed that science is ‘organized common-sense’, but it is as important to say that the common-sense of pre-literate peoples tends to embrace principles which we recognize to be elements of scientific methodology.

Of course it is the case that from a modern perspective a particular belief or practice may be judged wrong but ancient medical knowledge tended to accrete because it was often helpful not because it was always wrong. It may also well be the case that such patterns as early urbanization may even have increased mortality in the short term i.e. as an unintended consequence, but it would remain true that cooperation directed to dealing with felt problems in urban areas (such as the possibility of fire) was more helpful. It is a commonplace idea that morbidity and mortality were much higher in the past, but it is being affirmed here that human cooperation tended to lead in the direction of reduced morbidity and mortality. *A primary way in which cooperation leads to growth in population is because it (gradually) bears down on morbidity and mortality.* Plainly, too,

reductions in morbidity and in the occurrence of accidental injury – particularly in younger age-groups - have positive implications for subsequent fecundity and fertility.

The 'mapping' of the external world is directly relevant to migration. Given the availability of a map one is more confident of what one will find were one to move: for instance, one can avoid obstacles such as a mountain range; one can move in anticipation of finding a dense and occupationally varied human population as in a city or, alternatively, virgin territory for farming. Hence there can be a relatively large set of migratory movements of differing kinds which proceed in a relatively orderly, undisruptive way: the existence of a widely-shared 'mental' map may thus serve simultaneously to coordinate the actions of many people. Given that cooperation also enables humans to be adaptable, two particular tendencies may be noted in respect of its further impact on migration. It impacts through its tendency to distribute population across the greatest habitable area. A second main way in which cooperation impacts on migration is that it redistributes population within the context of a broad overall spatial division of labour. It can, for instance, generate movement towards areas which are already relatively densely populated such as cities, or, alternatively, away from cities into the suburbs. *The impact of cooperation on migration is such as to increase potential numbers in association with extension in space and also to redistribute population within an overall spatial division of labour.*

Domestication of animals and plants

The discussion now moves to link human cooperation to the vitally important phenomenon of animal and plant domestication. It is a familiar fact that the human presence on Earth has been accompanied by a process of increasing domestication of animal and plant life. Of course, it is the case too that differing animals and plants were first domesticated in different places; for instance, those domesticated in (say) the Fertile Crescent were very different from those domesticated in the New World. It is highly significant, however, that in the present context one can speak of a tendency towards increasing domestication overtime even allowing for cultural variations.

The notion of domestication may be used in a broad sense to refer to adaptation to humans through genetic change or in a narrower sense where the reference is more specifically to human control over reproduction. Broadly speaking human interaction with plants and animals generates genetic change in those plants and animals (in sum, the gene pool changes). When an animal or plant has been changed genetically in some respects, that forms the basis upon which there may be further change; in animal-breeding this process is understood and actively pursued. Each new generation of humans has its own (established, but also gradually changing) life-style but it is also interacting with a modified set of animals and plants. The human behaviour involved here is various; for instance, one might be referring to eating apples, playing with dogs or shearing sheep; there is also use of draught animals. The way of life of a shepherd is predicated upon the existence of sheep of a significant weight with a decent coat of wool on their backs; maize farmers these days typically fertilize their own plants. At the time *homo sapiens* appeared on Earth none of these ways of behaving would have been possible *even had*

humans possessed the requisite know-how; hence the process of domestication represents a source of long-term secular change. Since animals and plants constitute the only source of food and are needed to sustain the pattern of human life in many other ways this pattern of modification is crucial. As Petersen puts it: 'The domestication of plants and animals, even at the neolithic level of efficiency, increased the potential population of the earth enormously.' (1969, p.348) The conclusion is that *from the long-term process of the domestication of animals and plants it follows that the Earth becomes able to sustain a larger human population*.

Domestication also has a bearing upon the prospects in the event of substantial human mortality. Suppose large numbers die as the result of plague or war. The aftermath in Eurasia of the Black Death would constitute an example. In respect of the build-up of population following each such episode the key points are these: the land is still available - if it has been laid waste or vacated there is the possibility of movement back into it; the same types of domesticated animals and plants are (usually) still available. In many cases the know-how will continue to exist even in a substantially reduced population to make good use of the available plants and animals. In sum, there is often reason to believe that population numbers may recover within a few generations.

Having highlighted the strategic importance of domestication, it is important briefly to consider how it arises and situate it in relation to the phenomenon of characteristically human cooperation. Significantly, *other primates do not exhibit the same tendency to domesticate other species*. Of course, humans often themselves cooperate while relating

to animals but they also do so individually; they can also be observed to 'cooperate' with some domesticated animals to achieve objectives in relation to other domesticated or wild animals (consider a shepherd and his dog). Properly to situate the phenomenon one must return to the point that cooperation between humans involves individuals possessing and developing a repertoire of ways of behaving, the use of theory of mind and the ability to 'take the role of the other' being fundamental. Now that particular orientation may be employed in relation to animals even though the animals themselves do not (fully) reciprocate. For instance, a shepherd signals to his dog given his (the shepherd's) understanding of the view the dog has of a flock of sheep i.e. in an imaginative sense he 'takes the role' of the dog. Again, a human may act towards an animal in the light of the observation that the animal 'wishes to be let out of the house' or 'wishes to play'. The patterns of domestication arise from humans acting towards animals in the light of these understandings; as part of this they sometimes – indeed often - act towards them in ways which may be viewed as exploitative of the animal. In sum, it is *capacities associated with the ability to cooperate in a characteristically human way which give rise to animal domestication*. In addition, plant domestication primarily arises from human action informed by forward time orientation and expectation, an orientation which similarly has its source in human cooperative behaviour.

Fitness in social context

Fundamentally, following the genetic change at issue, the fitness of particular categories of humans is increasingly to be judged relative to an environment shaped by cooperation. Fitness concerns differentials in survival rates which bear in their turn upon differentials

in reproductive rates. Consider, for instance, the contribution to fitness of lacto-tolerance. This cannot be evaluated in some generalized sense without regard to the human as well as physical environment. Suppose, however, there is a developing context of animal husbandry giving rise to growing milk consumption, then this would be expected to generate differential survival rates between the lacto-tolerant and the lacto-intolerant. The proportion in the population who are lacto-tolerant would grow. However, even more important, the absolute numbers in the population would tend to grow. Hence the framework of cooperation – the life-style – shapes the gene pool while increasing numbers.

Another significant case concerns alcohol-tolerance. It is a striking and suggestive fact that 'alcohol' is etymologically one of the more antique words in the English language with traceable roots to ancient Sumer. (Roberts, 1980, p.68) How exactly alcohol began its rise to prominence within Western consumption patterns is shrouded in mystery, but it is of the greatest significance because, of course, when added to water it reduces the risks from certain impurities. It seems likely that human familiarity with it would originate from leaving (perhaps) fruit juice lying around for a few days, but for it to become regularly consumed and at all widespread within a community there would need to be an established mode of production. Once there were an incipient pattern of production and consumption the conditions favouring the emergence of alcohol-tolerance as against alcohol-intolerance would exist. There is nothing inevitable about this pattern and, significantly, alcohol-tolerance in Western European populations is rather more extensive than in Far Eastern populations with their historically different sources of food and

consumption patterns. Again, one can note the impact of an emerging life-style both on the composition of the gene pool and on a possible increase in numbers.

From these examples it may be seen that in respect of ‘fitness’ the human or social environment is as critical as the non-human. Indeed as civilization advances this tendency becomes more and more marked to the point where one might be tempted to affirm that the most important part of the environment of an individual human being is other human beings. In earlier times individuals contracting acute appendicitis in childhood would probably have died young and failed to reproduce but today in many societies those having a propensity to suffer from this condition need suffer none of these consequences – although this does imply dependence on others. Similarly, in modern societies, suffering from short-sightedness effectively does not imply any lack of ‘fitness’. Consider also in this regard the massive elaboration and extension of the division and specialization of labour in a modern society. One aspect is that people with the most extraordinary combination of qualities may be usefully accommodated. For instance, people lacking practical skills to the point where they might have starved to death in earlier times, but nevertheless are capable of abstract thought, find valued employment. These observations may reasonably give rise to the suggestion that within human society there is a certain tendency for humans to become domesticated in a way resembling the human domestication of animals. (Pagel, 2012, chapter 3)

The important inference to be drawn is that, in the human case, the widest but appropriate context within which judgments as to ‘fitness’ are to be made is increasingly the human

cooperative framework itself: it is that feature which places the cooperative genes fundamentally 'in the driving seat'. It is plainly the case that for extended periods in prehistory and history particular types of individual qualities will have been selected for, but it is also the case that, following overall change in the pattern of cooperation whereby subsistence is maintained, those tendencies in the selection of individuals may themselves undergo change. For instance, the qualities aiding survival and in a sense favoured among hunter-gatherers differ in some respects from those among pastoralists.

A further key point must not be overlooked. It is readily clear to all that qualities such as good eyesight or fleetness of foot would have survival value given a particular mode of subsistence; certainly those qualities would be valued. However, those lacking these qualities but possessing others of a quite different type might in practice survive as readily where their own subsistence is reliably and predictably maintained given the contribution made by the others. Hence the qualities which go to make 'good' witchdoctors and priests could be said to be favoured given the right cooperative context. It will probably not escape the reader that this point has particularly sharp application in our own times. Again, anyone can see the sense in which in a modern society we are all dependent upon scientists, engineers and medical doctors as well as farmers for the maintenance of our way of life. However, the extent to which the underlying qualities associated with effective performance of some or all of these roles (including, for instance, high intelligence) are being selected for is probably rather slight without being zero. Being a long-term welfare recipient and belonging to a family of welfare recipients – and possessing those qualities which assist in doing so more effectively – has survival

value as well, given a certain type of overall cooperative framework (which is in no way to deny that relations of dependence can generate systematic political change).

The same type of point applies to psychological and behavioural tendencies. At first sight, being aggressive or assertive seems to have survival value, but so too can being timid or meek – given circumstances where people generally have regard to or respond to those qualities; indeed, we are told that 'the meek shall inherit the earth'. In effect, particular types of society draw out and raise the profile of particular qualities, and in this regard change may sometimes be quite rapid. Thus in Nazi Germany, the qualities of a fascist-minded, bullying type of male were favoured together with a female type oriented to children, the kitchen and the church (and many of each type were forthcoming), but happily this was only for a relatively short period. The striking feature is the way in which differing types of society (with large populations) each exhibit correspondence between social structure and the distribution of character qualities in the population. Again, this points to the central importance of the wider cooperative framework in sustaining the aggregate population. In Appendix 4 the position of humans is considered in the light of the notion that fitness must be judged in relation to a species' position within the ecological system as a whole.

Human consumption: the need to 'repeat the dose'

At this point one can usefully draw attention – in a simplified, schematic way -to a recurrent pattern which is particularly relevant to human access to food and water but also has some application to their more general access to resources which sustain the

pattern of life. Suppose, for instance, that access is achieved on a particular occasion to a valued foodstuff or to water at a particular place or in a particular way and that it is also believed (given existing knowledge, which may in fact be scant) that it could not have been more readily achieved elsewhere or by other means. Now it may be that some food or water is consumed but so also is some removed e.g. to a home-base but there is a practical limit on the extent to which this could be done; also relevant is the point that stored food will deteriorate in quality and water cease to be fresh or become contaminated. The key point arises from the fact that it is of the essence that the need for access to food and water continually recurs: at some subsequent time the need will reassert itself. When it does it is an expression of human rationality that a main line of approach will be to try to gain access again in the same way i.e. to try to 'repeat the dose'.

The purpose here is not to follow through with unnecessary detail but to point up some of the implications of recurrent need. For a start, it is motivationally of the greatest significance and is a fundamental driver of knowledge, both particular and general. For instance, it is essential for those concerned to be able to recall where the access point was, how to get there and the method employed. Given awareness of scarcity there may be an attempt to control who has access to the knowledge. Now the attempt exactly to 'repeat the dose' may fail but relevant context may be supplied through the implicit understanding that conditions on the earth's surface tend to vary continuously. Given that one achieved access to a particular foodstuff at this point but it is not now available, could it perhaps be available at an adjacent point? Given recurrent need there is an

incentive to get to know what is available in the vicinity. Consider a further point. Several return trips may succeed but then there is failure. Why is that? Could the passage of time itself be a factor? Yes, it could because of the factor of continuous seasonal change. Perhaps therefore one could rely on other foodstuffs for a period but usefully return to this site at a subsequent time. Hence there is powerful motivation to achieve understanding of the significance of time, particularly as it relates to diurnal and seasonal patterns of change.

Where there is settled agriculture similar considerations come into play. For instance, someone cultivating the soil may perhaps commence by sowing and later reaping a valuable crop. How to respond when the need for a further crop is urgent or that need is anticipated? The tendency would be to proceed as previously by sowing in the expectation of subsequent reaping; or even, where a greater crop would be welcome, to increase the area planted. This last would be rational given the implicit understanding that adjacent land might have similar qualities. Again, this could fail because of seasonal change. Perhaps one can consume other foodstuffs in the meantime and sow again at the same time in the following year. Now we observers know that where similar planting is endlessly repeated on the same land the crop may deteriorate. But if such deterioration is noted, how should one respond? A reasonable first step would be to move operations to the immediately adjacent virgin land, which again is a kind of repetitive move. Should it also be the case that further attempts are made to farm on the original land it would certainly be a valuable observation to make that it can sometimes exhibit ‘recovery’ after

a fallow period. Hence there is powerful motivation for understanding to develop in a 'proto-scientific' direction.

Evident too in these types of cases is motivation to exercise control. That was apparent in the first example where knowledge as to the whereabouts of foodstuffs might be withheld from others. In the farming example of course it is only too obvious where foodstuffs are to be located. The motivation in that case is all in the direction of exercising control over who has access to the site of production (or storage) of the foodstuffs: the pressure is towards increasing security in respect of retention of, and access to, that which one is engaged in producing. One possibility is that there are several adjacent farmers with some shared interests who together protect their lands. Another possibility is to get non-farmers to help to do this probably in exchange for a proportion of the produce of the land.

Two differing uses in modern English of possessive adjectives are suggestive. In the broader sense the reference is to that which is associated with a person or persons and is, in some sense, 'of' them: my raspberry (which I have just picked); your shoes; his plate of food. However, to say the plate of food in front of someone is 'his' in this most minimal sense may hint at, but does not guarantee, secure access; for instance, someone else could take it away. Again, there is a sense in which what a farmer produces is 'his' or 'of him' but it does not follow from that alone that he has first claim on it. A strand of the human story concerns the construction through cooperative endeavour of an institutional framework whereby in appropriate contexts possession in a weaker sense is

firmed up into possession in a stronger one. There are many possibilities here but, of course, a second main use in English of possessive adjectives concerns ownership, implying unrestricted access to, and enjoyment of, property. The example of the farmer points also to considerations of fairness and moral considerations: humans come to feel that it would be 'unfair' if someone who worked to produce something gains nothing for his or her pains.

These examples point to the need for institutional arrangements and they exhibit the motivational pressures leading in that direction. Effectively, attention is being drawn to what might be termed 'pressure points' in life which give rise to a need for rules, thereby providing greater security and/or predictability. However - a point that recurs in a whole variety of differing situations – a need for rules rarely or never implies that any particular rule or set of rules is chosen (or emerges). Hence it is only to be expected that there will be many cultural variations between societies bearing upon the issues of access and possession. Importantly, in identifying 'pressure points' in life which give rise to cognitive understanding, practical action, and moral and institutional change, one is also identifying a source of cultural variations.

Despite seeming relatively obvious these patterns are very important, indeed they are relatively obvious precisely because they are perennial and ubiquitous, having application to our individual and family lives today and even to the activities of such 'collective actors' as nation states. It need hardly be said that in present circumstances individuals, families and nation states wish to know where crude oil or its various refined products

such as petrol are located and to have controlled, predictable and repetitive access to it. At the present time nation states are jockeying for position in the race to secure access to new sources of oil on the globe, accompanied by the attempt to develop international law regulating, for instance, access to the Arctic and Antarctic.

Regarding access to the most basic liquid of all, water, the issues differ somewhat from those applying to food-stuffs. There is the important distinction between fresh and sea-water. Growth in (implicit) understanding of the properties of water is crucial: it is heavy and a main issue concerns collection and transportation; indeed the easiest way of getting it in quantity from one place to another on land is downhill via a channel or pipe. The closest thing leading to water seemingly being 'produced' might be the construction of a well. Certainly there will be a tendency to 'repeat the dose' in terms of access; this is most obvious in respect of use of rivers, oases and wells. Again, understanding will develop as to diurnal and seasonal change particularly in respect of rainfall and flooding. Where fresh water is scarce there is powerful motivation towards cooperative control of its sources. There is growth of understanding that water may be contaminated and a consequential need to cooperate where possible to prevent contamination. Absolutely vital is the controlled use of water in food production. As is well known the political organization and technical division of labour in early civilizations – for example in the near east – was critically shaped by the need to develop and maintain systems for distributing water.

The idea of ‘repeating the dose’ is also highly relevant to sustained access to the food-stuffs of fish and sea-food. Indeed there is a sense in which it is even more applicable than for the main food-stuffs on land. This is because the initial experience is that where a fish is caught on one occasion, a further fish may be caught on a subsequent occasion. Again, in the many tidal areas of the globe, where sea-food is obtained on the sea-shore (say) in the area defined as between low and high tide, common experience is that it may similarly be found there again, particularly following a further high tide. Plainly too an initial belief may be that these sources are in effect inexhaustible; although, no doubt, there may be (potentially identifiable) conditions conducive to availability of supply. However, humans may well seek to exercise control over access to these sources, including knowledge of their whereabouts. Nevertheless, the motivational thrust in the direction of institutionalizing anything resembling ownership of areas of the sea is plainly less than the equivalent on land; that is more likely to come into play in respect of areas of the foreshore, lakes or stretches of rivers.

In sum, one can say that where there is recurrent need – especially for such basics as food and water – a rationally-based initial orienting tendency is to try to ‘repeat the dose’ to gain access. There is powerful motivation to retain and expand relevant geographical knowledge and knowledge of technique. Again, problems which are experienced tend to enhance understanding of the significance of time: indeed it is not too much to claim that progressive understanding of the significance (including correlates) of diurnal and seasonal variation is foundational with respect to scientific knowledge. (While not amounting to laws these patterns are general and law-like.) In connection with farming a

key understanding with respect to sowing and reaping concerns how often one can effectively ‘repeat the dose’; this is a strategic topic within agricultural science.

Very importantly, however, the pressures do not simply have outcomes in respect of cognitive understanding and, where appropriate, practical response; much more is involved. The acute need for predictable, and especially controlled, access gives rise to a need for cooperation going way beyond that involved directly in the collection or production of food or collection of water. In a search for security regarding actual consumption, there may be cooperation among those whose interests are aligned or, alternatively, cooperation deriving from a division of labour between those with complementary interests. This is the origin of property rights which may take many particular forms. A strategic development also occurs in the moral sphere: those who produce something valuable are felt to be entitled either to dispose of it or to gain something else of value for their pains. This growth of moral sense links inextricably to the general understanding that where producers gain nothing of value from their production they quickly produce nothing at all; from which we all lose out.

Institutionalization represents a ‘locking in’ of tendencies. In the literature a label frequently applied to societies before the modern period is ‘traditional’ with people understood to act repetitively in ‘customary’ ways, probably implying that to ‘repeat the dose’ in that type of society is supported by a normative ambience. In this account there is occasion more than once to refer to cooperation at differing levels i.e. that higher-level ‘second-order’ cooperation may govern lower-level ‘first-order’ cooperation: the

introduction or emergence of the former where there has previously only been the latter represents a qualitative step-change. In respect of the difference between traditional and modern societies a not dissimilar step-change is apparent. In particular, in the latter type of society to 'repeat the dose' is again relevant but this time it is to innovate again and again (in ways which include, for instance, increasing the productivity of land or the efficiency of water transportation or use): the expectation of innovation is 'built-in' and derives particularly from the pattern whereby research and development are institutionalized e.g. in firms and universities. The economy has a trend growth of (say) two percent and this is expected in forthcoming years. To do 'the same thing' in research and development is again to produce new products and services while in respect of (say) dress it is to adopt the new fashions just as one has done previously: 'repeating the dose' is again supported by a normative ambience but this time it generates incremental dynamism. It is judged that social development derives to an important degree from this kind of iteration involving change of level.

From this highly schematic account one also gains insight into the link to population growth, given resource constraints. Essentially, in the earlier examples considered above, 'repeating the dose' only promises increases in population where more land and – what is closely related – more sources of fresh water become available. This is simply suggestive of population growth by spreading. Where, however, there is the step-change to 'repeating the dose' of innovation, and where, in addition, that innovation bears among other things upon land and water use, there is the possibility of sustained population growth within a defined area. However, it is important to note that the selected examples

included the two differing contexts of food gathering and of food production as in farming, which differ markedly in respect of the population able to be sustained in a given area.

So far in this section the whole emphasis has been on the need for repetition in respect of general access to resources and consumption. It will probably not have escaped the reader's attention that similar types of consideration come into play at the micro-level of individual action and individual instances of cooperation which are concerned with that access. This is worth pursuing as a theme because the patterning in this regard also bears heavily upon the creation of social relationships and institutionalization. As has been stressed humans possess serious foresight. What they are interested in is not simply successful sex today but preferably also tomorrow and tomorrow; again, they are not simply interested in this meal or this night's sleep with a roof over their heads, but the next one and the next. In a broad sense individuals wish to have secure access to resources into the future which may provide personal security and that of near ones and dear ones. The predictable achievement of these interests for at least some is what social relationships and institutionalization are all about. Patently, marriage and the family are concerned with secure and predictable sexual access, and meeting the repetitive consumptive needs of family members including otherwise vulnerable youngsters. (The topic of kinship and marriage is systematically taken up in Chapter 4.)

Where an individual instance of cooperation is successful, frequently there is excellent reason to want to 'repeat the dose'. Indeed there can be a rapid build-up in 'vested

interests'; this is a source of some types of social relationships. Supposing in a hunting and gathering society one has partnered a particularly effective hunter, one will be conscious that it will be in one's interests to continue the association. Indeed, a major fear would be that the association might be discontinued, so every effort will be made to assist in any way one can (even when, given the power relation, one may receive a disproportionately low share of the overall product). Not just this, but one would have learnt from prior experience how to cooperate with particular individuals. Hence there is every incentive to convert instances of successful cooperation into something more permanent - a cooperative relationship. Some social relationships originate from the fact that interests are at least partly defined out of prior cooperation and thereby act as incentives for them to continue. It may also be the case that other relationships of a similar kind are evident in the locality. Where there are two cooperating pairs engaged in roughly the same kind of activity, were it to be the case that one of each partnership were to drop out or die, the remaining participants could themselves fruitfully combine. This is indicative of the process leading to the creation of distinctive roles, which may be identified apart from particular incumbents. In the next section, attention moves from a focus on the need to 'repeat the dose' in connection with consumption, to consideration of the mode of production and the significance for population of change therein.

Development of forces and relations of production

The view is taken here that the build up in the human population both among hunters and gatherers but also in later forms of society is in part interdependent with the development of what might be termed the 'forces and relations of production'. The use of the term

‘forces of production’ is taken to refer to know-how (including skills) together with the provision of tools and materials which are to be brought to bear upon a productive task. By ‘relations of production’ is meant the differing contributions people make in the actual performance of the task and the way in which they combine to effect it e.g. one person may act as a leader, while another contributes a specialized skill. Following upon a particular quantity of product becoming available there can also be discernible stages when it is distributed and then parts or the whole of it may be traded (so one may also speak of ‘relations of distribution and exchange’). Importantly, cooperation is typically at the heart of each of these elements. However, it is not to be thought that a build-up in the forces and relations of production straightforwardly ‘causes’ population growth. For one thing a particular build-up may only be possible given a recent increase in numbers. Economic growth must be understood as being interdependent with population growth i.e. strongly implicated in it.

For illustration let us note that during the very long period of hunting and gathering in pre-history there were some highly significant advances in food acquisition. For instance, hunters (who originally may have been little more than scavengers) became, on the archaeological evidence, sometimes able to tackle large animals such as mammoths – and even in numbers. There is evidence pointing towards operations such as driving game – perhaps using sticks but also even fire – towards bogs in which heavy animals might flounder, or driving them towards and over precipices. It may be judged that a whole number of elements need to be brought together to achieve this. For instance there must be knowledge of the mammoth as a potential food source, knowledge of the

movements of herds of mammoths and their nearness or otherwise to a bog or a cliff; if fire is to be deployed there must be the skill to make and sustain it. On the relational side there must be sufficient people available, clarity as to how they are to be disposed, who is to do what and when; also foresight is needed as a preliminary to a plan being put into operation.

The complications are of course not yet over. A mammoth may be lying dead at the foot of a cliff but no meat has yet passed down anyone's neck! The mind boggles at the thought of what is involved in dismembering the mammoth and removing a substantial fraction of the meat to one or more home-bases where it may be consumed not just by the hunters but also by (say) women, children and perhaps the elderly. Manifestly considerable organization is involved, and if things are to run smoothly there must be agreement e.g. about who gets the best and worst cuts and in what quantities. It is plain in fact that cooperation is needed at this distributional stage and one can envisage too, particularly given the vast quantity of meat which becomes available, that some could be traded with third parties.

It is apparent also that many such attempts might be made before a mammoth is successfully tackled, but those involved could usefully learn from each attempt, whether successful or not. The position is taken here that any potentially relevant retention of information or acquisition of skill amounts to *enhancement of the forces of production.* (It has been shown that pre-literate peoples have vast knowledge of vegetative sources of food in their vicinity; any increase in such generally-held knowledge constitutes such

enhancement.) The increment in knowledge or understanding could also give rise to *enhancement of the relations of production*. For instance, it might be realized that a greater number of people is required for the task or there is a greater need for their contributions to be coordinated. In Chapter 1 the assertion is made that cooperation virtually from the outset involves means-ends orientation and a delayed gratification pattern. It may be readily judged that that is the case here. If some people drive animals towards a point where they expect others to have lit a fire, then each of the two groups of people are orienting towards the other as a means; each activity is itself understood to be a means. Also to attempt to kill a mammoth is not to kill it; successfully to kill a mammoth is not to eat it: sub-goals must be reached which are necessarily less satisfying than the final goal itself - or more likely totally dissatisfying without it.

This is but a single example but it is judged the process whereby population growth is interdependent with enhancement in the forces and relations of production is general in the human situation: it is as true today as it was for hunters and gatherers. Furthermore the view is taken here that *change in this respect is to be understood as occurring incrementally*. Of course, this leaves open the issue of timing: change may have been very slow in the hunting and gathering period while being rapid today. However, there was a tendency for there to be change in a discernible direction from the outset. At an early stage humans were tool users but perhaps even more crucially they were tool makers; this seems a distinguishing feature compared with other animals. Tool-making is an example of action directed towards something which may not be intrinsically desired but which is understood to be a step or means towards something else which is desired.

As time passed stone tools were used for a greater variety of precise purposes, by such means as striking flakes from a prepared core. Also bone and antler were added to wood and flint, the bone needle being a key development in respect of the elaboration of clothing.

In respect of both the forces and the relations of production, felt problems are the proximate causes of incremental change. (Basalla, 1988) In respect of the former, given any particular configuration in respect of know-how, tools and materials, problems may be experienced and solutions sought. The existing configuration and the problems to which it gives rise are the essential crucible for the incremental advance. Progress could be made by trial and error or by serendipitous means; there can be analogies drawn from one situation to another. In a more complex society one might be able to identify an incipient set of ideas – 'theory' – perhaps warranting the name of pure science and an incremental advance in that sphere could give rise to applications. Similar considerations apply in respect of the relations of production. In any existing context of cooperative action, problems may be experienced which require and eventually give rise to a cooperatively applied solution. To take an example: population expansion may give rise to a need for greater organizational complexity, perhaps a modified division of labour, but that greater complexity has itself to be created.

Patently humans are to a degree creative or innovative but, contrary to what is sometimes thought, there is no need to postulate that that degree is particularly high. This is basically because many can benefit from a relatively modest technical advance where

they are in a position to observe it or hear of it. As noted above, the quality which people do possess in abundance is the ability to copy; hence a relatively modest improvement in technique which obtains appropriate recognition may sometimes then be relatively widely adopted. In addition in any particular circumstances it may that a whole number of what one might term 'candidate' innovations are available to be observed or adopted, many arrived at in unintended ways, from which some may survive by a process of 'survival of the fittest'. It is really only in the modern world where research is institutionalized and there are established roles such as scientist and engineer, so that practical innovations may be expected to come on stream continuously. (In Appendix 4 there is discussion of the human position within the ecological system as a whole and attention is there drawn to the contribution of values and also to the strategic importance of the progressive development of human understanding of elements of that system.)

Summarizing conclusion

In this chapter some basic implications of characteristically-human cooperation for population growth have been brought forward. Firstly, it was suggested that stemming from the genetic change under consideration, human practical activity directly and progressively impacts on the vital processes themselves: on both fecundity and fertility; on morbidity and mortality; on migration. The fact that some of these impacts are initially slight does not detract from their cumulative and long-term importance. A further long-term process of the utmost significance for population growth is the domestication of animals and plants. Given the theory being evaluated, it is highly

significant that it is human capacities inhering in, or arising out of, the ability to cooperate which give rise to domestication. There again, through time multifarious qualities of differing types are selected for in the human population - the gene pool changes in patterned ways for extended periods – but a key point is that judgments as to the 'fitness' of particular categories can only be made relative to an environment increasingly shaped by cooperation. The qualities selected for in animals and plants tend to serve cooperatively-defined human interests, while those selected for in the human population tend to make the overall pattern of cooperation easier to sustain or expand.

It has been argued that in connection with human consumption – for instance in respect of such basics as food and water – a rationally-based orienting tendency is to try to 'repeat the dose' to gain access. This has implications for growth of cognitive understanding, but it also generates a need for security which is the origin of cooperatively-maintained property rights and an associated growth of moral sense. At the micro-level interests expressed within, and arising out of, individual instances of cooperation give rise to certain types of social relationships and foreshadow the emergence of social roles. In a traditional society 'repeating the dose' refers to people acting repetitively in customary ways, but in a modern society it can also come to have application to innovation itself. Predictability and security are conditions conducive to population growth. As fundamentally, the latter phenomenon is interdependent with incremental change of the forces and relations of production.

Chapter 4: Kinship, Economic Life, Neighbouring, the Social World

Sexual behaviour

The theory of the selfish gene provides considerable understanding of patterns in animal behaviour between close blood relatives. On the other hand, social anthropologists and sociologists have provided detailed accounts of the working of human family and kinship systems. Kinship is fundamentally concerned with *social recognition of blood ties* – a significantly different focus from that of biologists. It is argued in the next section below that cooperation played the central role in the emergence of kinship organization. The early establishment of stable and secure family and kinship systems is an essential prerequisite for population growth. The discussion can, however, usefully commence with a brief consideration of the distinctive character of human sexual behaviour.

Animal sexual activity changes with the passage to the human level. The loss of oestrus by the female is important for several reasons: it links to the prolongation of infancy but also leads to the phenomenon of sexual love. At the broadest level *the coming of characteristically-human, cooperative behaviour refashions sex, giving rise to a range of options*. This impacts upon both the character of individual sexual acts and of continuing sexual relationships.

There is impact on sexual activity because the actions of either party may (paradoxically!) be 'desire-independent' in the sense used earlier. Because of this, the two parties can, for instance, cooperate in trying to produce near simultaneous orgasms or, alternatively, to produce a climax in one. Despite the predominantly expressive

character of sex there can be instrumental orientation. For instance, given appropriate understanding, a couple can cooperate to maximize the likelihood of conception or to minimize it – as is illustrated by the use of the rhythm method. Kissing another person may be the spontaneous expression of emotion at a moment, or – slightly different – one may kiss another because it is understood to be an expression of love. In a related way it seems that, despite the predominant character of sex being expressive flow, it is next to impossible to engage in that activity with another person without at some point at least orienting to the body of the other person, or to one's own, as an object or a means. (Sexual behaviour as play is considered on p. 255.) Plainly there may also be variation in respect of what it is felt 'right' to do in the context of sex. That there is a 'range of options' is dramatized for us by the fact that within the ethos of the post-war consumer society more conventional ideas have given way to the notion that choice may be made from something resembling a 'menu' of practices including, for instance, sado-masochism.

Some of these points bear upon the variable character of on-going sexual relationships or relationships where sex is at least an element. The fact that there is cooperation giving rise to a range of options means that the parties may shape their relationship so as to achieve other non-sexual objectives; there can be integration of significant life activities. Given foresight, people can embark upon a longer-term sexual relationship partly or even wholly for non-sexual reasons. Sexual relations may then constitute a basis or ingredient - perhaps a motivational thrust - towards the creation of what may be thought of as other kinds of ties, including notably the economic. In this connection - in a way with which

are familiar - the family (or couple) may be an economic unit of production and/or consumption. Behaviour in prehistory is inevitably shrouded in a certain mystery, but Scarre nevertheless feels able to make some helpful and suggestive remarks regarding the emergence of this type of pattern: 'H[omo] ergaster was the first hominin species whose anatomy and behavior fully justify the label human…H. ergaster was the first hominin species to resemble historic hunter-gatherers not only in a fully territorial lifestyle, but also in a social organization that featured economic cooperation between males and females and perhaps between semipermanent male-female units.' (Scarre, 2005a, p.12) On a related point regarding pre-literate societies, it is to be expected that patterns of behaviour will change once some insight into the link between penetrative sex and child-bearing arises. Population control in a tribal society is illustrated in Chapter 6.

Given that there are sources of power both internal and external to sexual contact, equality between the parties in this regard is rarely achieved. We are familiar with the way in which differences in respect of such matters as sexual experience, age, looks, wealth, and status, as well as the outlook of 'significant others' such as parents have a bearing upon who comes together. For our purposes here what is most striking is the extreme variability and flexibility exhibited in the relation between sex and power. For instance, no doubt it has tended to be the case that in patriarchal systems sexual activity focused on satisfying men; but there is also the pattern whereby young men may 'service' the sexual needs of moneyed or higher status women. The fact that two (or more) people can cooperate in the production of a climax in one plainly gives rise to the phenomenon whereby sex may be traded as in prostitution. Beyond this, particularly with the

assistance of various technologies, all manner of other patterns of behaviour may be built up with sexual interest as an underlying factor. For instance, through the media vast numbers may 'share in' the sight of a beautiful person. In a way paralleling the usage of the previous chapter, one may speak of change and development in the 'forces and relations of production' of sexual stimulation: the rapidity of change in this respect in the last century is evident.

Kinship organization

Attention next turns to the task of explaining the role of cooperation in the emergence of kinship systems. The existence of patterned behaviour among close blood relatives is to be expected from the perspective of the theory of the selfish gene in its application to animals. Dawkins (2006. p.297) has explained, for instance, how this gives rise to the hypothesis that, 'in a society with a high degree of marital infidelity, maternal uncles should be more altruistic than "fathers", since they have more grounds for confidence in their relatedness to the child', an hypothesis which has been tested with favourable results. However, it is plain that kinship and marriage as such are not illuminated in any fully rounded sense by the selfish gene theory as it has been applied to animals and it therefore becomes pertinent to inquire how human cooperation may have led to the emergence of such systems. The view taken here is that a focus on cooperation enables one to bridge the evident gap between the perspective of zoologists and the social scientific work on the social recognition of blood ties. Particularly valuable in this connection are such detailed accounts of the workings of human systems of kinship and

marriage as that provided by Fox (1967). Of course, the transition from the animal to the human level must be understood to be 'seamless'.

Following the genetic change under consideration, all the relationships between close blood-relatives become cooperative in their general character, including the most basic one of all that between mother and infant. That relationship becomes cooperative in the same sense as other relationships, but, of course, from its birth it is usually the mother who introduces the child to cooperative behaviour. The relationship with the young child is most definitely a power relationship but also patterned by the mother's tendency to behave in relatively selfless ways. Rather rarely is the pattern one of coerced cooperation, but instead she dominates the child in a physical sense (including transporting it) and by shaping the context of its behaviour.

Following Fox (1967) attention may next usefully be given to some basic points. The attachment of the mother to her own (young) child is centrally important in the human situation and, since she may have more than one, so is the sibling bond between her children which tends necessarily to arise because they are co-present with her (in actuality the children could conceivably be half-brothers and -sisters). Of course, both male and female are needed to create a child but there is a basic lack of symmetry between the situation of women and men which goes deep into the character of kinship systems. For one thing she knows which children have come out of her body but he for his part does not know this for sure even where there is some grasp of the link between sex and subsequent child-bearing; certainly he may easily not be similarly attached to his

'own' young child. However, the basic unit of mother and young children is vulnerable for she is in need of a man or men who can supply her and her children's needs e.g. for food and protection. A central reality is that she needs a man or men on whom she can 'rely'. Now this need could conceivably be supplied by the man (or men) with whom she has ongoing sexual attachment, or conceivably her (now adult) male siblings with whom she has an existing relationship could play a part. Either way this contributes to the pattern whereby the cooperating relation between man and woman may have the form of a power relation. Where men are, in addition, cooperating in gaining access to food this would contribute to the broader pattern of them tending to dominate more broadly or, as one might say, 'politically'.

Given the existence of possible alternatives, an operative kinship system amounts to a way of answering various questions: who is responsible for this woman and her children? Who is allowed to have sex with whom (and when)? Is there recognition of perhaps exclusive long-term attachments between particular men and women with their associated obligations (as is the case with marriage)? Following marriage where do people reside? More generally, who shares a home-base? When someone dies who has control of significant property, who subsequently has control of it (the issue of succession)? Following genetic change of the type described, where the human population locally is relatively tiny the need (implicitly) to answer these questions in any wider sense might not be particularly pressing, but as the population locally grows the position would change. This is because there could be all-manner of disputes without clear resolution. Cooperation and failed attempts to cooperate give rise to shared

understandings which inform future action. For instance, someone may be felt to be cooperative who accepts responsibility for what others see as *his* (or his wife's) children. It could be the case that certain patterns of behaviour would tend to become recognized as problematical while others are felt to be relatively unproblematic. Overtime those leading to less conflict would acquire normative weight, would become institutionalized. Hence those groups would tend to flourish – there would be less internal conflict - where they tend to have (implicitly) a relatively integrated set of answers to the above questions. The general point is that the emergence of rules helps generate orderly systems of co-action; there emerges an extended cooperative framework. (In a rather different context the links between cooperation, coordination and co-action are reviewed in Appendix 2.)

Importantly, it does not follow that every successful group will come up with the same set of (implicit) answers. Importantly, this is another instance where in accounting for a developing tendency, one is also explaining a source of cultural variations. In fact, the number of possible variations in answering the above set of questions is quite great (Fox, 1970, p.39), but the point is that for a population of any size answers need (implicitly) to be provided. There is the broad contrast in pre-literate societies between matrilineal and patrilineal systems, the latter reckoned by Fox to be 'neater' (1970, p.114). This seems to have arisen from groups which have, on the one hand, in effect put greater weight on the different functions men and women perform in procreation, or, on the other, those groups (the larger number) who have implicitly put weight on the greater male participation in the mode of production i.e. emphasized the male 'bread-winning' role .

Given that at an early stage the human population was thinly and highly dispersed it is germane to point out that the same types of issues would have arisen for many relatively isolated small groups at differing times. Differences in their precise circumstances might tend to push arrangements in one direction rather than another. What is being asserted is that where a group tended to converge upon increasingly normatively regulated patterns of behaviour which implied a reasonably clear and integrated set of answers was being given to the above questions, this would diminish the level of conflict; correlatively a failure to do so might lead to conflict and increased mortality. Hence the former type of group would tend to survive and flourish as against the other.

In this context the institution of marriage primarily has to do with the social position and, in a sense, welfare of offspring. Marriage may be thought of as a union of a man and a woman which is such that the children born to the woman are the recognized legitimate offspring of both partners. The conferring of this status on the offspring is material in connection, with, for instance, inheritance and succession. Marriage must also be thought of as a relationship between two groups. Again, it is apparent that there are institutional options. For instance, marriage may be monogamous or polygamous; if polygamous, it may be polygynous (one husband, two or more wives) or polyandrous (one wife, two or more husbands), the latter being very rare. There is an association between the existence of polygyny and a tendency for women to outnumber men. The emergence of these institutional arrangements is at the heart of social order.

Of considerable significance too are rules of endogamy and exogamy and patterns suggestive of the idea that marriage may be seen as involving a patterned exchange between separate groups of men; the associated types of rules are widespread but vary in their detail. An important effect of exogamy is that groups which might be separate and therefore potentially hostile are brought into relations of interdependence; there is also a sense in which groups are cross-fertilizing one another. Hence, there is an expanding framework of affinal and kinship links whereby the society is being both renewed and integrated. (Beattie, 1993, p.122) Again, an emergent pattern may be judged to diminish the likelihood of conflict between potentially hostile groups. The societies in which these types of arrangements crystallize would have relative advantages.

At this stage it may be worthwhile interjecting a point regarding the content of morality. A section of Chapter 2 deals generally with that topic and the view taken that morality develops out of the normative element inhering in cooperation and cooperative relationships. In that discussion no particular mention was made of sex, although it is a familiar fact that it often figures prominently within the content of morality. Having examined the impact of cooperation on the emerging nature of kinship (involving the elaboration of rules) one is in a better position to draw out a recurrent theme, of particular pertinence to patrilineal systems.

As already noted, consistent with the theory of the selfish gene at the purely animal level, adults naturally tend to feel attachment to their own young children rather than those of random others, but for men as opposed to women there can be genuine doubt regarding

which is their own issue. Where a man takes substantive responsibility for - and is expected to have responsibility for - a growing child understood to be biologically his, it will be recognized to be in his interests that he is not deceived in this respect. Hence within the wider cooperative framework (within which men dominate politically) it will be felt important that the female partners of men potentially in this position should not 'cheat', the primary responsibility being upon them because the potential problem is realized when they give birth to children. Given the time interval between sex and subsequent childbirth, assurance that a woman is a virgin at marriage would also contribute to her husband's security in this respect. As is familiar, there may also be a secondary pattern whereby, among men particularly, it may nevertheless be felt to be in a man's interests – at any rate he then becomes a recipient of sneaking regard - to have sex with a woman in circumstances where others would be responsible for any consequential childbirth.

Although kinship rules and expectations most obviously are concerned with the regulation of relations between blood-relatives, it is particularly important to realize that they bear just as heavily on relations between non-relatives. This is the case, for instance, where a man is effectively 'warned off' another man's wife, or where he is obliged to respect another (unrelated) man's claim on property acquired through inheritance. In addition, the influence of kinship ramifies through the extended network in this kind of way: where person A has a close kinship connection to, and hence interest in, person B, while B has such an interest in person C, then A may well need to take account of C and vice versa; these links reach out for some distance even though they become attenuated.

It is the very fact that kinship is so multi-faceted in its implications that contributes to it being so predominant an institution in pre-literate societies. In a related way it is easy to underrate its relative importance in a modern capitalist society. Consider, for instance, the fact that during one's lifetime one is required to respect not just the ownership of the private real estate in the country at a given time, but also the continual transfers of ownership which are occurring governed by the laws of succession. In passing, one may note that this (arguably, highly unfair) pattern is as integral to the functioning of modern capitalism as is the competition between individuals and firms, but it is the putative value of the latter which is always being advanced in ideological justifications of the system.

Be that as it may; on a final general point, from the perspective developed here, there is no naturally given affective tie between non-relatives, hence there is a distinct possibility of conflict arising between them. However, where cooperation occurs which draws together both kin and those who are not kin, a key point of interest concerns how these may inter-affect one another. In fact, tension arises because relationships between kin are particularistic and ascriptive i.e. they are 'given' and therefore hardly optional, while there is a tendency even from the outset for those between non-kin to take on something of an achievement-oriented character, involving greater exercise of choice. As one would expect cooperation between non-kin is likely to be, to a greater degree, centered on performance. People may become specially attached – as friends – but this tends to follow cooperation or arise out of it rather than to precede it. The tension between the two types of bases for cooperation is evident in every type of society.

Economic life and social differentiation

Attention next turns from kinship and marriage to a further centrally important aspect of human life, economic and property relations. Of course it is the case that these two aspects connect up, that people relate to kin while gaining access to the necessities of life; indeed they would be expected to favour kin while doing so. However, it also follows from the foregoing discussion that advantages would flow to those cooperating effectively not just with kin but also with non-kin. In what follows it must be continually borne in mind that in the early circumstances of mankind there would be lots of small groups to a considerable degree acting independently but also occasionally or more systematically coming into contact and potentially interfering with each other; hostilities would never be that far away. Hence those groups who cooperate most effectively will be that much more likely to survive and flourish; the cooperation could be in economically significant activity itself or it could be in the furtherance of hostile activity. It is also significant that, in respect of the latter, numbers of combatants affect outcomes.

Economic and property relations concern how people extract the physical necessities of life from the environment, and how they distribute the goods produced. Regarding the former aspect, the first and, in a sense, most basic method involves directly extracting what is required from the environment; this is done by means of hunting and gathering and sometimes fishing. On the evidence we have from anthropological studies, the effective social unit often takes the form of a small group of a few dozen who live in relative isolation from other similar groups which may together make up the society. Such groups are often on the move since the resources of one area become used up

prompting the move to a fresh area. (The way in which human activity is shaped by the need to 'repeat the dose' is considered in Chapter 3.) These types of groups possess few material goods which are easily portable. All the emphasis is placed on the solidarity of the group: interdependence is maximised with each individual being dependent upon the cooperation of the others.

Many on hearing about this method are struck by evident continuity from the purely animal level. However, the methods employed – for instance, in respect of hunting or fishing – would represent considerable technical advances associated with enhanced human understanding. This is plainly the case for hunting with bow and arrow and fishing with the assistance of any tool or constructed device. The growth in human understanding flowing from human cooperation is the subject of much of Chapter 2. Taking full account of the cooperation involved in the development of the methods employed together with that involved in their use, it is evident that the methods arise from human cooperation and are sustained by it; indeed they represent an intensification of it.

A second pattern arises from animal domestication. It then becomes possible to sustain life on the produce of flocks and herds. Societies are found which are virtually wholly dependent upon their herds while others have a mixed pastoral and agricultural economy. Those belonging to the former type are generally nomadic peoples or they may practice transhumance. Pastoral people tend to be independent and resentful of authority. They

are often also adapted to raiding and warfare; it being the case that property in the form of livestock is easily stolen and moved.

A third pattern, agriculture, makes possible a more settled way of life. This may be of the 'slash and burn' type, which nevertheless allows relatively long residence in a particular area. There develop in association differing systems of land-holding. Typically, the land is not regarded as the property of individuals, but is vested in social groups, such as extended families, lineages or tribes. As is fully discussed in Chapter 7, agriculture makes possible a greater population density and the establishment of wider-scale political units.

Given this brief review what needs to be pointed up is the contribution of cooperation in giving rise to these patterns and in sustaining them. No doubt there are variations in the range and scale of cooperation among hunter-gatherers but cooperation is at the heart of economic life. Domestic cooperation in food preparation and the rearing of children is ubiquitous. In the frequently arduous conditions of simpler societies economic cooperation is a foundation for social life generally. Proceeding further, anthropologists have made a number of distinctions in characterising the means of production. For instance, Malinowski contrasts communal labour and organized labour: in the former, the same kinds of tasks are performed by several people in association (as in berry-picking); in the latter, several socially and economically distinct but related tasks are performed by separate individuals or groups (as in dwelling-construction). (Beattie,

1993, p.188) Without amounting to it, the latter pattern is perhaps pointing towards the emergence of a sustained division of labour.

Turning next to the issue of how goods are consumed and exchanged, it is of the essence that people are living at or near the subsistence level. This means that people who produce the goods consume most of them themselves. However, this is a deceptive way of putting it because hunters, for instance, are putting food into the mouths of others besides themselves. It is also the case that they are not simply eating but consuming in ways patterned by values, such as feasting or occasionally marking the importance of certain social occasions, such as births or rites of initiation. The latter phenomenon has to do with sustaining a pattern of orderly cooperation across generations and through extended time.

Exchange as such is especially characteristic of situations where there is some form of specialization; where communities produce different kinds of commodities they can cooperatively come together to exchange surpluses to their mutual benefit. Significantly, however, the patterns of exchange are of more than narrowly-conceived economic significance, and take in social aspects; but since people value aspects beyond the narrowly economic this need not be surprising. Particularly important is a pattern whereby the presentation of a gift to a potential enemy can be fruitful because it creates an obligation. Well-known examples concerning the extra-economic significance of seemingly economic activities studied by social anthropologists are the *kula* of the Western Pacific and the *potlatch* of the American Indians of the North-West coast.

Among other things participation in the *kula* is an indication of social status; a further point is that the possession of a *kula* partner in a different region provides protection from dangers from human and spirit inhabitants. *Potlatch* has to do with claims to status and their public acknowledgement. (Beattie, 1993, pp.197-9) These patterns tend to diminish conflict.

At this point it is valuable to link cooperation to the bases of differentiation likely to be found within an early society. In this connection one may distinguish organization into groups, that is people with common interests and leadership, and classification into categories, which is people viewed as having something in common. One would expect the lineages considered in the last section to be basic groups in society.

Also linking in with that discussion, one would expect differentiation by sex or gender to be the most elementary social classification. Plainly this has to do with the fact that women bear and suckle the children, which tends to tie them in to the domestic scene. Where the economy is one of subsistence production it is not uncommon for a large share of agricultural work to fall on them. Meanwhile men's tasks tend to be those calling for greater strength and agility and which take them away from the home-base, such as hunting, sea-fishing and warfare. As already indicated they also tend to exercise political authority, to which may be added the performance by some men of important religiously-defined ritual roles.

Basic too is differentiation by age. Plainly there are children so young they cannot perform adult tasks, and older people who lack the strength for them. However, in a relatively unchanging social setting importance attaches to seniority and the idea that wisdom increases through life. Aging in the strict sense necessarily occurs continuously, but there are significant markers such as those indicative of the onset of puberty. Taking this into account recognition of adulthood typically involves passage through a ritual of initiation the main effect being that it qualifies people to marry. Arising out of this there are sometimes age-sets formed by those initiated in a given period and a connected pattern whereby these sets pass through age-grades, a grade being a stage reached in the life-course. Tasks may be allocated accordingly: for instance, younger men being required to take on those requiring physical strength such as fighting, while the older engage in those requiring 'wisdom' such as the arbitration of disputes.

Differentiation by age is one way of ranking people. However, there are other recurrent bases of ranking, stratification and hierarchy. Linking in with what has been said about kinship, it is sometimes the case that rank is ascribed on the basis of descent: persons belonging to certain such lines are accorded greater respect than others or receive privileges. In respect of hierarchy and stratification more generally a very important factor concerns protection or the outcome of warfare. For instance, there can be situations following the establishment of independent chiefdoms where outsiders become subjects because they have been conquered or are offered allegiance in return for protection. There can also be a division of a society into full citizens and those with limited freedom. In European history there has been the important distinction between

free men and others who are slaves or serfs, the slave being an item of property while the serf is not. (Mair, 1970, p.55)

Neighbouring relations

In this section there follow some very general observations on a type of human relation which is on its face very different from kinship or economic relations but is almost equally basic. The proposition being considered in this study is that cooperation – involving blood relatives and non-relatives, kin and non-kin – tends to give rise to population growth. Since space is finite, population growth would itself tend increasingly to give rise to circumstances where non-relatives would be brought into close proximity i.e. circumstances where they would be more likely to inter-affect or interfere with each other (if only by accident). However, since there is no naturally given affection between non-relatives, conflict could easily arise with all its attendant risks to life and limb. The implication is that for population growth to be sustained some other process must come into play enabling those in close proximity more readily to co-exist: neighbours must be able generally to 'get on'. It is worth noting that the issue can arise at several levels e.g. between neighbouring householders or those sitting at adjacent tables, but also (say) between differing nations such as the U.K. and France. How these situations are handled is thus basic to the human situation; the comments here seek to grasp that generality.

Let it be said straightaway that a possible response to the presence of potentially interfering, close neighbours is hostility leading to an attempt to drive them out or even

kill them, but of course that would involve risk to oneself. However, the potentiality to cooperate with them is there. What can be said is that those people who find they are able to sustain cooperative relations with neighbours will tend to survive and flourish rather more than those for whom this is not possible i.e. the local populations of the former types of people will tend more readily to grow.

It is significant that the term 'neighbours' is most often used in respect of equals or near-equals. A major way that the relation becomes important is that there can be chance or unanticipated occurrences where people can benefit from help: obvious examples would include observing that one's neighbour's house was on fire or about to be burgled; a more minor item might be having regard to the safety of a neighbour's pet which has climbed a tree. Again, poor people especially can find themselves short of something like a food-stuff which they could usefully borrow. So one can benefit from help, but this must be reciprocated for the relation to persist and flourish; that is what is involved in a cooperative relation. As stressed already cooperation involves a normative element implying that one may act in ways which are 'desire-independent'. Thus when a neighbour requests help one may well immediately feel irritated, but nevertheless respond positively because one feels one 'ought to'. Given that these types of situation are recurrent among people at large, as with other contexts of cooperation, there emerge norms regarding what may reasonably be asked of a neighbour; which implies that there are also breaking points. In particular it is important that neighbours understand that they must not encroach uninvited onto a neighbour's territory, hence the saying, 'good fences make good neighbours'.

In Chapter 1 it is made clear that cooperation is so defined as to include instances where the element of coercion is involved, so that phenomenon must be situated here. Plainly there is the possibility of someone trying, and indeed succeeding, in coercing someone proximate to them. However, it is important to assert that typically people cannot and do not conduct all their relations in that way. Consider for instance patterns of behaviour in slave-owning societies. Further to the observation that neighbouring is between near-equals, the neighbour of (say) a slave-owner will not be understood to be a slave but rather another – proximate - slave-owner. These two slave-owners could well have amicable neighbourly relations in no way diminished – in fact even enhanced - by their dependence on slavery. Indeed one centrally important way in which they are likely to help each other is by keeping an eye out for, and apprehending, each other's runaway slaves.

Not dissimilar patterns are evident in neighbouring relations even where nation states are involved. Take the case of the U.K. and France. The two populations with their differing languages and traditions are widely recognized not always to get on that well: affection between the British and French is not always foregrounded e.g. in the popular press. However, each state can benefit from the assistance of the other. When there is peak demand the British are quite prepared to receive electrical power into their National Grid by cable under the English Channel. The two states can usefully cooperate – and do – in apprehending fugitive criminals. The issue also arises regarding what is 'too much' to ask of a neighbour. Thus relations between the U.K. and France have at times become

fraught on the topic of whether the French are doing enough to stop illegal immigration into Britain.

The social and cultural world

Given the advent of cooperation there is multi-faceted qualitative change in the character of life. As noted values, norms and interests come to be defined within a developing cultural context. Crucially, people become dependent both on relatives but also on some with whom they have no close blood ties. They are vulnerable both in their relation with the immediate human and non-human environment. In relatively stable circumstances it is often possible to identify something resembling 'local communities' within which the whole round of life may be led. People can be said to have 'vested interests' in particular sets of arrangements. What implications are this likely to have for their relations with wider humanity? This way of setting the question up rather invites the answer 'they will be defensive'. Perhaps the truth is that they will tend to combine a defensive with a potentially exploitative outlook.

It will generally be the case that resemblances are set up locally such that most people will operate with some idea of 'our kind of people'. The origins of this are twofold. Where blood ties exist there will be discernible resemblances; to this are added all manner of culturally rooted patterns. In respect of the latter language is particularly strategic: no one is particularly keen on being dependent upon someone with whom they do not share language, which is not to say that they will not enter such relations where the inducements are sufficient. Importantly, too, with regard to the structure of norms and

values – in which there is ‘moral investment’ - there will be suspicion of those who clearly depart from understood local practices; for one thing, there may be an expectation of reciprocation which is not forthcoming. Religious differences promise to be extremely thorny since religion is concerned with highly strategic ideas which legitimise many courses of action. A consequence is that people are likely to be suspicious and potentially hostile toward those outside their particular cultural ‘bubble’. (see Pagel, 2012, Chapter 2) However, considering the whole generality of situations, there is considerable scope for variation in the numbers of people found within these kinds of cultural groups. Again, there is no reason *a priori* to believe, regardless of context, that the behaviour of a selected individual is to be understood simply by reference to a single cultural ‘bubble’; much more complex patterns are evident within modern western societies.

In these circumstances ideas are likely to develop regarding the differences between ‘our kind of people’ and others; or between ‘insiders’ and ‘outsiders’. Also, use is likely to be made of ethnic markers (including sometimes racial differences) to firm up the labelling of the categories; in the corresponding understandings there is every reason to expect confounding of natural and cultural differences. The fact that there is much more communication (including gossip) internal to a community rather than between communities lends itself to the formation of stereotypes i.e. expectations which are unreasonably rigid. Where people are felt to be different there will be a tendency not to extend to them, or at any rate not to the same degree, the expressions of concern for others and even altruism which we have argued arise within a cooperative context; at least, they may be put ‘on probation’ – they have something ‘to prove’. However,

returning to basics, it remains the case that there are gains to be had from cooperation between insiders and outsiders but problems may be encountered on the way to their realization.

Where it is evident that there is a difference of power between those in two proximate local cultural 'bubbles' and there is interference or conflict over scarce resources, early resort to the use of force by the more powerful is plainly more than possible since the 'costs' of so doing may be slight. A group may be driven out or there may result a system of forced cooperation as with slavery or the paying of tribute. A more benign development from contact would be trade or some other system of regularized exchange (such as kula or potlatch referred to above). There can be patterns where generosity may have the consequence of tying the other party into a system of obligation, or that seeming generosity conveys the meaning that a group is not to be meddled with because it has access to considerable resources.

Given reference to 'cultural bubbles' and the related notions of 'insiders' and 'outsiders', it is important finally to note a change in the character of cooperation once numbers become at all large: plainly there is an identifiable contrast between the functioning of very small and large communities. Whereas in a small community of fewer than (say) 150 people an understanding of the whole may arise out of personal knowledge of the others involved, this cannot be the case where the population is numbered in many thousands or even – as with most nation states - millions. Nevertheless, in the latter case, people clearly act in ways informed by their understanding of the whole. For instance,

they respond to symbols (such as flags) and representative groups (including national football teams).

Particularly to understand the phenomenon of nationalism, Anderson (1991) introduced the notion of 'imagined communities', but others have widened its application beyond simply national groups. The idea here is that members of the large group may hold in mind a mental image which underpins their identification with it. In a related way Anderson draws attention to the contribution of print to the functioning of early national communities, and no doubt the mass media are very important today – in providing a stock of appropriate images. Thus in drawing attention to the importance and sources of an imaginative element inhering in action arising within and sustaining large groups, Anderson's contribution is particularly valuable. However, in situating it in relation to this study one must return to the point that (even) a national group is to be understood as an entity arising out of human cooperation and sustained by it. The content of someone's imagination is not in itself behaviour, rather it inheres in or in some sense informs their behaviour; again – as one is reminded by mention of the mass media – cooperative or collective behaviour may be – indeed typically is - informed, in effect, by shared imaginative elements. Virtually all action could be said to be shaped or informed by imaginative elements of some kind – including, no doubt, action expressing identification with small groups. In Appendix 2 cooperation, co-action and coordination are distinguished and there is discussion of how the on-going reality of large groups such as nation states is sustained.

Summarizing conclusion

In this chapter the concern has been with how elements of the social fabric are built up and acquire stability. Given our animal nature, plainly sexual bonds and relations between blood relatives represent a vital starting point but both are changed with the coming of characteristically-human cooperation. Regarding sex the key point is that there arises a range of options, which means that the potential for sex to be an ingredient of differing types of cooperative relationship (no doubt characterized by differing patterns in power relations) and, in particular, its ability to be economically significant, increases; the 'umbra' of sexual intercourse potentially has a substantial 'penumbra'. Sex can be transitory and disruptive but more often it is (at least for extended periods) stabilizing in its implications.

Absolutely vital is the way in which cooperation, on the basis of on-going ties between blood relatives, gives rise to kinship meaning the social recognition of blood ties; but it is abundantly apparent that, at the same time, this is the source of a variety of kinship systems i.e. an important source of cultural variation. In this context marriage comes to define the position of off-spring, bearing, for instance, on inheritance and succession. An expanding framework of affinal and kinship links both renews and integrates society. This is the primary system of co-action and coordination.

Economic and property relations are as basic as kinship and marriage. In respect of the former, cooperation may be judged to give rise to, and sustain, distinctive modes of

production. Importantly, patterns of exchange may often be of more than narrowly-conceived economic significance. Kinship and economic considerations bear heavily on the bases of differentiation found in early societies: sex or gender; age-grading; ranking and stratification. An important source of stratification is a need for protection or the outcome of warfare. Further and more extended consideration is given to modes of production in the review of developments in prehistory and history of Chapter 7.

Although it may not seem immediately apparent the neighbouring relation is also basic in the human situation; as the population grows, it acquires greater importance and it operates at differing levels (e.g. that of individuals, communities and of nation states). Neighbouring tends towards being a relation of equals (implying reciprocity) but it can even have a bearing upon the stability of situations involving coerced cooperation, such as slavery. Consideration has also been given to the character of local communities and, in particular, to patterns in the outlook on 'insiders' and 'outsiders'. Patterns change as numbers rise but – notwithstanding the value of the idea of an 'imagined community' - larger as well as smaller groups arise out of cooperation and continue to depend upon it. In this chapter some important sources of stabilizing regulation have been identified, an essential condition for sustained population growth.

Chapter 5: Religion

Nature and origin

Cooperative activity may express or concern speculative thought just as it may be directed at more immediately practical concerns; indeed, the two may be found in combination. Certainly, speculative thought is typically highly strategic within culture generally. The position may be briefly clarified by situating religion. Although reference has been made to early man achieving full conceptualization of the external world, this is in no way to imply that the outlook at that stage could possibly have been a kind of simplified version of a modern, secularized or humanistic one. As anthropological studies amply illustrate, religion and magic tend to permeate social life in pre-literate societies. Magic is limited in its scope while religion possesses various aspects or dimensions: the practical and ritual, the experiential and emotional, the narrative or mythic, the ethical and legal, and the material. (Smart, 1993, pp.12-23) Despite there being an elaborate narrative or mythic *dramatis personae* – for instance, of gods and angels - the only facticities which one 'comes up against' or can rely on are people acting in religious ways, or buildings, works of art, and other material creations. Religion is strongly integrated and highly strategic in the social, including cooperative, life of a society through its role in legitimating the widest range of action.

It is important to stress that a religion is built up cooperatively over many generations and there may be said to be a religious tradition. Although the approach is partial it has proved possible to utilize the notion of a belief *system* in respect of religion, given that various elements interconnect in complex ways. There is a certain 'freedom of action' in

the cooperative elaboration of the ideas overtime flowing from the fact that the constraints in terms of the facticities are indeed relatively limited. Religion may be said to meet human needs but in no sense is it a straightforward manifestation of them; people experience it as meaningful as a result of acculturation (plainly, often from early childhood). Correlatively, it is often the case that those adults encountering a religion for the first time experience the whole, or at least some elements of it, as bizarre (consider, for instance, the doctrine of the Trinity within Christianity or the idea of original sin). Complexity flows also from the point that it is simultaneously making several differing types of contributions to the life of the society.

In Chapter 1 some brief points are made by way of explanation of religion and the intention is somewhat to extend the account here. (Stark, 1990) There the nature of early human conceptualization is considered and judged to have two primary strands: one consisting of concepts – such as purposes and reasons - relating to the understanding of human behaviour utilizing theory of mind; the other consisting of concepts which do not involve implicit reference to theory of mind. Associated with this, were two differing kinds of explanation, one involving purposive (or personal) causation, the other non-purposive (or non-personal) causation. The further suggestion was made that in the early circumstances of mankind, religion (and magic) arose because the strand involving reasons and purposes is being applied in contexts where we would expect to use the other type of explanation. A further suggestion was that, since human powers are so slight relative to the power of natural phenomena on which they depend, there is a motive and

tendency for them to seek to ‘come to grips’ with the natural world using concepts associated with the purposive explanation and understanding of human behaviour.

The notion is that early humans would be unable to distinguish sources and types of power in the way with which we are familiar; there would be awareness of purposive agency but what would be unclear would be the nature and limits of agency. In this connection it is revealing that we have come to use the term ‘power’ both in the physical sciences and in human affairs while being fully aware of the underlying conceptual differences. In science power is defined as the ability to do work in the mechanical sense and could be used for instance in respect of a machine or a hydro-electric plant. In respect of human affairs it refers to the ability of one agent to get one or more other agents to comply with their wishes or instructions. There is also a usage where one refers to a human being’s ‘powers’ meaning their potentialities in terms of action; this rather bridges the two contexts since we understand a human being as able to do work in the mechanical sense as well as being able to influence others. We fully recognize that it might make sense for a subordinate to ask a favour or plead with someone exercising power, while recognising that this would be pointless in relation to an inanimate power source. The very fact that in modern languages this single term has crystallized out into these two differing meanings and contexts bears witness to the fact that they were scrambled at earlier times. The same goes for the two differing meanings of ‘law’, the one – descriptive - concerning generalizations about the external world and the other – normative - concerned with how humans should conduct their affairs; the two contexts

would have been conceptually merged, or at least much less sharply distinguished, in the remote past.

As regards power the position of early man may be put in these terms. There would be general awareness that humans have the ability to produce desired outcomes. This may be done directly by individuals (by their exercise of their powers) but it can also be done for instance by way of instruction to another party; it may also be done using animal power as when draught animals are employed. In that respect there is awareness of intelligent or purposive agency but what would be unclear would be its scope and limits. The point is that a desired outcome may be forthcoming in contexts where, though it may be clear to a modern observer that no such agency is involved, that would not be the case for participants. Although familiarity with human action itself is the source of the idea of agency, a priori there is no reason to believe that agency is lacking from (say) a waterfall or cloud; after all each of these may generate desired outcomes. In addition, it may be altogether unclear what the scope of the power of humans or groups of humans is or was (recall the story of King Canute). Humans encountering a structure such as Stonehenge for the first time might easily have been led to believe it to be a superhuman product. (Potentially, there is lack of clarity regarding the source or location of collective agency.) In an instance of witchcraft directed by one person towards another a priori neither party can be sure of its efficacy or its inefficacy (although in actual practice usage is typically under-pinned by tradition). Agency could indeed be felt to inhere in any particular object or in the world at large. Indeed since so many desirable or undesirable outcomes in life – both major and minor - are properly understood by us to occur ‘by chance’ (a more

sophisticated idea than may initially appear; probability and statistics as a science seriously progressed only in the twentieth century), there is abundant scope for agency to be felt by early man to inhere in the world at large.

Long-term in the human story beliefs concerning powerful external agency to which we humans are subject inform cooperative – extending into collective - action. That action may take many forms but tends to incorporate a repetitive, stereotypical elaboration of types of behaviour which are experienced as meaningful in relation to actual human agency e.g. something is asked; something is given; people prostrate themselves; there is an effort to placate: in sum, there is a tendency towards anthropocentrism. Importantly, the publicly-observable, repetitive, collective behaviour is self-validating in the sense that aspects of it may themselves be taken as manifestations of external agency. The orientation to the wider world would not be of the purely neutral or utilitarian type which we tend to adopt.

In sum, one would say that in the early circumstances of mankind, although they possessed spoken language, they had very limited linguistic and conceptual resources and resources of knowledge. There would have been no readily available route to understanding the sharp distinction between purposive and non-purposive agency which is basic for us. An additional way of putting it is to say that they lacked secure access to the distinction between personal and non-personal causation. (An intermediate type of explanation is teleological in its character as when the Ancient Greeks forwarded the suggestive idea that water ‘seeks out’ the lowest point.) Hence the strong

anthropomorphising tendency: the entities believed to exist to varying degrees partake of the qualities of human agents; they can, for instance, be wrathful. Smart (1992, pp.299-300) summarises the character of traditional African religion in these terms: 'gods and spirits, those unseen forces which explain and affect human life, are thought of and related to in human terms'. There is no avoiding the point that major religions exhibit the same tendency to this day: regarding Christianity, the suggestion would be that far from God having created man in his own image, man has instead created the idea of God with qualities derived from man.

In earlier times too the past would have been shrouded in great obscurity; as always the future is uncertain and gives rise to apprehension. Linking in with purposive agency there is development in a narrative or mythic dimension. Thus early Christianity provides an account of the creation; it goes on to tell us that the original humans disobeyed God and were driven from paradise; God wished to save the human race and the people of Israel were chosen as His instruments for this; Christ on earth died for human sins and made available God's grace to the faithful; at the end of time God will come with saving power. Of central importance, this narrative situates and normatively guides present behaviour: the faithful are the church community and grace comes in particular through ritual participation in Christ through the Eucharist.

Religion is highly symbolic in its character and it also seems possible that the way in which it is expressed and understood may involve confusion between the symbol and the thing symbolized. Disagreements between Protestants and Catholics regarding the

doctrine of transubstantiation point in this direction, as does the way in which people relate to icons in eastern orthodox Christianity. In respect of religion, that which is called forth by words, images, architecture, music, and ceremony can hardly be deemed not to exist.

Thus religion exists at least partly because of the attempt to understand events in the world as meaningful and in the same sort of way as one understands the behaviour of people. To see the position even more clearly it is worth going back to the basic notion of this study that humans cooperate using theory of mind. What this means is that each of us is constantly 'going beyond' the externalities of someone's behaviour to grasp intentionality, motive and related aspects. (When someone is observed to enter a bank and we say that they are withdrawing money, at that point no money is observable at all.) Given a highly personal starting point, there is generally in human life a constant tendency to 'go beyond' physical externalities to make events meaningful and provide explanation: this is a major source of religion. (So is it of science, but in that case there is use of concepts which belong to the context of non-personal {or non-purposive} causation. On a different point, the tendency being considered here may even have a bearing on the ubiquity of 'conspiracy theories' in modern life.)

In a suggestive early work Frankfort and Frankfort (1961, pp.11-13) characterize the outlook in Ancient Egypt and Mesopotamia as being of an 'I – and -Thou' type. Significantly, three elements seem to be implied here: (a) both self and world are construed in terms of agency; (b) there is felt to be an intimate relationship between

them; (c) ‘Thou’ has greater power. From the outset the orientation to the greater power in the world is bound up with ideas of legitimacy and illegitimacy. One has familiarity with how ordinary people conduct themselves in the presence of someone of high status who has the ability to affect their welfare: something of this particular outlook may have been an ever-present feature of the orientation of early peoples to the world. As part of this, to get someone of high status to act in a desired way a subordinate typically has to acknowledge or implicitly accept a context for the legitimacy of the exercise of power. Thus from the outset the orientation to the greater power in the world is bound up with ideas of legitimacy and illegitimacy (the devil, for instance, forming part of a duality). (Atran, 2002)

Frankfort and Frankfort (1961) are focusing on near-eastern peoples. Thinking more generally, there seem to arise two main alternatives in terms of orientation in respect of power. Considering matters objectively, one would say that although an individual (or local human group) evidently has some power (as well as, or incorporating, some powers), the power located elsewhere in the world is – almost literally – infinitely greater (as demonstrated by such natural phenomena as the Sun rising and setting; or, in a modern context, by our understanding of how life on Earth is dependent upon there being a continuous supply of energy from the Sun). Therefore the perspective may be that the individual (or local group) is set over and against massive power, but there is an alternative. There is also the possibility that power may be felt to inhere in the massive totality of the world but that the individual (or group) is understood to partake in it or draw from it temporarily. (The underlying logical distinction is between identifying this

as distinct from that, as against identifying this as part of that.) The former of this pair of conceptualizations seems to feed into the dualist perspective characteristic of western peoples while the latter fits more into the non-dualist (or monist) outlook found in the orient. (Wilkinson, 2003)

In this connection an indicative idea within Hinduism is that of *Dharma*, '[t]he pattern underlying the cosmos and manifest in the ethical and social laws of humankind'. (Smart, 1992, p.85) In a related way a distinction is sometimes made between 'this-worldly' occidental religions and 'other-worldly' oriental religions, but this is perhaps no more than a tendency or an approximate summation of not-always-consistent elements. However, there is a highly specific but suggestive contrast between saving souls on the one hand and loss of self on the other. In their origins, these modes of thinking and orienting are emphatically not to be considered as some kind of 'mistake', rather they are consequences of the way in which conceptualization develops. (Mithen, 1999; Wright, 2009)

It need hardly be said that, given the religious outlook, where it is felt that particular individuals or groups can release the more general or overarching power, or invoke it, or be understood to act in conjunction with it, this itself massively enhances their ability to achieve outcomes in the face of other human beings. In the modern world this is in fact one of the main ways in which religion is experienced. The non-believer does not feel that he or she has access to, nor is their life 'overlooked' by, any such non-human agency. On the other hand, believers feel themselves to be acting in harmony with and

even able to invoke massive power, generally also viewed as the source of legitimacy. Not infrequently believers feel they gain advantages or privileges against non-believers; not infrequently it is felt the 'wrath' of cosmic powers could vent itself on non-believers or those adhering to other religions. The point being made is that religion itself is a source of power (quite irrespective of putative sources of power of supernatural origin), which is an underlying reason why people in the modern world are so reluctant to give it up. (Wade, 2009)

A consideration of the origin and nature of religion is bound to refer to the human familiarity with the occurrence of death and realization of its inevitability. Importantly, it is not just the thought of one's own death which is troubling but also those of near ones and dear ones; also critical is the point that this could occur at any time. Not just this, but there is underlying fear of illness, potentially distressing in itself but which could also presage early demise. Other animals are similarly situated in an objective sense, but with the passage to the human level there is understanding of the reality, which threatens to hang like a dark cloud over life. It is not uncommon for humans implicitly to feel that they are better placed than other animals but in this respect they are not. Particularly awful is the fact that throughout time many adults have had to live with the experience of the death of children, and young children with the loss of their parents; virtually all of us greatly fear these possibilities. Added poignancy is provided by the fact that, as has been stressed, humans are to a high degree future-oriented and concerned with security; yet, ultimately, future-oriented action will be interrupted or frustrated.

There is little doubt that religious ideas and practices have taken the various forms they have as a way of coming to terms with this 'dark cloud': the objective phenomena are subsumed within a wider interpretive and speculative framework. (In a broad sense, religion mediates the relation between the living and the dead; Boyer, 2001.) Given familiarity with Christianity, it is hard not to concur with Russell (1925, pp.18-19): 'If we were not afraid of death, I do not believe that the idea of immortality would ever have arisen.' Yet this is to pluck a single idea from one religious context. It is essential to stress that religious ideas and practices take many forms, are highly integrated and perform several differing functions; but as one element they typically interpret or situate these disturbing phenomena in ways which people find meaningful, perhaps particularly in an emotional sense. This is illustrated by the notion that good people will go to heaven and the bad to hell, which makes the cosmos seem fairer, while giving expression to the desire for retribution.

The ubiquity of fear of death, together with the realization of its inevitability, is of central importance for this study, however, because of its motivational importance in spurring cooperatively-undertaken efforts to delay it and generally to reduce morbidity and mortality; it thus provides a basic link between cooperative activity and the tendency for population to grow. The full conceptualization of the external world is a cross-cultural phenomenon and it is that which gives rise to the general understanding of the reality and inevitability of physical death (despite there being marked cultural differences in, for instance, the religious meaning of death). Although the changing methods used to tackle illness and potential mortality prior to recent centuries and the understandings informing

them often seem to us slight and pretty inadequate, the ‘direction of travel’ is clear, and it is towards the massive reductions in morbidity and mortality of which we are so appreciative.

It is also the case that to understand the early religious outlook, in this and other respects, attention must be given to more subjective elements. Taking a modern perspective it is readily appreciated that experience does not consist solely of experience of the external world. For instance, one is conscious of the content of one’s own thoughts and of one’s own dreams, both of which may or may not be conveyed to others. To orient to the external world is not to grasp the whole of experience, which was as true for early human beings as it is for us. But what sense is to be made of such elements as dreams? A priori there is no way of understanding their significance or non-significance. However, since interconnections are often initially grasped through correlation some significance is likely to be attributed to them. From a modern perspective it is abundantly clear that there are meanings to be extracted from dreams, and it is not at all surprising that they have been taken, for instance, as indications or predictions.

Freud is, of course, a writer known for his interpretation of dreams but he is suggestive on another point too. In his later work (Freud, 1949 [1923]; 1955 [1920]) he proposes that the human psyche may be divided into three parts: id, ego and super-ego. The id is the completely unconscious, impulsive, portion of the psyche that operates on the ‘pleasure principle’ and is the source of basic impulses and drives; it seeks immediate gratification. On the other hand, the super-ego is the moral component of the psyche,

which has no regard to special circumstances when the morally right thing to do might not be best for a particular situation. The third element, the rational ego, is usually reflected most directly in a person's actions in which context it attempts to achieve balance between the impractical hedonism of the id and the impractical moralism of the super-ego. Particularly pertinent here is this last which is the internalization of finger-wagging parental figures: you shouldn't lie, you shouldn't steal etc; 'conscience' is a word often used for it. Now there is modern understanding of internalization but did people understand the phenomenon in that way in earlier eras? An important suggestion is that the source of the prohibitions and finger-wagging may be judged to be, or interpreted as, external e.g. God. Where God is understood as the source of the moral order and one hears one's own conscience, that experience could be viewed as communication from God. Paul's conversion on the road to Damascus can perhaps be partly understood in these terms (involving God speaking to him). Again, where one can seemingly hear the voice – or advice - of (say) a dead parent, could not that be communication from the next world? Something 'internal' may hence be 'externalised'. (No doubt, in evaluating the significance of subjective experiences for religion account must also be taken of the widespread use of hallucinogens and other mind-altering substances.)

Dreams and private thoughts are significant in an additional and somewhat different way. Importantly, they establish that physicality does not exhaust what a human being is. This has a bearing upon how death is construed. Basically, the central observational

experience of the death of another is that that person will never move again ‘under their own steam’ or never do anything in a publicly observable bodily sense; in addition, the body will generally decay. But the existence of private thoughts and dreams makes clear that one is not totally made up of bodily form and publicly observable actions: there is more. This leaves open the possibility that the subjective elements form the basis for persistence of the individual beyond death (and, conceivably also, prior-existence before birth or even conception), so the widespread existence of beliefs of this type is only to be expected. It is indeed the case that in many preliterate societies people orient towards ancestors in a religiously and socially significant way; they are highly significant in the present (where they may be invoked, for instance, to secure or challenge rights or responsibilities asserted). The modern expectation that oblivion follows death (and precedes conception) is well-grounded, for instance on evidence demonstrating the interdependence of the mental and the physical, but this fuller understanding is essentially a product of science. (Dawkins, 2006)

There are other religious topics where a modern secularized understanding will differ from that of early human beings. It has been noted that pre-literate peoples generally understand that there is a link between sexual intercourse and subsequent childbirth while interpreting it in their culturally variable ways; no doubt the underlying basis of the understanding is again correlational. But do they understand as we do that birth cannot take place without prior sexual intercourse (i.e. in the absence of recently developed technologies)? There is no reason to think they would be confident on this point. Hence the notion that a virgin birth could take place, probably as a relatively exceptional or even

special event, is one that could easily have currency. Again the general thrust of the argument is that the religious type of outlook is to be expected in the earlier circumstances of mankind. However, that outlook is being expressed in conjunction with full conceptualization of the external world; indeed, it is difficult to envisage religion existing without it.

Thus in the passage from the animal to the human level, magic and religion inevitably make an appearance. (Bloom, 2007) In a modern secular context, as indicated above, we are used to taking the contours of the external world as a neutral, factual 'given' to which we may orient instrumentally. While the orientations of early humans include instrumentality as an element, the latter is embedded within a wider religiously- and magically-shaped worldview. For us, as Max Weber indicates, there has been a 'disenchantment of the world'. Associated with this, there has been systematic change in how power is felt to be exercised. From a modern secularized perspective, the exercise of agency is now felt to be substantively confined to humans and (higher) animals. There may be a certain implicit feeling of loss or vulnerability flowing from the fact that desired outcomes cannot be achieved through, or by appeal to, other putative external agents; notions such as 'fate' and 'bad luck' bear witness to this. On the other hand, the external world from its smallest to its largest manifestations is understood to be law-governed and to a degree predictable; in addition, our powers are greatly enhanced as we generate desired outcomes utilising our understanding of the external world (including our own bodies). However, this in turn gives rise to greater individual vulnerability as against our fellow human beings, who can now, for instance, make powerful weapons and even

adversely affect the earth's climate: few developments in life are an unmitigated gain or advantage.

It may be useful briefly to situate some other recent contributions to our understanding of religion. Rather different – and seemingly with more direct links to evolutionary theory – are recently developed cognitive approaches which seek to illuminate the origins and varieties of religion. In this connection it is relevant to note that evolutionary theory has greatly expanded since Darwin's day and is judged to bear effectively upon disciplines such as anthropology and psychology. As one would expect the key idea is that one can understand how we think through understanding the human mind as a product of evolution i.e. it developed as it did to facilitate the survival of the species. (As is well-known, one can understand differences between male and female outlooks and behaviour in respect of sex in this kind of way.)

Illustration of the relevance to religion is provided by reference to Boyer's 'modularity of the mind' thesis, which hinges on the idea that the human mind consists of various 'modules' processing different types of information and giving rise to differing expectations and inferences about the world. (Boyer, 2000 and 2001) This leads on to the idea that religion is the consequence of the functioning of differing domain-specific modules: beliefs about the supernatural originate from core knowledge being misapplied from one domain to another i.e. by a kind of cognitive malfunction. These concepts 'excite' the mind and propagate readily because they have the power to generate many inferences. (Boyer, 2001, p.164) However, the anthropologist, Bloch, is unconvinced

partly on the grounds that our core knowledge is shared with other animals which, nevertheless, manifest nothing resembling religion in their behaviour. (The view taken here differs in the respect that human but not animal knowledge is based upon full conceptualisation of the external world.) Bloch reckons that religion arises out of, and gives expression to, humans' imaginative powers. (2008, p.2060) From the perspective developed here a further comment would be that Boyer focuses on cognition but religion is essentially an associational phenomenon and religious orientation is attitudinal rather than simply being of a cognitive type.

Again cognitive in its emphasis but also bearing upon issues as to how religion is expressed is Whitehouse's (2000; 2004) 'modes of religiosity' thesis. This author draws from psychological theories of memory and views forms of religious experience as deriving from specific cognitive systems. A key distinction made is that between 'semantic' memory and 'episodic' memory, the former being concerned with abstract knowledge of the world, the latter concerned with actual occurrences in a person's experience. (Whitehouse, 2000, p.113) The suggestion is that the differing forms of memory underpin different types of religious life. Whitehouse traces links between semantic memory, the relatively anonymous character of communities and relatively unemotional and doctrinally-organised forms of religion; in addition, he points to links between episodic memory, highly cohesive social ties and intense and imagistic forms of religion. Whitehouse judges that, while the modularity thesis bears upon universal features of religious thinking, his modes thesis accounts for religious variation. However, it has been suggested that there is no ready explanation for – what is frequently

observed – 'oscillations between both modes within the same traditions' (Tremlett, 2013, p.111).

Ingold's (1996; 2001) work has a different emphasis for it involves a move away from putative universal mental mechanisms back towards anthropological scrutiny of everyday life. Indeed he rejects the picture of the mind as involving fixed mental systems in favour of a developmental model. Our human capacities are attributable not so much to genetic inheritance but to what he refers to as a *development system* which is 'the entire system of relations constituted by the presence of the organism in a particular environment' (Ingold, 2001, p.261). Within 'the environment' he appears to include both the natural world and culture and relationships. Clearly in some respects complementary to that of Boyer, his approach probably recalls for some the nature/nurture controversy, but though it feeds into the study of religion within particular societies, it remains to be demonstrated how it would contribute to understanding the origins of religion or its development in the sense of systematic change over time in religious beliefs or institutions.

It seems that fully to understand the phenomenon of religion there is a need to consider both cognitive and other capacities of individuals and the nature of cooperation and cooperative frameworks. Indeed both the individual and the relational are brought to attention when consideration is given to the familiar question: do we need religion? Responses to this question are informed by approaches and contributions within social anthropology which have been characterised as 'functionalist' or 'structural-functionalist' in their character. Consideration of the so-called 'functions' of religion is helpful as long

as it is understood that it bears rather less on the issue of origins and rather more on the contribution to social integration and stability. The suggested functions of religion are sometimes for individuals and sometimes for society as a whole. For example, Malinowski (1948) says that religious ritual relieves anxiety when people are embarking upon a risky venture. On the other hand, it may be suggested that religious ritual draws people together; it integrates society. Evidence from social science suggests that societies held together by some kind of religious practice may survive more effectively or for longer. The notion here might be that among humans there is evolutionary adaptation to the use of shared rituals; they may indeed have tangible benefits. The imagining of invisible agents could play a role, for instance, in underpinning cooperative social behaviour. Religious sanctions have been prominent in systems of social control. Rather different but potentially pertinent too is Girard's theory that religion was necessary in human evolution to control the violence that can come from mimetic rivalry. (Fleming, 2004)

Of course, there are important differences in relevant respects between simpler and more complex societies. A feature of modern societies is that they contain many ethnic and religious differences. Nevertheless some would probably say that a society like the UK is partly integrated, not so much by being Christian, but from the fact that it arises from a Christian civilization. With regard to functions of religion for individuals this point arises: were it suggested religion relieves anxiety regarding (say) death it might be added that the construction of heaven, hell and Day of Judgment introduces new sources of anxiety which otherwise would not be there. Again, supposing it is agreed that religion

may be integrative and increase group identities and loyalties, then at the same time this may sharpen hostility between religious groups, as it has for extended periods in Northern Ireland. A very important feature of major world religions has been the tendency for schism to occur e.g. within Christianity, between Roman Catholic and Protestant, and within Islam, between Sunni and Shia.

Evidently religion takes many forms and has had a variety of functions attributed to it. Yet, seemingly, it may both address the issue of individual anxiety but also reshape and even intensify it; again, it may be integrative in respect of a particular social group but divisive as between groups; in addition, it may tend to be explicitly or ideologically conservative in its political implications, but it can also be radical (consider, for instance, the religious concerns of the two sides in the English civil war). While it has unintended consequences, it seems religion both arises out of and in a sense addresses (i) aspects of individual psychology, and (ii) more localized as well as the widest social concerns. However, a basic point is that its own emergence and development are interdependent with the more general development of human conceptual resources and resources of knowledge. It is of the essence that humans are symbol-users: religion is highly symbolic and probably arises and is shaped at least in part by confusion between the symbol and that which is symbolized (consider, for instance, debate as to the precise meaning of the Eucharist). While specialising in the symbolic, it is an aspect of the cooperative and the associative life of a community: religious traditions and institutions are a central context within which ideas and practices are endorsed and disseminated.

The influence on fertility and contraception

Throughout extended time religions have brought together the largest human groups, the largest contexts of, and frameworks for, cooperative activity. Each religion possesses its own normative order concerned with what adherents feel they should, or should not, believe or do. At first sight a concern with the normative directs attention towards the ethical and legal dimension of religion but, given the high degree of systemic integration of religion, the normative may also be judged to bear upon the ritual, narrative, doctrinal and philosophical dimensions. Here the concern is with whether human cooperative activity tends to give rise to population growth. In this connection religious groups are of central importance not only because, at least until the modern period, they have been the largest such groups, but also because, as indicated above, religions play a primary role in legitimizing the widest range of human behaviour, the main and most significant thrust being via the legitimation of marriage and the arrangements in respect of family and kinship. In stabilizing and securing these central institutions, there is thereby less social disruption which would itself threaten survival and population numbers.

In assessing their overall influence it must also be readily acknowledged that religious teachings and practices in some respects serve to increase and in other respects to decrease population, the latter tendency being exemplified by the practice of celibacy and the monastic tradition, as well as human sacrifice (considered below). Before proceeding further it is also worth noting that, since religions are actually or potentially in competition, and any particular religion claims to know the truth and right conduct, it serves its interest to grow rather than decline in overall numbers, both relatively and

absolutely; indeed the religions of any era may be thought of as the longer-term survivors from a larger potential pool. Plainly a main way in which religious numbers will grow is by natural increase within the group. This is despite the familiar fact that religions vary in their tendency to proselytize and their tendency to be antagonistic to their rivals.

With an eye to modern circumstances, it is suggestive very briefly to review what various religions have to say about fertility and contraception (with the particular assistance of Stacey, 2012). Though religions are sometimes marked by the existence of quite detailed rules concerning, for instance, when couples may or may not have intercourse, it is the broader tendencies that must be identified.

Jewish law considers children a blessing, so a man may not abstain from procreation or get sterilized before he has fathered a child. There are differing tendencies within branches of Judaism, but the Torah promotes prolific childbirth and orthodox rabbis believe that being fruitful and multiplying is a male duty. Regarding family limitation, because of 'Onan's crime' in Genesis, the birth control pill is preferred over barrier methods so as to prevent 'the spilling of seed'.

The Roman Catholic Church forbids sex outside marriage, so its teaching about contraception must be understood in the context of a husband and wife. The Church teaches that sex must be both unitive and procreative, or, specifically in the words of the catechism, serve the following two-fold purpose: 'the good of the spouses themselves

and the transmission of life (2363)'. Natural family planning such as periodic abstinence is the only approved contraceptive method.

Protestant and Episcopalian Christian notions about birth control stem from church tradition and teaching rather than scripture since the Bible says little about contraception. Contraception was condemned as a barrier to God's procreative purpose of marriage until the start of the 20th century. More recently it is stressed that members use birth control as dictated by their consciences: the institution of marriage may be strengthened where couples do not feel threatened by the possibility of having children they cannot support.

Islam emphasizes that procreation within the family is a religious duty, so there is unanimous rejection of sterilization and abortion. Because contraception is not expressly prohibited in the Qu'ran, many Muslim scholars approve of family planning, but others believe that birth control is forbidden since the Qu'ran contains the command to 'procreate and abound in number'. Most Islamic traditions will permit the use of birth control where maternal health is an issue or where the well-being of the family may be compromised.

Traditional *Hindu* texts praise large families, though some Hindu scriptures that applaud smaller families also exist, which also emphasize the development of a positive social conscience. Hinduism encourages procreation within marriage, yet there is no explicit opposition to contraception. Some Hindu texts describe birth control methods while other scriptures contain advice on what couples should do to promote conception.

Traditional *Buddhist* teaching favours fertility, and there is reluctance to tamper with the natural development of life. Buddhism urges the importance of parents taking care of their children, so they can grow up with a good quality of life. There is no really established doctrine on contraception, so a Buddhist may accept contraceptive methods with differing degrees of hesitation, the worst of all being abortion or 'killing a human-to -be'.

Chinese religions emphasize the importance of balance and harmony in the individual, the family and society. Since having too many children can upset this balance, family planning has been a valued aspect of human sexuality. Confucians, unlike Taoists, put more focus on procreation than on the joy and art of sex; they are not as open to birth control since they are more sensitive to any restriction on their God-given right to procreate.

These highly abbreviated summaries bear witness to differences between major religious traditions and also to change overtime. A familiar position within Christianity is that God's purpose or the 'function' of sexual intercourse is to procreate the species, but sexual enjoyment as such is rather more valued within the oriental religions. All of these religions or religious tendencies date back to times when fertility was higher than today: it needed to be and was expected to be, not least because of much higher child mortality. It is therefore very significant that one can fairly say that those religions which persisted for extended time traditionally encouraged that high level of fertility: that is a level such

that had all the children born survived into adulthood, the overall population would have tended to grow, probably quite rapidly. Thus, while in many of the societies of earlier times fertility and mortality were in actuality roughly in balance, the impact of religion was such that the former stood every chance of exceeding the latter.

More recently the religions have tended to modify their approaches somewhat in changed population circumstances. Of course, family planning in the strict sense is a concept of the last century or so, but in the main the religions have conceptual resources enabling them appropriately to guide members and to varying degrees they acknowledge the contribution of contraception in present conditions. Nevertheless it broadly remains true that if religion were the sole or predominating influence on fertility practices, population size would be firmly on an upward trajectory. It continues to provide an upward thrust to population numbers in the modern world.

Religion and suicide

Of strategic importance is the religious outlook on committing suicide, which is to be understood as action undertaken with the intention of producing one's own death. Rather different is action undertaken in the knowledge that one's own death will or may result, or preparedness to lose one's life in the service of some other goal i.e. where the loss would be collateral. Taking account of the full range of human circumstances there is no reason a priori to judge that the losses from suicide in the strict sense need be tiny or negligible. The precise approaches of major religions arise out of their respective

narratives and theologies but the tendency is to be at least generally discouraging of the practice; brief illustration follows. (en.wikipedia.org/wiki/Religious_views_on_suicide)

As regards Judaism suicide has been frowned upon and traditionally suicides have been buried in a separate part of a cemetery, and may not receive certain mourning rights. However, suicide is sometimes acceptable in Jewish law e.g. as a preferred alternative to committing certain cardinal sins. As is well-known there are significant differences on the topic within Christianity. For Roman Catholics suicide is objectively a sin while among some Conservative Protestants it is seen as self-murder, the sin being akin to that involved in murdering another person. Some other Christian denominations do not view committing suicide per se as committing a sin but that course of action is still viewed unfavourably or regrettably.

Within Islam suicide in the strict sense is viewed as one of the greatest sins and detrimental to one's spiritual journey. (This is to be distinguished from martyrdom or dying in battle for the faith.) Within Hinduism the dominant tendency is to view committing suicide as a violation of the code of non-violence and therefore wrong, but there may be acceptance of the right of elderly yogis with no ambition remaining to end their lives by the non-violent means of fasting to death. Among Buddhists a basic precept is to refrain from the destruction of life, and the view is taken that reasons for suicide tend to be negative and thus counteract the path to enlightenment. Among several religions there is acceptance or understanding of suicide where an individual has been dishonoured.

Religion and human sacrifice

Given that one is evaluating the thesis that cooperation tends to give rise to population growth, it is appropriate too to consider the impact of religion on mortality. Religion may, for instance, be a direct or indirect cause of war; religious schism is one source of conflict while the integration of religion with nationalism is another important phenomenon of the modern era. The topic of war is taken up more generally in a later chapter. At this point attention is given to a practice that seemingly flies in the face of the central thesis. At least in the case of war loss of life tends to be viewed as unfortunate collateral to the objective sought (and could typically be avoided or diminished by early capitulation), but there are situations where religion is directly responsible for the promotion of death.

Strikingly there are indeed contexts in which religion has legitimized human sacrifice. Most often this is by way of offering to a deity; there is a degree of parallelism with the ritual slaughter of animals and the practice is to be understood within the context of religious sacrifice in general, although its human consequences differ. A further pattern is that of 'retainer sacrifice' where (say) a dead king's servants are killed and buried with him to continue to serve their master in the next life.

The perspective offered here is developed through consideration of the following account of human sacrifice in respect of the Mexica or Aztecs: 'It was at the Temple Mayor that the most extravagant human sacrifices took place, to ensure rain, energize the sun, and

guarantee military success… the primary concern of ritual was to maintain balance in the universe and to suppress the forces of disorder that might destroy the world.' (Webster and Evans, 2005, p.635) Hence, importantly, the practice is being understood in quasi-rational terms with human sacrifice being viewed as a means to an end. In this connection the 'end' is partly but not wholly specified in empirically identifiable terms. For instance, 'to ensure rain' is extremely vague – in respect of quantity and timing – but the occurrence of rainfall as such is an empirically identifiable state of affairs; 'military success' is similarly vague in respect of degree and probably also time-frame but again has some empirically identifiable basis. On the other hand, it may be reckoned that a condition of 'balance in the universe' is not empirically identifiable, although this might need qualification in respect of 'forces of disorder'.

As already indicated, with the coming of characteristically-human cooperation, there is from the outset straightforward means-ends rationality in the context of many practical activities; indeed the very notion of using an effective means to reach a specified goal originates and gets its sense from there. Integral to the whole idea is that the choice or use of means bears upon success. Where success is not observed to occur or occurs only rarely there is pressure to adopt another means or even to abandon the end. Now it has already been pointed out that humans may not make the same distinction between purposive and non-purposive causation which we tend to make and may judge that outcomes may be achieved in ways mediated through the purposes of such agents as gods and spirits. Hence people quite reasonably continue to use means-ends language in religious contexts where they judge means may be effective in reaching the end.

However, it is a mistake to assume they are abandoning the notions of ‘effectiveness’ or ‘success’ in this respect simply because there is a religious setting. The position is that where the actions being employed to reach a given end are not demonstrably effective, in the long-term there is a tendency for that putative means or route to be abandoned. To take an example: humans may sometimes pray for rain but given that it is not demonstrably effective – since praying or non-praying are uncorrelated with subsequent rainfall – the practice of praying when rainfall is sought tends to decline.

Where human sacrifice is undertaken as a means to an end, the practice will tend to decline in the long-term because of the ‘costs’ involved - in producing the supply of victims - together with the failure for it to be demonstrated that the means is effective in achieving the goal. This last can be for one or other or both of two reasons: the means appears to have no bearing upon the achievement of the empirically-identifiable goal; confirmation of the achievement of the goal is lacking because the goal is not empirically identifiable. So, for instance, in the case of the Aztecs it could be the case that no rainfall or military success follows; or, there is no identifiable evidence one way or the other as to whether there is ‘balance in the universe’ at any particular time. At this point in the discussion there may be a tendency for the reader to respond by saying that where there is no rain the religious authorities will simply respond by saying that not enough people were sacrificed or respond in an ad hoc way by reference to some other factor. They may well do so but the error is to fail to realize that there is a ‘cost’ to be paid in their so doing. Again the religious authorities may well respond by saying in effect that they are the only arbiters as to whether or not there is ‘balance in the universe’, but this familiar

type of move does not in itself demonstrate the achievement of that state of affairs. Another way of putting it is to say that gradually religious authority in these respects will tend to be undermined. In the short-term effects of this kind will generally be slight partly because of the limited conceptual resources of the people and their resources of knowledge; also because religion ramifies and performs many functions simultaneously. Nevertheless there is good reason to judge that in the long-term the practice will tend to decline and be discontinued.

To understand developments in the short-term attention must be given to the 'costs' involved and the magnitude of additional and potentially-countervailing interests and concerns. The Aztecs were able to sacrifice large numbers (at any rate temporarily) because they could draw victims from neighbouring peoples whom they were able to dominate; but seizing such victims required a considerable in-put of effort. Also the Aztec actions served to increase the likelihood that other surrounding groups might combine against them (in fact, some at least initially did side with the Spanish invaders). Had the leading Aztecs sought to draw these same large numbers from their own ranks there could have resulted internal rebellion. In fact, they did draw smaller numbers of victims from their own ranks and, in this connection it must be fully recognized that these people and their families would have shared in the religious mind-set. Nevertheless, because of other interests, there is the potential for internal resistance to be generated, its magnitude depending, for instance, upon the social location of the selected victims.

Similar points may be made in respect of ‘retainer sacrifice’, where the rationale is again of a means-ends type, it being intended that the attendants serve the dead king in the next world. The underlying issue concerns the failure to demonstrate the effectiveness of the means. The achievement or non-achievement of the goal is not demonstrable; ultimately more is needed than an assurance by the religious or political authorities. For this reason alone, in the long-term, the practice may be expected to decline. In the shorter term the strength of countervailing interests is again pertinent. In particular there is the matter of whether there are independent reasons as to why it might be worth preserving the lives of the attendants; in this regard their status and possible future contribution to the community is relevant. Countervailing concerns may be expected to prevail in due course.

Summarizing conclusion

Religion is highly variable in its precise nature but virtually ubiquitous. In the early circumstances of mankind it arose partly because purposive explanation was being applied in contexts where we would expect non-purposive explanation to be used i.e. there was familiarity with purposive agency but lack of clarity about its precise scope and limits.

A central concern of this study is the relation between religion and population. The major religions existing at any particular date are to be understood as the survivors from a much larger pool. There is good reason to judge that these ‘survivor’ religions have

traditionally encouraged a high level of fertility, partly because it is in their interests to do so. A high level here means one which is sufficient to promote gradual longer-term population growth despite such persistent and familiar patterns as high age-specific mortality - of particular salience being high child and high maternal mortality. In recent centuries, following rapid declines in age-specific mortality rates, the major religions have demonstrated flexibility by modifying their outlook on fertility to varying degrees, acknowledging the contribution of at least some types of birth control and family planning methods. Nevertheless religion's overall contribution is still such as to promote population growth. A specific way in which it does this is by discouraging or condemning suicide.

A striking practice pointing in quite another direction is human sacrifice, where it seems that religion may directly promote mortality. This can indeed be a meaningful way of acting given a particular world view and understanding of circumstance. However, reasons have been given as to why, where it is viewed as a means to an end, the practice would tend to decline and disappear in the longer term. In the short term it may be undermined by countervailing interests.

Chapter 6: Simple and Complex Societies

In this chapter the aim is to begin to explore the nature of the link between cooperation and population in differing types of society. Firstly, some evidence derived from an anthropological study of a tribal society is considered. In this connection it is of course relevant to point out that virtually all such societies studied by modern anthropologists were already undergoing significant change as a result of contact with westerners (generally in a colonial context) i.e. it would be false to consider them as genuinely isolated; but, nevertheless, insights may be gained regarding their character even prior to such contact. Second, there is consideration of a small, but important, analytical part of Diamond's (1998) work throwing light on the understanding of types of society, interactions between them and the possible implications for population size and density. Among other things that analysis draws attention to the significance of a society's division of labour and change therein. In the remaining two sections of this chapter there is general discussion of the significance of that phenomenon in differing types of society, followed by the specification of a distinctive pattern linking cooperation to population growth. It is reckoned that that pattern is exemplified by some of the important developments traced in Chapter 7.

Food supplies and population control: a case study

The general direction of argument points to cooperation leading to an increasing population. Of course, all manner of factors can intervene to prevent this happening for extended periods. It is valuable to gain insight into the human response for example to failing food supplies.

An instructive early study providing information on population control in a tribal society is provided by Firth, based on his fieldwork in the 1920s. Given their relative (but not total) confinement on a Polynesian island it is not surprising that Firth tells us that, 'the population of Tikopia was normally in a state of equilibrium with its food supply' (1970, p.373-4). What is rather more surprising is the sheer number of differing mechanisms of population control which he identifies: celibacy; prevention of conception (including use of *coitus interruptus*); abortion; infanticide; sea-voyaging; war. Thus there is action to reduce sexual intercourse, to alter its character, to impact on gestation and to kill children (by smothering); in conventional terms, there is direct action in respect of both fertility and mortality. Sea-voyaging involves the practice of men, especially the young unmarried, setting out on sea voyages from which they are unlikely to return. This is striking in that it hints at the idea – which may apply elsewhere - that social action may be taken which increases the likelihood of 'accidents' or which is tantamount to encouraging near-suicidal behaviour. War seems to involve driving out a section of the population, perhaps a clan or those belonging to a lower stratum.

Given present concerns a point of particular interest is when exactly the population resorts to killing infants. Apparently, infanticide is at the discretion of the father, 'and the motivating factor is said to be primarily the comparison with potential food supplies' (Firth, 1970, p.374). When half-starved the women are less fecund anyway and it is notable that were there to be an excessive number of youngsters, they could compete with their own mothers for food. Hence the action taken has the consequence of maintaining

the condition of the population so that numbers may recover quickly once a sustainable increase in food supplies is achieved. Indeed, given that action is rationally informed by forward time-reference, the potential for population numbers to recover is to an identifiable extent greater than it might be in the case of an animal population. As regards the social meaning of the actions, it is significant in the present context that the view seems to be that it is not that drastic to kill an infant not yet ready for social life. The actuality from the anthropological evidence is some way removed from the picture (due partly to Malthus) of catastrophe resulting from accelerating population growth 'overtaking' food supplies.

It is clearly significant that the dispersion of the human population on Earth extended eventually even to the settlement of many - even tiny – islands. It is known, for instance, that many islands were populated from an initial 'primary dispersal centre' in the Marquesas Islands from around 400AD onwards (Barraclough, 1978, pp.48-9); that centre was itself supplied from Polynesia and Melanesia. Those settled from the Marquesas include Easter Island and Tahiti, and this source may even have been the origin for settlement in New Zealand. In that light one may be led to reflect further on the evidence from Tikopia of sea-voyaging in circumstances of food shortage. Presumably some of these voyages would be successful with landfall being made elsewhere. In that case population control on this specific island may be judged to provide a stimulus to population growth on other islands. Hence insight may be provided into a population process contributory to dispersal across the islands, bearing in mind

that, as pointed up in Chapter 1 it is that process of dispersal which leads ultimately to a greater aggregate population.

In respect of pre-literate societies more generally, it is important to clarify that population control forms an established pattern and is not to be thought of as simply operative at times of anticipated food shortage. It seems all pre-literate cultures have the ability to limit family size, and traditional restrictions are not such as to maintain balance between fertility and mortality at a subsistence level, but rather *to maintain an economic surplus*. As Douglas affirms, 'It is the demand for oysters and champagne, not for the basic bread and butter, that triggers off social conventions which hold human populations down.' (1966): in this respect modern societies may not be so very different.

Societies: simple and complex

From the perspective developed here, while there are among close blood relatives genetically-rooted, affectively-governed behavioural tendencies which are further shaped by the superposition of kinship ties, between non-relatives – in the absence of sexual interest - there is no naturally given affective tie. Affect – such as that expressed within friendship – tends to follow cooperation between non-relatives or arise out of it. In addition, within wider patterns of cooperation, as discussed in Chapter 1, there are felt obligations. Yet the possibility of conflict arising between non-relatives who are brought together is relatively high: the potential for cooperation is there but it needs to be realized.

Diamond (1998) has provided some suggestive, if necessarily schematic, ideas assisting the understanding of types of society, their interactions and the implications for population size and density. His four types of society are the band, the tribe, the chiefdom and the state (1998, pp.268-9). Importantly, in his account there is no simplistic suggestion that one or more variables may be identified which purportedly 'cause' population growth. Rather variables such as societal complexity, food production and population size and density are judged to inter-affect one other. For instance, he argues population growth leads to societal complexity, but societal complexity in its turn leads to intensified food production and thus to population growth.

Diamond (1998, pp.286-88) first draws attention to differences between smaller and larger or denser groups in respect of social control and economic transfers. Regarding social control the suggestion is that the differing characters of the two kinds of groups may be grasped once one gives attention to the basics. In the terms developed here the starting point is that genetic change enables both those with blood ties and those lacking them to cooperate – which they may do with advantage - but, critically, while a degree of attachment may tend to exist between close blood-relatives, no such attachment may be assumed to exist between unrelated strangers. Not just this but when strangers quarrel, where relatives of either party are in the vicinity they may take sides as well which could lead to a destructive brawl. As already noted, humans have a marked tendency to squabble and quarrel, but the way in which this may be handled differs depending upon the nature and size of the social group.

In smaller groups or bands e.g. of hunters and gatherers where people are closely related, relatives of two quarrelling parties may come in to mediate. Even in a tribe where many are still close relatives and at least everyone knows everyone else, again possible mediators of quarrels may be forthcoming. There is evidence that solidarity and a sense of community may be sustained in this kind of way within a social group up to a size of about 150. (Dunbar, 2011) But once numbers get much larger – say into the thousands – the possibility of quarrels breaking out between unrelated strangers in the absence of natural mediators is altogether higher. Supposing this leads to murder or serious injury there is the added prospect of retaliation by relatives of those dead or injured, leading to a destructive cycle of violence. Hence a larger group which left conflict resolution to ordinary members in this kind of way would be in danger of breaking up. Therefore in order to continue in existence the larger group may need to develop centralized authority to seek to monopolize the use of force and promote conflict resolution.

Somewhat similar considerations concerning size of group come into play in the economic sphere. It is in people's interests to transfer goods. For instance, individuals differ in skill and consequently some may find themselves with an excess of some desirable commodity accompanied by a shortage of another, while for others the position is reversed. This gives rise to the cooperative pattern of transfers of goods made on a reciprocal basis. However, while pairwise economic exchange may suffice in a small group it might not do so in a larger one. What would help would be a way of redistributing goods in addition to the reciprocal pattern. One method would be for there to be transfers of surpluses to a central authority which in turn redistributes them.

But if simpler societies differ in these ways from larger, more complex ones how, according to Diamond, do the former tend to be reduced in number in favour of the latter? In accounting for this he embarks upon 'evolutionary reasoning' (1998, p.288). He points to the fact that there are many smaller ones which differ among themselves. For example, they may differ in respect of how effectively they resolve conflict and redistribute goods. They may differ in respect of the richness of their resources given the land, rivers, coast etc to which they have access. Supposing smaller groups then impinge on each other, this could generate conflict particularly where there are no close relatives mediating between them. There are several possibilities. For instance, where population densities are low one group might simply drive out the other. However, where this possibility is lacking there could be some process of partial merging or accommodation; this could involve the paying of tribute by the dominated group. Perhaps more likely is the case where one group dominates but also becomes more integrated with the other probably giving rise to some element of stratification in a larger entity. Importantly, these arrangements involve cooperation but often of the coerced-cooperative type.

Diamond affirms that, 'competition between societies at one level of complexity tends to lead to societies on the next level of complexity *if* conditions permit' (1998, p.289; italics in original). Thus, for instance, tribes conquer or combine with other tribes to reach the size of chiefdoms, which conquer or combine with other chiefdoms to become states, and similarly states may become empires. The important conditions which must be met concern whether large units can solve the problems that come with their larger size e.g.

concerning internal social control and economic integration. No doubt elaborations in the division of labour including hierarchical organization may contribute to the solution.

Diamond points up the contribution of war, or threats of war, to the amalgamation of societies. Importantly, outcomes differ depending upon, for instance, population density locally and the presence or absence of intensive food production. Where population densities are high and the defeated have nowhere to flee, two important possibilities arise (Diamond, 1998, p.292). One is that the defeated can be used as slaves, another that the defeated are left in place, but are deprived of political autonomy and pay tribute. Again organizational issues need to be dealt with. From the perspective developed here it is to be expected that, following war, once a reasonably stable social entity has emerged its overall population would tend to grow, even where it is based on coerced-cooperation.

Hence there are clear reasons for the emergence of social groups with larger and denser populations and insight may be provided into their changing character. Among the variables which interact to facilitate population growth would be changes in technology, especially that of food production. As stressed previously, the extension of knowledge and enhancement of technology must be understood as occurring incrementally. This might include understanding variations in the land and its suitability for crops, the introduction of new crops or the use of draft animals. The 'evolutionary' development of the plough – through many small changes – has been traced from ancient times through into the twentieth century. In respect of the economy, there is interdependence between

food production, the division of labour, patterns of exchange (reciprocal or redistributive; via tribute or taxes) and control of the land.

The division of labour

In Chapter 7 key developments in prehistory and history are traced in order further to clarify the implications of cooperative behaviour for population growth. Within that account changes in the division and specialization of labour are highly strategic. At this point the aim is to provide insight into the contribution of that particular phenomenon and the direction of argument is influenced by Durkheim's classical study (see particularly Durkheim, 1964, pp.233-82). A general discussion of the significance of the division of labour overtime in differing types of society precedes the presentation of an abstracted model focusing on a discernible pattern linking cooperation and population growth; that pattern is exhibited by some important developments highlighted in the account of Chapter 7.

In general, population expansion is accompanied by a tendency for patterns of cooperation to become more complex and involve differing levels within a discernible hierarchy. This may be illustrated through simple examples bearing upon the highly strategic organizational principle of segregation in time and space. Suppose, for instance, that in a hunter-gatherer society pairs or groups of hunters are found to interfere with one another; they may agree to hunt at different periods of the day. Again, suppose that several families are found to be seeking to set up their home bases at the same desirable place; they may agree to set up their bases at differing places. However, suppose in these

cases, despite seeming agreement having been reached, further squabbling and interference breaks out, then recourse may be had to adjudication by a group of village elders. So cooperation at the higher level may give rise to renewed cooperation – at any rate in the form of compliance – at the lower level. The same pattern is evident across differing types of society where reference upward within a hierarchy generates coordination at lower levels. This is a marked feature of centrally important aspects of social control such as legal systems.

Again, for settled populations, difficulties arise in respect of organization and control, particularly as population grows. Typically, central importance attaches to securing food production and distribution and the provision of a water supply. Solutions are arrived at employing differing levels of cooperation together with expanded communication between those levels; the solutions also involve segregation of activities in time and place. In the way cooperation comes to be structured, the single most important organizational device is the division and specialization of labour. It is crucial in two respects: it tends to increase average product per person while diminishing the tendency for conflict to arise, conflict which might lead to maiming and increased mortality. An elaboration in the division of labour may change a situation of intense competition into one of mutually beneficial cooperation. Notably too the division of labour is manifested both within a framework of work tasks – as in an industrial organization – but also spatially and residentially; it also progressively bears upon the time dimension (including the pattern whereby a single individual performs differing activities at predictably different times).

Concerning the link between population and the division of labour it has been noted in a suggestive way that the population of settlements has been found to correlate positively both with the number of occupational specialities and the number of types of social organization (Petersen, 1969, p.348). From historical evidence it is apparent that frequently solutions to organizational problems are borrowed from elsewhere, for example in the way that the early Christian Church's organization into bishoprics was taken over from political organization within the Roman Empire. Of course, every facet of the division of labour needs to be tried out and prove itself in practice. It is worth stressing that, in respect of modern populations, were the overall division of labour somehow to be instantly dissolved there really would soon follow something approaching the Hobbesian 'war of all against all' with the lives of people being 'ugly, brutish and short'. Within the broader context of the division of labour is to be found a specific cooperatively-arrived at organizational device, the rational bureaucracy, described by Weber as 'man's greatest social invention' (Gerth and Mills, 1998). In summary *people have cooperated in developing ways by which they may cooperate more effectively or remove impediments to cooperation.*

For settled populations, there is an important pattern which may provide a link between expansion in space and population growth. The basic point is that, as part of the spatial division of labour, *settlement typically involves the designation of space from which people are substantially excluded.* Putting it this way round may sound initially odd because it would be more common to think seemingly more positively in terms of land

use. It can though be readily seen that the implication of a designated land use is that people wishing to engage in some other activity – not that designated - must keep out; that is the whole consequence of land-ownership, for instance. This phenomenon of exclusion of population is particularly well-known from the case of Great Britain's Enclosures Acts of the sixteenth to the eighteenth century and the highland clearances of 1750-1840AD. The consequence of patterns of exclusion is to move people on to other land, when available, where the population can grow. This single process contributed strongly to the expansion of population into the American west, Canada, Australia and New Zealand.

Co-operation and population growth: a discernible pattern

The account being presented here is in one sense necessarily simple since, at root, it concerns the link between expansion in the extent and scope of human cooperation and population growth. Proceeding further there is an important discernible pattern (illustrated at certain points in Chapter 7) which is again relatively simple and may be encapsulated in the single paragraph which follows. However, that particular formulation – though intended to be accurate and precise – leaves various aspects implicit which need properly to be spelled out. The following three paragraphs round out the account of the pattern by making these specific aspects explicit.

As humans cooperate there is a tendency for them overtime to inter-affect one another in ways that give rise to additional cooperation of wider scope and especially to higher-level cooperation (which regulates lower-level activity and cooperation, and, in particular,

generates lower-level coordination and co-action); another way of putting it is to say there is a tendency for there to be enlargement of the framework of cooperation. In this connection it must be understood that some of the cooperation will (in general) be of the coerced type. Although the process commences in the quintessentially local it has no clear limit short of embracing the totality of mankind. The tendency for the cooperative framework to build in this way is interdependent with the tendency for population numbers to grow. The reference here is to gradual, incremental change.

This formulation refers to 'additional' and 'higher-level' cooperation but, so far, has said nothing explicitly about the utilization of material resources, without which population growth would be impossible. It must therefore be made clear that the additional cooperation tends to manifest itself through elaboration in the division and specialization of labour of a technical kind. On the other hand, the higher level cooperation already referred to may be said to be elaboration in the division and specialization of labour of a social or organizational type. Therefore it is also correct to say that the elaboration of the division and specialization of labour is interdependent with the growth of population.

This last formulation, however, is insufficiently clear as to how elaboration in the division and specialization of labour of either kinds tends to arise; for the account being presented and evaluated here to be sound it would need to be generated from the character of cooperation itself. As discussed in the last section of Chapter 3, felt problems experienced at particular points (within an already existing cooperative framework) are the proximate stimulus to incremental growth of understanding

concerning either technical or organizational matters; the originating source of innovation is typically highly local. However, it is notable that cooperation by itself gives rise to a tendency for relevant information and understanding to spread. Where there is reference above to 'labour of a technical kind' what is meant is skilled labour (quite possibly using tools) or labour informed by specialist knowledge and it is now being asserted that cooperation itself tends to give rise to a spread of expertise. (A particular institutionalized arrangement within which this would occur is master and apprentice but this pattern could, for instance, be informally approximated in particular instances e.g. as between cooperating father and son.) Again, cooperation itself may lead in the direction of an understanding that leadership is required: firstly it may be informal and implicit across instances of cooperation, then this may become explicit, and finally there is an understanding that one or more individuals may be expected to specialize in this way.

Finally, not enough has been said so far which sufficiently acknowledges the fact that material resources occupy space and are geographically distributed. Further to the tendency for information and its utilization to spread, it is worth noting the distinction between the consequential elaboration in the division and specialization of labour locally within an already given cooperative framework and its elaboration elsewhere, perhaps remote from the original source. This last may occur, for instance, where there is knowledge of the geographical distribution of material resources (often in the form of raw materials) which are required. The latter may lead to the multiplication of a pattern over an extended area. Furthermore there can be understanding that a particular

development is only possible in a particular circumstance (say, where running water is available). Consequentially, there will tend to develop a discernible division of labour in space.

A further comment regarding this description of a general pattern may be helpful. The reader may be inclined to respond by pointing out that no explicit reference to culture is made, especially given that societies differ markedly in this respect. Hence there may be felt to be a significant omission. In this connection, the culture of a society is to be understood as the shared ideas – incorporating knowledge, values and standards - and material culture as the artifacts utilized; together these make up a shared way of life. The appropriate response is to say that shared ideas are to be understood as a constitutive element of cooperation or a wider cooperative framework within which artifacts are employed. The shared ideas of a society, including those relating to the production and use of artifacts, change as the pattern of its cooperative life changes; hence the contribution of changing ideas is fully, if largely implicitly, acknowledged.

In the description of the pattern there is in fact mention of ideas in that there is reference, for instance, to specialist knowledge and its utilization spreading; pedantically – in the terms of Chapter 2 - that knowledge may be said to concern aspects and processes evident in the 'external world' (which incorporates our own bodies). Examples may help. There could, for instance, be an increase in the numbers of people able to make a bow and arrow and/or those able to shoot deer with it, or there could develop a more marked division of labour between makers and shooters of bows. Alternatively, the

ability to make and sustain fire within a population, or to cook with it, could spread (Wrangham, 2009), or there could arise an associated division of labour; again, the numbers of people successfully accessing a particular food source might grow. One is here concerned with practicalities bearing upon the means of subsistence and therefore also upon population and its components, births, deaths and migration.

Summarizing conclusion

In this chapter the nature of the link between patterns of cooperation and population growth has been explored, taking in simpler and more complex societies. A much more extended consideration of complex societies is provided in Chapter 8. A purpose here has been to direct attention to the division and specialization of labour and change therein which may be the single most important means by which cooperation sustains larger and growing populations.

A surprise in respect of population control in the simpler tribal (island) society is the sheer number of differing mechanisms involved. The response to diminishing food supplies is informed by an understanding of future probabilities, thereby maintaining the condition of the population, so that numbers may recover quickly once a sustainable increase in food supplies is achieved. A further feature is that population control evidently contributes to a process of dispersal across various islands which itself leads ultimately to a greater aggregate population. More generally, it appears that in simpler

societies population control forms an established pattern geared to maintaining an economic surplus.

Diamond (1998) assists in the understanding of types of society, their interactions and the implications for population size and density. The tendency for population numbers to increase is interdependent with changes in patterns of social control and of economic transfers. When certain conditions are met, competition between societies may give rise to societies of greater complexity. As numbers grow, systematic change in respect of the division and specialization of labour is crucial in two respects: it tends to increase average product per person while diminishing the tendency for conflict to arise, conflict which might lead to maiming and increased mortality. Paradoxically, in settled societies the designation of space from which people are substantially excluded may indirectly give rise to population growth. An abstract model has been presented – again foregrounding the division of labour – concerning the interdependence of incremental change in the cooperative framework and the tendency for population numbers to grow.

Chapter 7: Developments in Prehistory and History

The central notion being explored in this work is that characteristically human cooperation tends to generate population increase. In this chapter an outline interpretation is presented as to how this has occurred through prehistory and history. Initially, there is scrutiny of the tendency for the population of hunters and gatherers to grow through expansion in space, a key phenomenon already referred to for illustrative purposes in Chapter 1. There then follows a consideration of developments occurring since the end of the last ice age – the period beginning around 9600BC. The main form the exposition takes is not to trace developments in particular regions of the world but rather – with the considerable help of Scarre (2005b) – to point up the various patterns and tendencies evident across the world and to comment on their significance. The particular pattern described in the last section of Chapter 6 and concerned with the phenomenon of increase in the division and specialization of labour is exhibited by some of the specific changes identified. There follows scrutiny of the nature and significance of a phenomenon of central historical importance, empire, and then one of paramount importance in the modern world, the nation state. Arguably those modes of political organization and subsequent developments arising out of them underpin the tendency for population to be kept on an upward trajectory.

Hunters and gatherers

In respect of population growth the crucial phenomenon of prehistory was the tendency for hunter-gatherers to spread. Both push and pull factors must be understood to be involved. It is often asserted that the tendency to migrate or for the population to spread

stemmed from the fact that hunting-gathering populations (who may well have been nomadic) grew just enough to press upon the *carrying capacity* of the land utilised, by which is meant the number of people who may be sustained in an area given its physical resources and the way people use them (Sanderson, 1995; Miller, 2007; Weeks, 2008, p.32). Clearly conflict resulting from population pressing upon resources could generate violence and a consequential rise in mortality. Alternatively, there is the possibility of migration or a tendency for the population to spread which is achieved on a cooperative basis; that cooperation might or might not be to a degree coerced. Furthermore, given human foresight, a crisis over resources may even be anticipated and the situation eased by movement of a segment of the population at an earlier stage. Those groups who could deal with the situation on a cooperative basis would tend to grow in numbers and influence relative to those prone to episodes of internal violence.

Taking the longer-view it is apparent that human groups spread widely to occupy the habitable parts of the globe and, in addition, there were systematic changes in the technology used throughout space and over extended time and within particular regions (for example, in the precise character of stone tools). A point to stress here is that conditions on the earth's surface tend to vary continuously, facilitating movements to adjacent areas. However, plainly what differentiates humans from other animals is their ability to adapt to changing or even substantially changed conditions in a relatively short time (or number of generations). For instance, as they spread, humans adapted through changes in the food hunted or gathered, they modified their tools and they altered their clothing or shelter in response to climatic change. At the same time they continued to

provide their own subsistence cooperatively. Therefore these movements of people were fundamentally associated with changes in respect of the division and specialization of labour; they would not have occurred without them. People emerged with the ability to identify new sources of edible food, or to fish, or with the ability to make new types of clothing. A striking example is presented by the first human occupation of the Americas – achieved in approximately two thousand years – involving adaptation to territories as different as tundra and sub-tropical rainforest. This type of population growth – through extension in space – was thus evidently interdependent with changes in the division and specialization of labour of a technical type.

The tendency for the population of hunter-gatherers to spread was also accompanied by a tendency for their changing way of life to effect an expansion in the carrying capacity of the land. For instance, where there is a slight improvement in the sharpness of stone tools or arrow-heads a given area may be able to sustain a greater number of hunter-gatherers. More generally, one can say that where humans migrated or spread while adapting to new conditions in any of the types of ways indicated above, the carrying capacity rose as compared with what it would have been in the absence of that adaptation. Most obviously where humans in moving to a new area acquire knowledge of some additional food sources, the carrying capacity of that new land is effectively greater than it would have been had they moved without that increment of knowledge. These kinds of changes may well have occurred relatively slowly or even extremely slowly – as with technical improvements in stone tools - but it is the tendency for them to occur which is the crucial phenomenon. Plainly, too, the improvement of tools for hunting allowed for an increase

in population. For instance, the spear was for many purposes more efficient than the club, and the bow and arrow more efficient than the spear. Inventions such as these facilitated the development from small, nomadic hunting bands to more settled tribal societies. Plainly cooking, when it emerged, contributed greatly to the effective carrying capacity of the land. (Wrangham, 2009)

So far, the discussion has proceeded as though humans are simply moving into areas not already occupied by other humans, but plainly any initial tendency for things simply to proceed along those lines will not last for long: groups will tend to come into contact and begin to inter-affect one another. When they do so there are a number of possible scenarios. For instance, one group could essentially try to drive out or displace the other; one group could enslave the other or bring them into relations of tribute. (In passing the generality of the situation may be noted: what happened when Europeans first arrived in North America or Australia was that the indigenous population was displaced, but in those cases the 'technology gap' was enormous.) Particularly in cases where the 'technology gap' is small or virtually non-existent, the resort to violence or threat of violence is plainly a possibility, but will it always be profitable? The point is that violence is always undertaken at risk to oneself; also those groups who too readily resort to violence may become depleted in numbers and influence relative to others who can avoid or foreshorten it. What may be asserted is that routine and automatic resort to violence will not in general prove to be the most effective pattern for a group to further its own interests. (Again there is a certain degree of generality: Hitler got a long way by threats and violence but ultimately failed and 'at cost' both to himself and his own

national population.) No, typically groups will tend to prosper which adopt other approaches which implicitly involve some degree of compromise. Groups which can achieve and maintain workable arrangements of co-existence albeit based on coerced cooperation will tend to gain in the long-term, relative to those with a more routine resort to hostilities. However, the establishment of the former types of arrangements involves patterned changes in behaviour e.g. leading figures using their influence to control 'hot-heads' or arranging the payment of tribute. Typically, there is again a modification of the division of labour primarily of a social or organizational type and this may be considered as interdependent with the greater potential for population growth.

From hunter-gatherers to states and empires

Let us next focus on developments occurring since the last ice age (beginning around 9600AD), a period which is reviewed utilizing work of Scarre (2005b). A single-paragraph summary of these developments may help to orient the reader. By that early date anatomically modern humans were established on all continents except Antarctica. There followed environmental change and the human response to the new opportunities offered by a warmer climate. Of particular importance is the domestication of plants and animals which led to the establishment of farming economies able to support larger communities. The result was growth in world population to levels unsustainable by hunting and gathering alone. Expanded food production and demographic increase were themselves directly associated with changes in social complexity and technological development. As they grew in size societies became more complex in internal organization and during the 4th and 3rd millennia BC, new kinds of settlement appeared in

the form of cities, associated with the invention of writing and the development of the state. Of course, hunting and gathering continued to be practised down to recent times in conditions hostile to agriculture.

As already indicated, in addressing these developments in greater detail, the emphasis is still on the identification of patterns and tendencies. However, it is essential to distinguish that way of proceeding from the familiar but mistaken one of regarding the human story as one of 'progress' or inevitable passage through readily specifiable stages. As is well known, in the nineteenth century the early anthropologists Morgan and Tylor viewed the development of human society as a movement from 'savagery' to the 'barbarism' of early farming societies and culminating in the 'civilization' of Mesopotamia and Egypt; several more sophisticated such schemes of stages have been presented more recently. There is little doubt, however, that these schemes fail to grasp or encapsulate the degree of complexity of actual human experience. Nevertheless in what follows it is important to draw attention to tendencies. For instance, where it is the case that a crucial development arose independently in several different regions of the world at different times, one may well be entitled to talk about the *tendency* for it to occur. Since the argument being presented concerns the tendency for changing patterns of cooperation to be associated with demographic increase, it may prove possible to subsume such crucial tendencies within the wider framework. A further point to note in what follows is that the general pattern of the account involves viewing increasing population or increasing population density as interdependent with the other critical changes rather than being a simple cause or consequence of them.

It is of the essence of the argument being developed here that, on the best available evidence, the crucially important phenomenon of agriculture arose independently in at least seven different regions of the world. It was not the case that agriculture was a chance discovery made in one region which then spread rapidly and globally once its advantages were experienced. However, in spreading inexorably from its various origins the shift from food collection to food production greatly increased the human carrying capacity of the planet. Before considering what might account for this parallel process of change it is important to clarify the meanings of some associated concepts.

The following definitions are provided by Scarre (2005b, p.183). *Agriculture* is to be understood as the establishment of an artificial – local human-created - ecosystem in which selected species of plants and animals are cultivated and reared. At its heart are the intentional propagation of food and the isolation of the domesticated species from their wild relatives. There are several related concepts. *Domestication* is a biological process involving changes in the genotypes and physical characteristics of plants and animals as they become dependent on humans for reproductive success; it may well be unintentional. *Cultivation* is a cultural phenomenon involving intentionally preparing fields, sowing, harvesting, and storing seeds or other plant parts. It requires significant and deliberate changes in technology, subsistence and, particularly, time-perspectives. *Herding* also requires intentional changes in the relationship between humans and animals. Agriculture itself may be considered as a commitment to this relationship between humans and plants and animals. It results in more people, more villages and

impetus towards more complex social and political organization. A further key idea is *sedentism*, a residence pattern of permanent year-round settlement, which replaced the mobility associated with most hunter-gatherer groups. In at least some regions of the world (particularly Southwest Asia) these kinds of settlements are believed to have preceded the shift to cultivation.

With the assistance of these definitions, a set of tendencies may be identified. Evidently, close relationships between humans and their food sources stretch back tens of thousands of years into the Paleolithic; the domestication of the dog as a hunting aid occurred at this early stage. There is then a tendency for agriculture to develop from hunting and gathering (even ahead of the use of cultivation some hunter-gatherers may have exhibited a tendency towards sedentism); as part of that development the general tendency for humans to domesticate animals and plants is manifested. Further tendencies are the adoption of farming by hunter-gatherers from their neighbours, and the displacement of hunter-gatherers by expanding farmers. In connection with the latter phenomenon the tendency for humans to force the issue generally had positive overall demographic implications. There followed a tendency to use technologies of intensification in association with increasing population numbers or density, including particularly irrigation, ploughing and terracing. In this connection plough agriculture only developed where suitable animals for traction were available and hence traditional world agricultural systems may be divided into two types: hoe agriculture and plough agriculture. In connection with the expansion and elaboration of agriculture the development of domesticates (an essentially irreversible feature) served to anchor the

process, with species carried by human action far beyond the geographical range of their wild ancestors.

It is highly significant that the most frequently cited reasons for these parallel processes of change are demographic increase and environmental change (Scarre, 2005b, p.186). This helps to make clear that the processes underlying the tendency for hunters and gatherers to expand their geographical range and for agriculture to emerge from hunting and gathering exhibit basic similarities. In each case there is a tendency for population to exceed the carrying capacity of the land and for the problem to be overcome with the help of technical advance; however, in the former case the 'solution' is extensive in its geographical implications while in the latter it is intensive. Thus population pressure may lead hunters and gatherers to expand or spread in ways made possible by technical modification, but that same source of pressure may also be relieved by intensive adjustment involving technical and organizational change. There is a pattern of feedback between population and the pattern of cooperation, whereby change in each has implications for the other.

Turning to environmental change as a causative factor, this is equivalent to saying that there is change in the physical resources locally and conceivably more widely. This could occur naturally i.e. independently of human activity (as is usually the case for, say, climatic change) or it could stem partly or wholly from that activity itself (as when animals are over-hunted). Its significance concerns the precise way in which resources are being used. In terms of the carrying capacity of the land the change plainly could be

favourable in the sense that it could conceivably enable larger numbers to be sustained without any technological change occurring; in that sense it would represent an opportunity. The alternative – and because of the great generality of types of environmental change the more likely possibility – is that the change is adverse and reduces the carrying capacity of the land i.e. given the precise way resources are being used; here the change represents a challenge. Among hunters and gatherers this could bring forward the time when population pressure prompts movement or expansion in the range of population. Again, it may bring forward the stage at which there is a more intensive adjustment.

Of course it is additionally important to appreciate that humans can anticipate change and they can also note changes in relativities. They may note the build-up of population pressure and act in advance of it becoming acute. Again, they can note environmental change of a type which changes the relative value of their local physical resources compared with those observable, or to be anticipated, elsewhere. There can also plainly be change in both the physical and social environment. Thus hunters and gatherers can become aware of the nearby practice of agriculture, potentially changing their understanding of the range of options in life. All these types of understandings may give rise to change.

Given that agriculture allowed the growth of larger and denser populations, a further evident tendency was for there to emerge more institutionalized social formations (states) and complex concentrated settlements (cities). Again the human tendency towards

aggression played its part in furthering the pattern as non-state communities adjacent to an early state felt obliged to form themselves into states to protect themselves from their more powerful neighbouring state - the phenomenon of secondary state formation. Finally the tendency for writing to emerge in early state societies must be noted. It has been stressed that demographic increase is interdependent with or implicated in these important developments but it is rarely properly to be viewed as a simple cause or effect.

The genetic change at the centre of this account concerns the ability to cooperate with others whether or not they are kin. Plainly there are net advantages to be had from cooperation on either basis, but it must be stressed that there is no reason (in either case) to expect the products or gains from cooperation to be shared equally; far from it, particularly where cooperation is coerced. Throughout it is the case that humans are gaining access to their means of subsistence cooperatively, but the patterns of cooperation exhibit a tendency to undergo systematic change. *The tendency is for kinship to decline in its relative dominance as a structuring principle although it always retains importance.* Among hunters and gatherers it is the central structuring principle. However, with the emergence of farming communities important changes become evident connecting greater social complexity to settlement, material culture and warfare. As Scarre indicates, 'There is a constant tension between centrifugal tendencies (the well-being of the community or village) and centripetal tendencies (the success of the individual household).' (2005b, p.190) It may be judged that the immediate and narrower concerns of kinship tend to be articulated through the latter. Furthermore as Scarre affirms, 'Sedentary settlements also provide fixed points within the landscape and

become a focus of identity (the place where you live), ethnicity (the community to which you belong), and ancestry (where you and your forebears were born and buried).' (2005b, p.191) More generally, in respect of social complexity, despite kinship remaining the key structuring principle, new types of social organization emerged. Social distinctions became increasingly institutionalized, as status at first based on individual prowess became transferred to individual lineages or families. There emerged systems of hereditary leadership. There was an elaboration in the division and specialization of labour going beyond the requirements of kinship. Material culture not only created an increasingly artificial world in which people lived and worked, but also signalled social diversity and difference. As regards warfare, the growing size of agricultural communities led to a gradual escalation in the scale of human conflict that has broadly continued to the present day. Plainly the investment of labour in fields and dwellings which could be raided or seized, along with food stores and increasing numbers of valuables, provided an incentive encouraging group-organized violence. Hence there was a growth in social organization oriented to defence and attack.

The advent of cities and states pushed further the decline in the relative importance of kinship as a structural principle. There was coalescence into larger and more institutionalized social formations and complex concentrated settlements. As numbers increased the cooperative framework expanded in both a horizontal and a vertical sense, an elaborated division of labour dealing with technical matters as well as issues of authority. States by definition possess centralized political institutions with ruling elites exercising control. Importantly, while 'kinship plays a less prominent structuring role in

states than in non-state societies, much of the internal history of states is focused on struggles for power and the succession among kin groups within the elite, in the form of ruling families.' (Scarre, 2005b, p.194)

At this point it is worth reminding oneself of the basic proposition that while those who are close kin have an already-given attachment to, and interest in, one another (which is not to say they may not quarrel!), this is not the case for non-relatives. Critically, in a state the leader or leaders stand in the latter relation to most of the subject population; hence there is a serious implicit need for their exercise of control to be legitimized. The fact that they may share identity and ethnicity with subjects may be relevant in this respect but is in itself insufficient. This is the context in which to understand the elaborate social organization concerned with the stylized or idealized portrayal of leaders and deities, together with the evident propaganda and stage-managed public performances. For the relationship to be maintained it is necessary for the subjects to comply: some (but not all) may do so because of coercion but the leaders are more secure where the subjects widely accept or even revere higher authority.

In connection with leadership there are clear potential problem areas. The issue of succession is one: when a leader dies who should take over? Since the whole of the population at least understands the institution of kinship that is one possible basis for choosing a new leader. But what if the leader has no offspring or their child/son is not yet adult? Also basic is the point that leadership always has instrumental aspects, for instance the need to respond to crises and war: where a leader is manifestly incompetent

how to respond? Close kin of a leader may expect to benefit from the leadership but they are also in a better position to judge competence than others and less likely to be totally taken in by propaganda; also the effective status and wealth gap between leaders and their own close relatives may be large. There is plenty of scope for struggles over power and succession within the elite.

Plainly the adoption of writing within states is of massive longer-term significance. Two points of early importance are that it is relevant to administrative competence and relevant too to the scope of cooperation over time and at a distance. Where revenues are gathered from subject populations written records increase the likelihood that this is done predictably and – where relevant – fairly: writing represents a (potentially) shared reference point which may come into play in dispute-resolution. Written content also offers greater certainty or predictability in circumstances where there is likely to be a considerable time delay in executing an intention (illustrated by the operation of a will) or where there is a need for accurate communication at some physical distance or involving intermediaries. Writing gives rise to new bases for cooperation and facilitates cooperation between larger numbers of people.

In this section, many tendencies for similar developments to take place independently across societies have been identified and pointed up. Part of the reason for so doing, concerns the issue as to the significance or otherwise of human culture, by which is meant shared knowledge, values and standards or a shared way of life. In connection with the explanation of developments in human life it is commonly said that these depend

upon culture and that societies and groups differ in respect of their cultures. In response it must be said that cultural differences are indeed extremely real, but one must nevertheless be wary of leaning too heavily on the explanatory value of the notion of culture or cultural difference faced with these patterns. Scarre summarises the position in these terms (2005b, p.41; italics in original): 'The fact that these same *trends* – towards food production, social complexity and urbanism – are found as independent developments in different parts of the world suggests that they correspond to basic facets of human behaviour that are common to all of us' i.e. that which all human beings share is fundamental rather than what divides them. Now regarding the explanation of that overall pattern, most would agree that common elements in the situation of human beings everywhere have a bearing upon it e.g. the availability of animals and plants which may be domesticated. Proceeding further what seems to be involved is not so much culture as the systematic or patterned changes which cultures may undergo – as in the change from hunting and gathering to agriculture. This last is primarily to be characterized in terms of change in social and technical organization i.e. in the pattern of cooperation.

The view is also taken that changes of the same kinds are to be associated with the further developments in human society, which may be judged as in conformity with the pattern identified in the last section of Chapter 6. One might consider for instance modern societies where subsistence is obtained largely through the application of inanimate sources of energy, and much or most of the population lives in cities. This type of society allows a population of a given size to procure a yet greater supply of goods and services from a given territory. Yet this is plainly done utilizing a very complex division

of labour. The number of specialized, technical tasks performed in an industrial society is vast. Not just this, but new social configurations are employed; for instance, the rational bureaucracy developed to effect the administration of large enterprises. These types of society are further characterized by the existence of an elaborate spatial division of labour. Hence, in sum, there is interdependence between population growth and the enhancement of the division and specialization of labour both in respect of its technical and social and organizational aspects.

Before proceeding further it may be helpful also to summarise how these developments from hunter-gatherers through to industrial (or post-industrial) society may be viewed in ecological terms. The growth of world population would not have been possible without humans making radical changes in their ecosystem. Plainly these changes have not been merely quantitative; that is our relationship to our biological and physical environment is much more than an enlarged replication of the relationship of hunter-gatherers to theirs. Indeed, because of the economists' 'law of diminishing returns', the additional supply of labour occasioned by an increase in population usually has *less* productivity than the existing labour supply. Hence usually the means of subsistence does not increase proportionate to an increase in population. Rather, the mechanism by means of which the means of subsistence has kept pace with growing population is a *qualitative* change in the ecosystem i.e. a change in technology and organization serving to increase the production possible on a given territory with a given input of labour. It seems likely that this type of change was occurring – but with greatly varying rapidity – both during the extended period in prehistory prior to the advent of settled agriculture, and during the shorter

period thereafter, but with the difference that responses to population pressure were more extensive in their territorial implications in the former case and intensive in the latter.

Empires and beyond

The evidence is that early states arose in lowland basins with fertile soil that could produce high agricultural yields with the benefit of irrigation, but cities and states subsequently developed in a much wider range of environmental settings. The human tendency to threaten and sometimes use organized violence is again centrally involved in subsequent developments, since frequent warfare between cities and states and their neighbours resulted in the formation of ever larger political entities. Factors driving the process included: the desire for security (through neutralizing or conquering potential enemies) or economic gain (by controlling greater resources) or personal ambition on the part of rulers and elites. The process appears sometimes as a series of recurrent cycles, by which individual states became powerful and achieved regional dominance, only to fracture and fragment as they failed to establish durable systems of integration and administration. There is evidence for such cycles in south-west Asia, and in Central and South America.

At their most expansive, these accumulations took the form of empires, such as the Roman Empire around the Mediterranean basin, or Peru under Inca rule. The distinction between state and empire is not an easy one to draw (Morrison, 2001). Empires are territorially more extensive and organizationally more complex. However, what they do represent, despite cycles of growth and decline, is a general process of global

development leading to the formation of larger and larger political units. The Spanish and British colonial empires are more recent steps along the same trajectory. This general process of global development accompanies a tendency for population numbers to increase long-term.

Darwin's claim is surely well-founded that, 'empire (where different communities fall under a common ruler) has been the default mode of political organization throughout most of history…The history of the world, it is tempting to say, is an imperial history, a history of empires' (2007, pp.23, 491). Plainly, given their prominence in recorded history and the generality sought here, empires warrant particular scrutiny. As regards the issue of definition, a consideration of work of Abernethy (2000) and Motyl (see Mackie, 208, p.44) brings forward these key ideas: that empire is a relationship of domination and subordination between one polity (the 'metropole') and one or more other territories ('colonies') claimed as its lawful possessions; also, that it may be understood in terms of 'core' and 'periphery', where a relatively complex metropolitan core dominates people to whom it is not accountable and there exist culturally and administratively distinct peripheries. Of course, it is the case that empire has taken many different forms over extended periods of time. One can note, for instance, the distinction between maritime and land-based empires and also that between states which were empires (e.g. Russia with its incorporation of Siberia) and states which possessed empires (Great Britain).

For our purposes Ferguson's rather different (informal) notion of empire is also suggestive for he defines it as an organization for extracting goods or services people would not offer voluntarily in a free market, or would not offer at the discount enforced. This might mean, for instance, that empire forced them to hand over their land, or to export raw materials on ships or through ports of the metropole, or to agree to reduce trade barriers or tariffs. The definition helpfully reminds us that empire is quintessentially a partially-integrated set of organizational and institutional arrangements with coerced cooperation at its core. This underlines the point that empire produces clear 'losers', both those who lose their lives who might not otherwise do so or those who lose out materially, and yet there are reasons for judging that in the longer-term it may tend to lead to overall population increase.

The direction of argument is readily illustrated by reference to the European maritime empires. The explosive penetration of the Spanish into the American continent was accompanied by epidemics, war and elemental exploitation resulting in great population loss. Particularly between 1750 and 1870 there was the subordination or removal of indigenous populations from vast areas of American, Australasian and South African temperate zones. Yet the land use changed fundamentally from relatively extensive methods of exploitation to relatively intensive ones. Indeed the explosive European penetration paved the way for these 'neo-Europes' – as they are sometimes termed – to be drawn in as integrated parts of a wider European-led economy. In association with these kinds of changes, empire – whatever the short-term population losses from

particularly warfare and epidemics - placed the populations of colonies and former colonies on an altogether higher longer-term population trajectory.

As is particularly illustrated for North America, it was not infrequently the case that the way the natives had already modified the ecology on land helped to create conditions which the superior technology of the newcomers could readily exploit, particularly in respect of fertile soil, game, timber and fisheries. Crucially too the colonists introduced European fauna and flora calculated to sustain their way of life in a way which Crosby has characterized as ecological imperialism and amounting to 'the biological expansion of Europe' (Crosby, 2004). That author also summarizes in an interesting way the ecological relation between the Amerindians and aboriginals more generally and subsequent European invaders, viewing the former 'as the shock troops, clearing the way for the second wave, with its more complicated economies and greater numbers' (Crosby, quoted, Williams, 2008, p.163).

These are striking instances concerning the implications of empire for population, but to grasp the position even more generally it is helpful to bring into play, and even extend, the theme Ferguson (2003) develops which is that – particularly major – empires such as Rome and nineteenth century Britain provide *public goods* for colonies and perhaps even internationally. In this connection it is worth focusing on the basic point that the metropole imposes some degree of order within its territory, with its politico-social and cultural elements. No doubt the detail varies greatly, but the paramount state uses its power to impose rules upon what might otherwise be a relatively anarchic configuration

of states or communities. In the latter connection the paramount power may indeed be said to confer the ‘public good’ of peace (even despite the phenomenon of suppression of local rebellions), it being a clear possibility that without its contribution the constituent elements might themselves be involved in local wars.

The metropole may often be seen to impose a politico-legal framework, together with language and religion; there may also be expansion of literacy, but this is emphatically not to say that cultural diversity within the empire is eliminated (just as local religions were tolerated in the Roman Empire alongside emperor worship). The use of more effective technologies may be extended over a greater area. The public goods conferred may also include laws and institutions for the protection of property rights (see, for instance, O’Brien, 2002, p.4). However, one clear consequence is that within the context of the imposed order there are new possibilities for cooperation, necessarily including, of course, the coerced type. Once the full range of ‘public goods’ is considered it becomes apparent that such elements as peace, language, institutions and technology may point in the direction of a modified pattern of cooperation associated with a rising population. Plainly this is more likely to be realized where the empire endures.

Case Study: the Chinese Empire

For illustrative purposes, let us consider a land-based empire of huge importance in Asia, the Chinese, which most certainly did endure, focusing particularly on conditions under the Qing dynasty (1644-1912), and prior to the changes forced on China by Britain in 1842. The approach to empire in that context may be characterized as relatively

unchanging and traditional. China's name in Mandarin means 'the Central Kingdom' and the emperor was considered as ruling by 'mandate from heaven'. Politics and administration were underpinned by a religious outlook embracing the teachings of Confucius, a thinker who legitimized the agrarian state by arguing that agriculture was the true basis of economic, political and moral well-being. Imperial control of such a large country was maintained by the use of civil officials (whom Europeans called 'mandarins') together with a social elite of scholar-gentry or degree holders who performed many essential functions of government in the localities.

It seems that the long period of political and social peace following the stabilization of the Qing dynasty was an important permissive context for something of a population boom. The amount of food available per head increased with the introduction of American food crops (notably peanuts, maize and sweet potatoes) in the seventeenth century; and agricultural productivity rose sharply in the eighteenth. The civil officials regulated movements of resources such as rice around the empire and, more generally, maintained a buoyant system of internal trade between regions, thereby helping to sustain a growing population numbering around 150 million in 1700, approximately 313 million in 1794 (Rowe, 2002, p.475), and perhaps 400 million in 1842 (Hack, 2009, p.9). However, there was also, during this period, a situation of relative 'technical stasis' in China, constrained by 'an elite culture hostile to borrowing, adaptation and innovation' (Waites, 2009, p.126).

Up until 1839 the Qing dynasty had extended its territorial control essentially by accretion from surrounding areas. Military campaigns were conducted against bordering kingdoms mainly to the north and west; which were often then turned into provinces. A characteristic *modus operandi* consisted of a 'tribute system'. The ideologically-rooted notion was that foreign states should and would acknowledge Chinese superiority through words and tribute, in return for which they received gifts; in actuality this sometimes amounted to inter-state trade accompanied by required deference and formalities. A further 'internal' feature of China's imperialism must be noted. The Manchu rulers of the Qing dynasty were, as the name suggests, of Manchurian origin and they always remained to a degree separate from the ethnically different, mainly Han population. Hence the Chinese empire may be thought of as 'internal' in respect of the domination of the Han and other groups; but 'external' in respect of control over territories conquered or brought into relations of tribute. However, the overall conclusion must be that the empire exhibited a tendency to expand its land area, drawing in adjacent peoples, but it did so in such a way that its overall population and population density tended to rise. The Chinese case is illustrative of the point that the empires even of despotic states can provide public goods within their borders – such as better communications, and free(r) movement of (at least some) people and goods, and unifying institutions and language – which provide conditions for population growth.

In considering the overall impact of an empire on population numbers there is a need to examine both the period in which it endured and its - possibly considerably extended - aftermath. For illustrative purposes consider the ancient civilizations and empires of the

Greeks and the Romans. In this connection it is not difficult to highlight - should one feel inclined to do so - highly negative features such as the fact that both were based on slavery and Roman government was at times dominated by something resembling mafia families; the deaths and injuries arising from the activities of the Roman legions were no doubt massive. However, it seems likely that long-term each impacted positively on population growth: after all these may properly be viewed as 'seed-bed' societies within western civilization. Each contributed in science and technology. Of strategic importance too are considerations to do with language and institutions. In each case language constituted a *lingua franca* which continued to be of prime importance for centuries after its specific ancient empire had disappeared, and it was via these languages that great knowledge and understanding were passed to much later generations. Latin formed the basis of the Latin languages upon which the unity of western European national groups such as those in Gaul and Iberia became based (superseding tribal loyalties); again, Roman law played an important long-term role in Europe. The Roman Empire ceased to exist but the Christian religion which was institutionalized within its boundaries continued in both its Latinate and Greek forms. A tentative conclusion is that Greece and Rome played their part in the long-term population growth of Europe as well as more widely.

Thinking more generally about imperialism and post-imperialist phases, one can perhaps risk the tentative assertion that the longer-term consequences are likely to be more marked where the empire had longer duration and where the cultural and institutional integration had been greater; there is also the matter of whether colonies were - in any

sense - 'prepared' for the post-imperial phase. In a suggestive study Abernethy (2000) considers empire and end-of-empire over the period 1415-1980 and makes an important point concerning political legacies. He argues (Abernethy, 2000, pp.367-9) that the chances of successful post-independence democracy are influenced by how far colony-wide representative institutions had been in place, and functioning effectively, before independence. He tabulates former metropoles against the degree of freedom in their ex-colonies. The British Empire, however belatedly, did extend representative assemblies to most colonies, and a majority of its colonies exhibit greater degrees of freedom, while the empires characterized by more authoritarian rule, such as those of France and Portugal, produced ex-colonies with much lower degrees of freedom – assessed by him as of the year 2000. At least one can say the more the 'idea of liberty' was rendered concrete in pre-independence territories, the greater their chance of having more democracy after independence. More generally, one can identify circumstances when a 'carry-over' of institutions is more likely, and where particular institutional configurations may promise more in terms of population growth (modern India providing an illustration).

In a suggestive way Ferguson widens his analysis to examine the provision of public goods by hegemonic states, where this influence may be judged to go beyond the confines of conventionally defined empires. He has in mind the wider role of Britain in the nineteenth century and of the USA in the later twentieth and early twenty-first centuries. Ferguson's essential point is that the paramount state or 'hegemon' may provide 'public goods' on a wider basis and other nations benefit; for instance, that state may maintain a degree of order and use power and persuasion to impose flexibly

enforced rules upon an otherwise potentially anarchic system of international relations. Thus he judges that the British Empire 'acted as an agency for imposing free markets, the rule of law, investor protection and relatively incorrupt government on roughly a quarter of the world' and encouraged those things in still more countries by 'the imperialism of free trade' (Ferguson, 2003, pp. xix-xx). He goes on to argue that 'no organization in history has done more to promote the free movement of goods, capital and labour than the British Empire in the nineteenth and early twentieth centuries', as well as 'to impose Western norms of law, order and governance around the world' (pp. xx-xxi). No doubt some will take issue with the detail of the account but his point is surely well made that a hegemonic power may sometimes extend widely the availability of public goods. The net result may be that the scope for possible cooperation is extended with positive implications for population growth.

A world of nation states

It is appropriate at this point to move the focus of discussion from the historically important phenomenon of empire to the arguably more modern conception of the nation state. There is a marked difference between political organization in the Middle Ages and that evident today. Whereas at the earlier time the human population was organized around empires and world religions which often lacked precise political boundaries, what one now finds is the division of geopolitical space into fixed, bounded territorial entities. Particularly since the Second World War when European powers divested themselves of former colonies, a worldwide system prevails, whereby humankind is organized into approximately 190 exclusive communities, or nation states. In political terms there has

been a tight in-filling of space, in marked contrast to the position in former times. It is important for present purposes to examine the origins and significance of this now highly familiar phenomenon.

Five elements seem to be involved in the nation-state system (see McGrew, 2004, p.133). A principle of *territoriality* operates whereby there is organization into discrete territorially-defined political communities. The notion of *sovereignty* is forwarded as, within its territory, each state or national government claims supreme and exclusive authority over its people (formerly viewed as subjects but increasingly defined as citizens), while also, in some sense, seeking their allegiance. A principle of *autonomy* separates the internal domestic sphere from the world outside: the individual countries are responsible for and, in a sense, 'contain', the political, social and economic activity within their fixed borders. States have *primacy* within the political landscape since they control access to the natural and human resources within their territories. Finally, there is a principle of *responsibility*, whereby states are understood to be responsible for their own survival and integrity – they must 'look after' themselves - while also being responsible for the security and well-being of their citizens, and, in particular, protecting them from outside interference. They do so within the context of an - at least potentially - relatively 'anarchic' international 'system'.

This particular set of arrangements whereby humanity is organized is referred to as the *Westphalian System* and it is significant that it is judged to have its origins in Europe and in the Peace of Westphalia (1648 AD). At that date European monarchs agreed, 'to

recognize each other's right to rule their own territories, free from outside interference' (McGrew, 2004, p.133). Around that time the population of Europe was tending to grow, increasing the tendency for the peoples of individual states to inter-affect or interfere with one another, and there were important religious (especially protestant and catholic), linguistic and other cultural lines of division; the continent had been racked by territorial claims and disputes often resulting in war. This was also the period when European powers were beginning to see more opportunities for expansion overseas than within Europe itself. Absolutist monarchs were finding themselves endlessly at loggerheads, but, nevertheless, this development represents a highly strategic extension of the cooperative framework. The essential point is that it introduced relatively more predictability and security into the frameworks of the lives of Europeans; hence it increased the likelihood of population growth. It exemplifies the pattern whereby *extensions in the framework of cooperation and population growth inter-affect one another*.

Of course, it was only in the twentieth century and particularly following the Second World War, with the dismantling of European overseas empires, that 'statehood and national self-determination finally became the sole principles by which the world's peoples came to be politically organized.' (McGrew, 2004, p.133) But what exactly had happened to transform a European into a worldwide phenomenon? The main factor was that, in the meantime, empires had come to dominate virtually all the world's inhabitable territory, thereby making certain public goods more widely available, as discussed earlier. European colonial powers and those subject to their influence increasingly operated with

the system of concepts underlying the nation state. Competing European powers came to define boundaries between their spheres of influence; they also created sub-territories or quasi-nations within their empires. As already indicated, it was also generally the case that, despite the occurrence of many wars, empire tended to put colonial territories on the trajectory of increasing population. Vitally, too, it was the experience of subjection to European power that created, particularly in educated elites in colonial territories, the aspiration to independent statehood. Thus the end of empire led to the birth of numerous nation states whose boundaries had been determined by colonial powers, rather than ones which arose from indigenous – for instance, tribal – differences. Hence the phenomenon of empire is a vitally important causative influence on the creation of a comprehensive nation state system. Nevertheless, in sum, a fundamentally cooperative organizational and conceptual framework had been created on a worldwide basis which opened the way to further population growth.

Further developments since the war plainly have been shaped by power differences between nation states. However, in connection with a consideration of the contribution of hegemonic or relatively dominant states (of the type provided earlier), the error is to conclude too readily that their actions and the consequences of those actions are to be understood simply by reference to the idea that they are self-serving. (An equivalent error may be made in respect of the contributions of individuals.) Thus dominant powers at the end of the Second World War came together in the creation of the United Nations Organization (UNO), when, no doubt, each one had an eye to its own national interest (and which interests are manifested to this day in the composition of the UN Security

Council). Nevertheless, virtually every nation state in the world now belongs to the United Nations which advances common interests on the widest basis; it has also developed its own powers and authority. Its overall contribution is such as to reduce tension and conflict in the world and is supremely illustrative of the general pattern in human life whereby, where there are groups who are constantly squabbling and fighting, higher-level cooperation is expressed in the creation and contribution of overarching bodies which moderate and serve to diminish the occurrence of violence.

More generally, the pattern evident in geopolitics since the Second World War may be characterized in the following way. Although nothing has emerged which remotely constitutes world government, there has been a considerable build-up of international governance, with such bodies as the UN, The World Health Organization, the World Bank, the International Monetary Fund, the World Trade Organization playing prominent roles. Again, there have emerged supra-national regional groupings of considerable importance such as the European Community or mutual defence associations such as NATO. Thus it has been a period especially marked by higher-level cooperation, by which is meant cooperation over and above that which is proceeding within the confines of particular nation states. While it is the case that these bodies are geared to achieving differing objectives, it is noticeable that many are concerned with such matters as orderly resolution of disputes, or setting the terms upon which parties may relate in an orderly way, or assisting parties who are temporarily in difficulties; there is also the recurrent idea that lower-level entities (such as firms) should be enabled or constrained to relate or compete ‘on a level playing-field’. In a complex world with such a large population and

experiencing globalization – itself a phenomenon manifested at several levels from the individual to the supranational - the potential for conflict which could lead to violence is particularly great. Nevertheless the tendency is for structures of higher-level cooperation to play an ever-more-prominent moderating role, thereby creating the conditions for further population growth. (A consolidated review of the significance of violence and war in the human story is provided in the final section of Chapter 8.)

Summarizing conclusion

This chapter has focused on how changing patterns of cooperation have tended to generate population increase throughout prehistory and history. The population of hunter-gatherers tended to grow through expansion in space. Significantly, the crucially important phenomenon of agriculture arose independently in at least seven regions of the world. The emergence of agriculture may only be understood once it is appreciated that various incremental stages are involved as are differing associated phenomena such as domestication, cultivation, herding and sedentism; there is also the important distinction between hoe agriculture and plough agriculture and the need to take full account of technologies of intensification. Population pressure contributed by leading hunter-gatherers to spread in ways made possible by technical modification, but the same kind of pressure sometimes resulted in intensive adjustment involving technical and organizational change.

A further evident tendency was for there to emerge more institutionalized social formations (states) and complex concentrated settlements (cities). The human tendency towards aggression played an important part. In association with these changes there is a tendency for kinship to decline in relative importance as a structuring principle although it always retains importance. That the same trends – towards food production, social complexity and urbanism – are found as independent developments in different parts of the globe points to the importance of gradual yet systematic change in social and technical organization i.e. in the pattern of cooperation.

Warfare between cities and states played its part in the formation of ever larger political entities. Recorded history is marked by the emergence of empires and nation states. Attention has been drawn to the way in which, in respect of empire, the metropole confers a range of public goods throughout its territories thereby tending to generate a wider pattern of cooperation associated with a rising population. Empire and population growth both played a part in the emergence of the nation-state system, initially in Europe. Despite the occurrence of wars, a fundamentally cooperative organizational framework was thereby created – eventually on a worldwide basis. More recently there has followed a build-up of international and supra-national governance i.e. structures of higher-level cooperation which perform a moderating role. There is evidently a dynamic setting, conducive to a steadily rising population growth.

Chapter 8: Complex societies

In this chapter the attempt is made further to situate complex societies within an extended discussion of the ways in which human cooperation may tend to give rise to a growing population. Given the nature and degree of that complexity the approach adopted is intended to be suggestive rather than exhaustive, concentrating on the most strategic aspects. Thus consideration is given as to how orderly cooperation is sustained and extended in larger populations. In this connection, the development of the built environment, money and technologies of communication plays a key part. The attempt is also made to situate the notion that there has been extension in the scope of rational action. It becomes apparent, given patterns in Western societies, that there is a discernible approach to a limiting point in terms of the scope for communication to give rise to cooperation. This brief review of some key elements is again suggestive of the idea that the single most important variable mediating between the occurrence and expansion of cooperation and the build-up of population is the development of the division and specialization of labour. Finally, in the chapter, the perennial phenomenon of violence and war is considered.

(a) The built environment

Cooperation emerged and first developed between people who were physically close. With the coming of sedentism use would have been made of the home base and movements of people assisted by the creation of paths and the use of animal tracks. Overtime the domestication of animals came to play its part in the transport of people and goods. More recently there have been many important technical advances in respect of

means of transport. It may be judged that these are highly significant in relation to the elaboration of the division and specialization of labour, most notably in respect of its spatial aspect, and are interdependent with population growth.

A main pattern to note concerns co-action. It is plainly the case that humans change the physical environment in semi-permanent ways. Through their patterned activity and cooperative efforts they are provided with the physical means which they rely upon to sustain their way of life. Consider in this connection the nature of a house. The rooms are designed for and lend themselves to various uses, but they also proclaim those uses. Newcomers generally know what to expect. Hence the design lends itself to orderly co-action; for instance, one person may be washing up while another makes the bed and a third uses the toilet. The design accommodates patterned use in respect of both space and time; there is a minimal tendency for people to interfere with one another in unexpected ways.

A semi-permanent structure such as a house represents an investment in its own use with substantial implications for future action, although of course it could be adapted – at cost - for other uses. There is a sense in which a house encourages people to live in it (consider the phenomenon of squatting), which itself has implications for population. Significantly, where the housing stock of a given area consists of two- and three-bedroomed houses, this itself seems to carry the implication that families may be expected to consist of parents with three or fewer children rather than parents with ten.

Semi-permanent structures and artifacts convey information and implications for expected behaviour.

The same goes for the physical environment outside the house. A path provides a surface upon which to walk but, more than this, it provides a recognized route. Roads are transformed surfaces linked within a network upon which vehicles readily move but they also proclaim their own use. Notably there is an elaborate associated system of signs and communication both regulating and facilitating their use; systems operate whereby attempts to interfere with orderly movement of vehicles are cut short. Those encountering and using roads know what to expect. Physical movement is maximally assisted – while of course being at cost - but the likelihood of people hindering or impeding each other minimized. Hence individuals are presented with a greater range of options in respect of those with whom they may have face-to-face contact, while the possibilities in terms of co-action are maximized e.g. one drives to work and after work to the supermarket, which has meanwhile received a fresh delivery.

It is important to stress that the system of signs and communication associated with semi-permanent change in the physical (built) environment includes both permissions and prohibitions. For instance, given the institution of private ownership, there is understanding of what a house, a farm, or a factory is, but also that one would normally only enter for limited periods when permitted to do so by the occupier/owner. The effect is to lead the majority of the population to expect to be excluded from large areas for extended periods of time. Nevertheless the orderly arrangements are such as to increase

the predictability of successful passage, to reduce the chances of people interfering with one another, and hence reduce the likelihood of conflict leading to injury or death.

These semi-permanent created features of the physical environment generally change very gradually overtime. (A counter example is presented by the occurrence of war.) It would be unthinkable to relocate all the buildings located in, and functions performed in, London to (say) Llandindrod Wells in quick time. Manifestly the preservation and gradual development of these features is sustaining of the overall societal division of labour and the large population with which it is interdependent; indeed, the improvement of the facilities could more readily accompany a rise in the population using and dependent upon them.

(b) Writing

Two centrally important points about writing as opposed to oral communication concern time and objectively-given – potentially public – shared reference. The human memory is perhaps surprisingly good, but it is by no means infallible. Things of great importance may nevertheless be forgotten and there can be endless disputes about what was said or agreed. Hence effective human cooperation in a practical sense is powerfully advanced by the coming of writing. Above, the notion of cooperation giving rise to shared 'mental' maps of an area is advanced. When these kinds of maps are supplemented by physical ones, there is potentially more reliable information and shared reference sustained through time. Significantly, writing, as noted in Chapter 7, first emerged in several regions as a device for record-keeping in hierarchical (priestly) and/or bureaucratic

contexts in the ancient world. No doubt, even given a social system of highly unequal power relations, it played a major part in regularizing transactions and making them more predictable, hence diminishing the tendency to provoke unintended conflict. Of course, from the outset there is the potential for differing types of writing expressing various types of interest – the religious and artistic concern with calligraphy would be illustrative – hence bringing people together on various bases.

Importantly, as is suggested by its origins, writing is relevant to a range of what might be termed 'second-order' phenomena and activities, associated with and arising out of 'primary activities'. Once organization gets at all complex it is difficult for people to know precisely what is expected of them and how differing contributions connect up. Writing can provide the agreed reference point. The central feature of a modern rational bureaucracy is decision-making by reference to written rules. It is also the case that particular documents and particular formulations which may be embodied in documents acquire a special status. In a religious context particular formulations acquire 'canonical' authority as scripture. Also highly strategic are precise legal formulations embodied in documents which govern activities within and beyond courts, and secure the status of other documents. The law and scripture powerfully legitimate and regulate in their differing ways on the widest basis. On a specific point, a property transaction as expressed in a deed may be taken as definitive of the transaction. Paper money on its face bears witness to what is owed but also constitutes the monetary value in itself. These materials acquire their significance from associated second-order cooperative activity, but

they then play a fundamental role in shaping orderly activity and the division of labour in their various spheres.

There is no reason to believe that the underlying intellectual powers of humans have altered radically since the invention of writing but their intellectual achievements have expanded exponentially. This is because writing facilitates every type of second- or higher-order, shared, 'mental' activity. Prior to writing, mathematical knowledge was rudimentary, but it flowered with the coming of writing. Without any type of external representation of number, people could perhaps count up to four or five, but it would have been next to impossible to do the equivalent of calculating in one's head 14x15, leaving aside the issue of motivation for so doing. With the coming of external representations as with the abacus and writing things get altogether easier; even then the adoption of a convenient notation is crucial. Individuals interact with writing when seeking to engage in disciplined inquiries and writing enables the individual contributions to build. Thus writing powerfully assists even rudimentary investigation of a scientific or technical type. Yet those investigations may also open the way to practices enabling a larger population to be sustained.

(c) Money and capitalism

Of strategic importance in the human story is the emergence of money. A specified item comes to be used as a medium of exchange in, for instance, markets; this has included livestock, stacks of grain and cowry shells. A very early example comes from Mesopotamia where 'values of account were being given in measures of grain or silver

before 2000BC' (Roberts, 1980, p.104). Whether or not items are easily transportable is highly relevant to their ease of use – a factor favouring precious metals; true metal currency arises, for instance, when ingots are officially sealed. Many peoples in the ancient world got along for centuries without money but there was, nevertheless, a tendency for that institution to arise, expand in scope and ramify in its implications. (Davies 2010; Ferguson, 2012) Significantly, where money is initially used within a particular administration its use tends eventually to extend beyond that administration; also currencies become convertible.

Where there is simply barter or a (purely) administered economy the fact that the trading relationship is directly associated with the physical conveyance of goods for collection and delivery, tends to confine the activity to a limited locale. On the other hand, where there is an easily transportable medium of exchange – a stock of value – there is the ability to trade over a wider area and with a wider population. Money facilitates and promotes cooperative trading relations with populations whose individual members are not known or identifiable in advance: it lends itself to the development of markets in both goods and services. There can also be borrowing and lending, so ties originating in this way may again involve those who are relatively remote geographically. Of course there are stages in the precise use of money (with use of coin and paper coming later), but with extension in the geographical range of individual currencies and their tendency to become inter-convertible, a process is set in train whereby the populations drawn together in an economic sense tend to expand without limit. It is not too much to claim that the introduction of money is an early harbinger of globalization.

Money tends to develop markets for labour power and (even) people themselves, as with slavery. Clearly money gives rise to specific roles such as money lender, but more generally it assists in the development of the division and specialization of labour. With the coming of coin and paper particularly, money as a readily partible medium of exchange lends itself to action on the basis of a calculation of relative value. Someone engaged in a specialized role or a set of anticipated roles can do so in the expectation that they can afford to meet their other needs from the proceeds. Again, they can plan to achieve a surplus.

There is a specific and important way in which money contributes to the development of cooperative relations in respect of trade in goods and services, while also sharpening the division of labour. It is implied by Ricardo's law of comparative advantage. Suppose there are two individuals or groups of any size (e.g. nations). Suppose also that the first individual or group is good at producing food and very good at producing clothing, while the second is bad at producing food and very bad at producing clothing. Given this circumstance most people tend to judge that it would be in the best interests of the first party to walk away from the second; but Ricardo showed that this would be an error. In fact, both parties stand to gain by specializing - the first in clothing, the second in food - and trading their surpluses. When generalized, these same sorts of considerations point to the gains to all flowing from free trade. The key point to arise is that given the institution of money and the way it comes to define interests and relative values, there will be a tendency through extended time for parties to realize there are gains to be had

by their entering these kinds of relations i.e. there is a tendency for the potential to cooperate in trade relations to be realized. Since this argument is general and has application at so many levels, it could hardly be of greater significance in the understanding of how cooperative relations tend to develop without limit. (I am indebted to Mark Pagel for alerting me to the significance of the argument of this paragraph and for the very details of the example used here to convey it; see Pagel, 2012, pp.104-5)

It has been stressed in this account that there is a tendency for orderly cooperative behaviour to be promoted and for interference with cooperation to be minimized. This provides useful context within which to understand the coming of insurance. Clearly with the build-up in trade following upon the use of money, it would become apparent that potentially valuable cooperative relationships could be disrupted by chance events or by other parties with ulterior motives. A party could, for instance, have commenced cooperation but then because of interference be unable to go through with it. Insurance helps to overcome the disruptive effects of adverse possibilities and thus facilitates more readily sustainable patterns of cooperation.

As has been particularly thoroughly documented and researched by historians and social scientists, a whole configuration of elements came together at a particular time and in a particular geographical area to give rise to and form a developing capitalist economy. Besides the prior existence of a money economy, a large number of other preconditions and conditions – particularly legal and financial – underlie this particular institutional form. Not just this, but there is point to the suggestion that the motivations of those who

came to play strategic roles at an early stage within that institutional context were in part of religious origin. At roughly the same time too religion was playing a part in the emergence of other strategic roles such as that of scientist and technologist. Partly as a consequence, the nations concerned were becoming relatively more powerful than others in military terms. These developments were preconditions for the phenomenon whereby populations underwent the 'demographic transition' (considered in Chapter 9). The point to stress at this stage is that though these developments associated with the emergence of the capitalist economic system occurred in a particular geographical region, there is every reason to expect that the pattern would not remain confined but would be extended much more widely.

Money lends itself to the development of a chain of cooperative links between those who are remote geographically. However, associated with this, there is expansion in the range of unintended consequences of action. Thus people in one place who refrain from buying a particular good may, as a consequence, give rise to unemployment of workers in a place remote from them. Again, within a developed capitalist economy, the patterned actions of large numbers may be seen to give rise to conditions of 'boom' and 'bust' without anyone really intending it; indeed, governments may be observed to struggle unsuccessfully to arrest the tendency. The institution of money is thus central to the phenomenon whereby patterned instances of cooperative action generate indirect consequences which 'escape' easy cooperative control; further cooperative efforts are, however, typically forthcoming which, in their turn, address those consequences, perhaps leading to the amelioration of problems.

(d) Extended scope of rational action

The general human capacity for rational action has already been firmly asserted, but it is notable that many theorists point up the strategic importance of that type of action in the modern era. Particularly influential is Max Weber's view that a rationalization process has proceeded over the centuries in Western societies (Gerth and Mills, 1998); one may add that the scope of that type of orientation would appear to have been even further extended in association with globalization. In his analysis of action, Weber distinguished between rationality in relation to a value and means-ends rationality but it is the latter which receives most attention. As noted already, that author also highlights the central importance of the use of rational bureaucracy for formal organizational purposes. The notion is that people have tended increasingly to adopt a rational approach in their lives, meaning that they proceed in a calculative way by selecting the most (objectively) effective and efficient means in order to achieve 'concrete' goals i.e. goals which correspond to the realization of an empirically identifiable state of affairs as opposed to (say) spiritual ends. (The discussion of religion of Chapter 5 provides a contrasting instance: attention is there drawn to the kind of quasi-rationality expressed even in such a practice as human sacrifice but reasons are given as to why that practice might be expected to decline or disappear in the longer-term, given the 'costs' involved and the non-demonstrability of its effectiveness.)

The more systematic adoption of a rational approach is bound up with the emergence of particular institutional forms, perhaps most notably with a money economy and

capitalism. The point about a money economy and markets of the type with which we are familiar is that one has ready access to information about price and the ability to make fairly comprehensive comparisons across an extended range. The notion of what is in one's interest may now be used in a comprehensive and integrated way and is widely and publicly understood. Most obviously it is in anyone's interest to sell at a higher price and buy at a lower price, because being left with a larger sum of money enables you to do anything you could do with a smaller one but also able to do more: it simply increases absolutely one's range of options. Importantly, economic actors who fail to act in ways which serve their self interest in this sense will tend to be driven out of the market. Hence it proves to be helpful within economics to operate with the notion that prices and the allocation of scarce resources can be explained by the rational maximization of utility by economic actors. However, it is of the essence that stable relationships of exchange depend upon the cooperation implied by the existence of trust and law enforcement i.e. the extensive adoption of a rational approach depends upon an institutional context with cooperation at its core.

Further to this strategic example it may be judged that wider adoption of a rational approach is highly bound up with there being publicly available systems of recording and measurement – as there is with money. The modern approach to the rational organization of work is dependent upon monetary calculation but also upon the accurate measurement of space and – especially – time: the characteristic patterns of industrial societies arise in this way. The operation of rational bureaucracy is itself highly dependent upon the keeping of accurate written records. In a further highly strategic example it may be

suggested that the development of an institutionalized rational approach to science and engineering was interdependent with the recognition of the value of accurate recording and measurement of such variables as time, space and mass, ultimately taking in the very large and the very small. (As Weber himself points out in a rather different example, people orient more rationally in the production and consumption of music given that standardized musical notation has been developed.)

A rational – in combination with a more humane – approach is also evident in penal policy. There is now a vastly diminished tendency to wish to cause offenders pain for its own sake or as revenge. No doubt too one reason for the savagery of past centuries was that it was hard for the central authorities of states to know about and control behaviour throughout their territories: in effect, they sought to control even in remote places by putting the population into a state of extreme fear (often amplified by the religious context) through the exemplary punishment of unfortunate individuals. By contrast, prisons are now designed to confine and monitor offenders but also with the goal of rehabilitating them. In many modern democracies the killing and maiming of offenders has been eliminated entirely. One could fairly say that these types of society seek to incorporate everyone – whatever their past behaviour - into the overall framework of societal cooperation.

A further basic point is that people are more likely to orient instrumentally where the suggested means to a given end is of greater reliability. Given the central concern here with population and population growth, a further highly strategic example would be

change in the approach to child-bearing and rearing. Now in the foregoing it has been stressed that since they first understood, albeit in rudimentary form, the link between sexual intercourse and subsequent child-bearing, humans have sometimes tried actively to intervene so as to reduce the likelihood of childbirth. However, until relatively recently in situations where heterosexual desire was given expression, it was relatively hard to produce a deterministic outcome in terms of restriction of childbirth. The significance of the innovations of the nineteenth century and in particular the vulcanization of rubber is that this begins to change; the advent of the contraceptive pill of the nineteen-sixties is even more decisive. The change in outlook which this made possible in Western societies in the last two centuries may be summed up in the phrase *family planning*: there was now some real hope of controlling the numbers and timing of births. The resultant changes in behaviour contribute to the population patterns of the last few centuries which are considered in Chapter 9.

(e) Globalization

A consideration of the built environment and transport, money and writing sets the scene for a more general characterization of the process underway in respect of human cooperation. That process is highlighted to an even greater degree once full account is taken of recent developments in information and communication technologies. The term most often used to encapsulate the pattern of global change is globalization. In one particularly succinct account this is viewed as a process involving *stretched social relations, intensification of flows* and networks of interaction and interconnectedness that transcend nation states, *interpenetration* of economic and social practices, and the

development of *global infrastructure*. (Cochrane and Pain, 2004, pp.15-17) Also pertinent for present purposes is the notion of *time-space distanciation*. Conventional face-to-face interaction involves people being co-present, but interaction can become 'extended' in space and time, with the parties no longer being co-present. (Held and Thompson, 1989, pp.7-8; Giddens, 1990) This type of distancing has plainly been facilitated by new forms of transport and communication. For instance, the telegraph enabled people to communicate quickly when at a distance. The central focus here is on cooperation between embodied persons and patently the possibilities in this respect have developed massively as have those in respect of the creation and maintenance of extended cooperative frameworks; no doubt too there is massively expanded scope for the latter types of frameworks to inter-affect one another. Among other things, with the assistance of newer technologies, there is a growing capacity for nation-states and other agents to store information about populations and thereby to monitor and potentially control their activities.

As noted already money facilitates trade over a greater area and with a wider population; additional (invented) financial instruments ensure payment at some future date. One may now engage in financial transactions with those on another continent by electronic means and at the press of a button. Again, with the coming of social networking sites, there has been rapid advance in the ability to gain information rapidly about previously unknown people. In sum, there is a greater ability to cooperate at a distance on various bases, alongside a greater ability to determine with whom one may wish to cooperate; this may be followed as appropriate by in-person, face-to-face contact.

It may not be too far-fetched to suggest that the patterns evident particularly in western societies are straining towards what may be characterized as an 'ideal type' pattern, although subject to severe resource limitations. In saying this one has in mind several elements. Supposing every residential unit – or even every adult – has 'personalised' transport such as the motor car, then the possibilities for bodily in-person contact are in effect maximized, accept that they would be even greater with the help of personalized aircraft (!) Meanwhile electronic communication maximizes the possibilities for contact where the parties do not need to be co-present, and also facilitates the selection of co-respondents. Certainly the possibilities for cooperation seem to be in sight of a maximal limiting point. More than this, without being too speculative, there does seem to be a perceptible tendency for information which people were previously content to remain 'private' to be reclassified as that which should be able to be accessed more widely e.g. through social-networking sites. Were this tendency to develop further it would only serve to enlarge the pool of information which may inform the choices of potentially cooperating parties. When account is also taken of other strategic developments – for example, that in respect of the built environment - a pattern becomes apparent: *cooperation gives rise to conceptualization of the external world, but then humans set about changing the external world so as to maximize the possibilities for cooperation within it.*

Patently, too, the various elements of globalization bear upon the tendency for the world's population to grow steadily. Plainly, for instance, global infrastructure

contributes directly through a cooperative enterprise such as the World Health Organization; and the input of that organization is essentially dynamic: it is trying constantly to innovate and improve performance. Many other elements of infrastructure provide systematic and innovative contributions which bear indirectly upon population growth. The steadily advancing improvements in transport and communication are of the essence e.g. in enabling people to seek help when in difficulty and in mounting a response.

Developments occurring at this time in education are also indicative of a transformation from face-to-face cooperation to cooperation on the widest conceivable basis, the point being that anyone with an internet connection can have access. For instance, proceeding beyond the traditional model of a university with its lectures and tutorials, we may now all benefit from 'massive open online courses' or 'Moocs' (Agarwal, 2013, p.31). This online learning is said to promote active learning, with learners watching videos and engaging in interactive exercises. Moocs enable instant feedback through automatically graded exercises, self-paced learning, and peer learning through online discussion. Front-rank academics and educationists contribute in innovatory ways and data collected online contributes to research on how students learn most effectively. Use is even being made of artificial intelligence to help teachers assess students' work. The striking claim made is that, 'Moocs make education borderless, gender-blind, race-blind, class-blind and bank-account blind.' (Agarwal, 2013, p.31) At any rate, there does appear to be an underlying potential for universal reach.

The significance of violence and war

The reader may well be conscious of a source of difficulty for an approach which focuses on the notion that characteristically human cooperation gives rise to population growth, particularly when taken together with the assertion that there is no naturally given tendency for there to be positive attachment between unrelated persons. That difficulty concerns the marked human tendency to threaten, and not infrequently to resort to, the use of violence. This tendency is perennial and has been manifested at every level from the individual through to the supra-national; it is not just that humans show a marked tendency to squabble but things frequently go from bad to worse and they resort to fighting and war. (Junger, 2010; Keeley, 1996) Plainly this seemingly points in a direction different from the thesis being considered here because cooperation in the use of violence or in war results in death or injury: it increases mortality and loss of potential fertility. This topic is in a sense 'worked through' in the evidence and discussion of Chapter 7, but it may be valuable to provide a more succinct, integrated response at this point.

At the risk of being pedantic, the connection between cooperation and war may be expressed in the following terms. A conventional war in which there are two opposing armies or sets of forces – of which there have been a great many in human history – is not an instance of cooperation between them, and *the resulting maiming and mortality results from their failure to cooperate*. Indeed the failure to act cooperatively typically stems from the rejection by one or both sides of the possibility of coerced cooperation i.e. where one side capitulates and is effectively dominated or even enslaved by the other; on

the other hand, during combat there is cooperation within each side. Hence the actuality of violence and war could be said to represent *a failure to realize a latent potential for there to be cooperation* between the two sides. However, typically war does end with cooperation between them, which is not infrequently of the coerced type. There is a clearly identifiable pattern whereby all higher-level cooperation between representatives (which itself could be coerced i.e. undertaken subject to duress) during and at the end of the conflict – taking the form of negotiation (directed to achieving an outcome 'on the right terms') - concerns the basis for further long-term cooperation between the two sides.

It is worth reflecting that human beings could have evolved to be less antagonistic and belligerent than they are towards members of their own species if it served that species well, but they have not done so; this reflection points to the position being more complex than initially appears. Thus a key point in response is that conflict leading to violence, just as is the case for coerced cooperation, has played its part in creating the conditions for population growth. Consider for instance the tendency for early humans to spread throughout the habitable parts of the globe. It seems likely that this tendency to spread originates at least partly from the tendency for potentially violent conflict to arise (including between blood relatives) once the population locally begins to exceed the carrying capacity of the land; but it was this very tendency for the population to spread which more nearly maximized overall numbers at that stage. Also, where a settled agricultural population extends its range by force to displace hunters and gatherers this might well lead to overall population increase, which could even be the case where the former proceed to dominate and enslave or destroy the latter. Again, where whole

continents such as North America and Australia are thinly occupied by hunter-gatherers and others using simple technologies, patently their substantial displacement by settlers with superior agricultural and general technologies opens the way to greater population growth. Considering the tendency among humans cooperatively to threaten and sometimes to resort to violence, it seems likely that its positive implications for longer-term population growth through its potential to create the conditions for it, more than outweigh the negative implications of violence lacking in that potential. However, there is also good reason to believe that human cooperative activity of a 'higher level' type tends also to come into play to limit the losses in numbers sustained from this source.

Indeed, arising out of the review provided in Chapter7 of developments in prehistory and history, the key point may be made more sharply: that the threat of violence or the actuality of that threat may be the critical causative factor in societal or institutional change of long-term significance for extending the scope of cooperation and thereby making population growth more likely. As already noted Diamond (1998) draws attention to the contribution of war to the amalgamation of societies: creating larger entities which from that point on draw together previously conflicting parties within a more integrated system of control. As has been shown, from Ferguson's (2003) work one may draw the theme that following upon the creation of an empire, the paramount power may be said to confer various 'public goods' for its colonies – including (relative) peace – which are conditions for extension in the scope of cooperation, again with positive implications for population growth. As has already been explained, empire was itself an important part of the context giving rise to the fully-developed nation state system with which we are

familiar and that development, too, may be seen to have positive implications. The point is not that the likelihood of waging war is thereby eliminated - far from it - but that it is at least significantly diminished because the scope of the authority of individual governments is clarified and agreed in respect of internal affairs within defined boundaries, thereby increasing the security and predictability of life for their populations. Additionally relevant is the pattern experienced in living memory whereby, within the context of that nation-state system, there is a massive build-up of international governance directed at maintaining and developing cooperative relations between the governments and populations of differing nation states. Hence sense may be given to the assertion that societal and institutional change overtime has tended increasingly to realise a latent potential for cooperation without recourse to violence and war.

A specific aspect concerns change in social organization in anticipation of possible violence or war; this could be associated with either an aggressive or a defensive stance. This typically involves the use of centralized authority to reorganize and redirect resources. Therefore there is a stimulus to state formation or to the further strengthening of central state institutions. Significantly too, it is virtually always in the interests of the authorities to be able to call upon greater manpower. Plainly the position will be helped by a larger availability of younger adult males; were the requirement to persist for extended time the number of male children and the fertility rate would be of concern. There is also a discernible pattern whereby states not infrequently hire mercenaries to fight on their behalf. Yet necessarily their ability to generate resources enabling them to do so has some relation to the size of their own populations. Hence there is at least an

underlying interest in there being a rising rather than declining population; of course, so also would there be an interest in making good the losses sustained from actual violence or war.

The links between war and population may also be illuminated through consideration of the histories of particular geographical areas. A state, empire or nation-state associated with a particular area may perhaps be characterized as a human macro-cooperative endeavour, but it is not a naturally occurring phenomenon in any other sense. England (or Great Britain) may be a 'green and pleasant land' but there is no natural conjunction between that particular area on the globe and (latterly) a democratic political entity of English-speaking people: that came about as a complex resultant of Anglo-Saxon invasions, the Norman Conquest and innumerable other occurrences. At various times external adversaries have needed to be tackled or repelled while internal conflicts have also played their part in its developing nature. Plainly fighting and war has been part of the means by which that particular national entity emerged and persisted through extended time. It will also be readily granted that conditions were created (*inter alia* endogenous change was generated) which gave rise to considerable population growth, without that necessarily being a national objective at any time. Hence, one can say that some cooperation issuing in violence and war – thereby giving rise to mortality – has in practice been a necessary condition for population growth within the defined area of Great Britain.

As is also illustrated by the case of Great Britain, systematic (endogenous) institutional change plays its part in reducing the likelihood of internal violence; in this connection the institution of the law is strategically central but other institutions are involved. However, systems of social control are not static but are emergent and develop in response to felt problems. Thus, in our type of society, what typically happens is that there is an accretion in law (perhaps both civil and criminal) to accommodate, and have application to, all the various sets of circumstances which present themselves; the whole point of the law being to reduce the likelihood of disputes getting out of control. The common law system of England where the state of the law is determined by binding precedent taken together with the continuous input of statutory law is illustrative of a pattern of growth by gradual accretion. Not just this, but other changes concerning for instance the existence and operation of a police force are introduced to reduce the likelihood of violence in civil society; the very notion that in a society like ours the state has a monopoly on the legitimate use of violence points in this same direction. Hence the occurrence of violence within a society tends to bring forth the institutional developments which make its re-occurrence that much less likely. This is the main reason why, as the population of an individual society grows, the occurrence of violence within it may do little more than increase pro rata with population size, in a way which the authorities find broadly tolerable. Hence although there is a loss in numbers from this source it is not enough to arrest overall population growth.

In exploring the links between war and population it must also be borne in mind that war is a major source of social change, both internal to the societies involved but also more

widely. War prompts change in the political and social 'agenda' as people grapple with both shorter- and longer-term considerations. Hence care is needed in the attempt to specify the population-implications of a particular war. Briefly reflecting on the Second World War, the direct losses – particularly in central and eastern Europe and especially in the Soviet Union – were massive. However, that war also ushered in an extended period marked by all manner of developments in transnational governance geared to reducing the likelihood of further wars and promoting economic growth and welfare. The emergence at an early stage of such bodies as the United Nations Organization, The International Monetary Fund, the World Bank, the World Health Organization and institutions addressing the large-scale problems of refugees is particularly well-known, but there have been all manner of further developments over subsequent decades; no doubt too that war provided context for the emergence of pro-welfare policies within individual nations. So it would not be claiming too much to say that the occurrence of that particular war played its part in the creation of conditions lending themselves to further population growth across large parts of the globe.

Reflecting more generally on the persistent human tendency to devote significant time to killing and maiming one another, there is a discernible contrast between the position following the emergence of human cooperation and that apparent today. As already noted the tendency for hunters and gatherers to spread throughout the habitable regions of the globe was maximally promising for overall population growth given the way in which conditions on the Earth's surface naturally vary. However, it was helpful in another way too because, given a dispersed population with simple technology including that of

warfare, *there was maximum likelihood that local flare-ups would remain local and each one threaten only a tiny proportion of the total population.* It need hardly be said that in this respect the situation is very different today where a conflict between nations possessing nuclear weapons could have continental or global consequences. One may conjecture that in the early stages following the emergence of characteristically human ways of cooperating, the benefits flowing from cooperation enabled the population to grow given both natural conditions and despite the human tendency to get into physical conflict. As time passed, broadly speaking the losses in conflict tended to increase as the population increased, but they nevertheless remained insufficient to arrest the tendency for it to grow in the medium term (true even of World War I). However, with the coming of nuclear and other – dare one say – 'weapons of mass destruction' there is certainly a major potential source of instability which did not exist following the early dispersal of population, because 'the population eggs are (increasingly) in one basket'. Nevertheless, that does not change the overall direction of argument. Even following a nuclear conflict impacting on (say) one or two continents, it remains more likely than not that the depleted world population would subsequently exhibit a tendency to increase.

It may be helpful to identify a general problem bearing heavily upon the dangers in respect of hostilities and war in the modern era. In modern societies the roles of (research) scientist and technologist are institutionalized (notably in universities and firms), so that scientific and technological advances are continually coming on stream. The motives for the activity are sometimes purely to do with 'knowledge for its own sake', but are much more often commercial; in other cases military applications are

themselves the goal. It is worth interjecting that it is not at all clear how any 'authorities' could intervene to bring this general process whereby advances are continually coming on stream to a total halt, even should they wish to. No doubt many of the research advances are benign or beneficial and bear directly or indirectly on the creation of conditions which enable further population increase to take place (without that necessarily being the explicit goal). Yet – the point of particular relevance here - it is almost impossible fully to identify the potential consequences of any particular research advance, which in practice may ramify in several directions. Perhaps the most familiar example would be the way that the theoretician Einstein and the experimentalists Rutherford, Cockroft and Walton would have had no idea that their seemingly pure scientific contributions might have a bearing upon the later production of nuclear weapons. Fleming 'stumbled' upon penicillin without even fully realizing its beneficial potential (later identified by Florey and Chain), but a research scientist could almost as easily stumble on some compound or organism which could form the basis of a 'weapon of mass destruction'. Now of course, some systems of regulation and control bearing upon the direction and use of scientific work are in place, but there is good reason to believe that they could prove to be quite insufficient at any time. (At the time of writing the widening availability and use of drone technology looks to be of a kind that could come back to haunt us.) One can risk the general assertion that the pace of scientific and technical advance has a marked tendency to outstrip developments in the societal means of exercising social control over its consequences.

Summarizing conclusion

The overall thesis being evaluated is that cooperation tends to give rise to population growth and there emerge en route complex societies. In this chapter strategic aspects of such societies are identified which sustain and extend cooperation, thereby providing context for population growth. A key element, the semi-permanent built environment both facilitates and constrains use while also constituting a system of signs and symbols whereby understanding as to that use is maintained and extended. It is a fundamental condition sustaining and accommodating change in the spatial and temporal aspects of the division of labour, itself probably the single most crucial element implicated in population growth.

A second element, writing, gives semi-permanent physical expression and thereby potential shared-reference to thought, but it also facilitates that thought particularly in respect of more abstract processes. Writing is vital in the coordination of activity underpinning, for instance, developed legal systems and the workings of modern complex organizations. A third element, the institution of money, in its physical form constitutes a focus of shared reference, at once symbolizing and constituting value. It promotes cooperative trading relations of a market-type of goods and services on a geographically-extended and virtually open-ended basis. To be more precise, its very existence structures interests in such a way that there is a tendency for the underlying potential to cooperate in trade relations to be realized together with a sharpening of the division of labour; its apotheosis is reflected in free trade. The institution has in-built dynamism tending to give rise to further related developments such as systems of borrowing and

lending (perhaps at interest) and insurance; that dynamism is further manifested in the emergence of capitalism and ultimately finds expression in globalization.

In the human story rational action is evident from the outset but that type of orientation is more widely and more systematically expressed in association with the emergence of particular institutional forms – such as money. Of particular importance is means-ends rationality where an objective judgment as to effectiveness and efficiency of means may be made in relation to the achievement of an empirically identifiable end. Here conditions conducive to the wider and more general application of a rational approach have been identified; particularly germane to population is the rationality implied by the notion of family planning employed in recent centuries.

The process underway at the present time, arising out of cooperation and giving ever greater scope for it, is globalization. That process involves many elements and operates at many levels; perhaps most obviously there is a tendency to transcend the confines of individual nation states, Attention has been drawn to the pattern whereby cooperation has given rise to technologies and expert systems which in their turn maximize the scope and nature of possible further cooperation and extended cooperative frameworks. The various elements of globalization bear upon the tendency for the world's population to grow steadily.

Extended consideration has been given to the significance of the ubiquitous phenomena of violence and warfare. While increasing mortality and maiming in the shorter-term, a

key idea is that they have played a necessary part in the creation and persistence of circumstances conducive to longer-term population growth. In this and the previous chapter various tendencies in prehistory and history have been noted which are interdependent with population growth. In this connection the emergence of differing kinds of political entities – including states, empires, and nation states – is of fundamental importance. As has been argued there is good reason to judge that within these kinds of units conditions tend to be created which are favourable to population growth. However, *it is unclear that any such entity could have emerged and persisted without some use being made of violence and war*. On the historical and (such as it is) pre-historical evidence we have, the only route through to such entities involves fighting and war which is then also prominent in the way they are sustained. However, there develop in parallel systems of higher-level cooperation which increasingly realize a latent potential for cooperation.

Chapter 9: The Demographic Transition and its Aftermath

Some recent population patterns

As stressed throughout, evaluating the central thesis of this work involves considering whether the characteristically human way of cooperating tends towards a large and steadily growing population, where the unit of analysis consists of those drawn together within a cooperative framework. In respect of earlier times this would appropriately involve consideration of isolated societies (approximately true for Tikopia considered in Chapter 6) or (relatively) isolated civilizations, such as those in the New and Old Worlds prior to the fifteenth century. Clearly at the present time one cannot proceed simply by consideration of individual societies because effectively the vast majority of the world's population is drawn together through frameworks of cooperation; this stems from the process of globalization which is underway. One can nevertheless usefully look at patterns across the various societies of the world. Attention has already been drawn to the acceleration of the world population growth rate since about 1750AD i.e. from around that time a larger rate of population growth than that averaged previously became sustainable. In fact many points of significance for the thesis may be derived from a consideration of the evidence of recent centuries. A useful starting point is to note that the patterns in differing types of societies which have contributed to overall world population growth in recent centuries led to the formulation of a putative *theory of the demographic transition*.

This theory – popularized particularly in the early years after the Second World War - was relatively congruent with at least some known facts about mortality and fertility. It

was viewed by some as an explanatory account of the impact of economic development on the decline of mortality and fertility and involves distinguishable stages. The initial stage is one of high birth and death rates and because the two are approximately equal the natural increase is around zero, but perhaps with a slight increase. At the second stage there is a high rate of population growth because a decline in the death rate is proceeding at a faster pace than any decline in the birth rate. At the third stage the rate of population growth is lower than at the second stage, because the birth rate is falling more rapidly than the death rate. In the final stage, population growth is small or even negative, since the magnitudes of the low birth rate and death rate are approximately equal. Those popularizing the theory judged that the simultaneous occurrence of economic development, industrialization and urbanization was a cause of the initial decline in mortality and subsequent decline in fertility. This was more plausible in respect of mortality since economic development led to higher living standards including nutrition, better sanitary facilities and improved medical care. However, the impact on fertility was less clear. Nevertheless many demographers accepted this broad pattern of explanation at least for a time.

Then fresh data for populations after the Second World War cast doubt on the seeming neatness and adequacy of the theory. For instance, some populations supposedly at the fourth stage – such as the United States - experienced higher levels of fertility after the war than those preceding it and this persisted even after the supposed ‘bulge’ period due to babies perhaps postponed because of the war. (Heer, 1968, p.11) Attention then turned towards such explanatory factors as changes in age at marriage and of child-bearing.

However, fertility tended to stay at a higher level and the population rose even during a period which saw increased industrialization, urbanization and economic development.

Nevertheless the demographic transition model roughly draws together some discernible patterns across a wide range of societies. One pertinent observation is that many societies at both the first and the fourth stage experienced modestly increasing populations. In addition, for populations at the first stage there was indeed often a relatively rapid decline in mortality, brought about partly by such dramatic actions as spraying malarial swamps from aircraft. Now it might have been the case that the high fertility would have continued unchecked in those societies for an extended period perhaps at a later point leading to suddenly increasing mortality as some sort of crisis developed; perhaps that crisis might then have been addressed to be accompanied and followed, however, by other crises stemming from continuing high fertility. The point one is making is that the process whereby mortality and fertility rates diverged and then came back to be closer was not in fact 'bumpy' in this kind of way but relatively smooth, no doubt at least partly because the fall in mortality itself caused a decline in fertility. However, it became apparent as more data became available that in most of the (less-developed) societies the rate of natural increase continued to remain high while the (more-developed) societies at the fourth stage tended to have rather lower or even in a few cases negative rates of natural increase.

As one would expect, social scientists have explored in some detail the interconnections of the demographic variables. In connection with the demographic transition attention

was drawn, for instance, to a pattern arising out of the patriarchal character of many developing societies. With a society at the first stage it seems that many male household heads (of joint families, for example) were highly fertile because they hoped to live into old age and wished to have adult sons who would support them in their declining years; yet child mortality was high and only just over half of births were male. In this context very young children constituted a drain on household resources (but by no means a massive one), although the age at which children would be expected to begin to contribute to household income would be young by Western standards. The subsequent decline in mortality was generated, as already noted, at least partly by factors associated with economic development which could also bear, if less directly, on fertility, but it seems clear that the declining mortality itself had an impact. So, for instance, associated with economic development the value of relatively unskilled child labour may have eased making the overall burden of young children somewhat greater. On the other hand, the patriarchal fathers experienced declining infant and child mortality and then could somewhat reduce their fertility while retaining a similar degree of confidence about their old age. Also, where there are fewer children more resources may be devoted to each one, thus aiding their survival. Thus proximate factors may be identified making it clearer how fertility and mortality might move closer.

As stressed above virtually the whole of the world's population is at the moment being sustained within a partially integrated cooperative framework and that population is indeed growing. Importantly, patterns of migration are implicated in the process. Overall world population growth in recent centuries has tended to be accompanied by migration

from areas of rapidly growing population into areas where population is growing less rapidly. Formerly this meant an outward expansion of the European population, but more recently it has meant migration from less-developed to more developed nations. In sum, in recent decades by far the greater part of the growth of the population of our inter-dependent world has originated in less-developed nations, but some of that growth has been continually transferred to the more-developed through migration. There has also been a massive shift of people from rural to urban areas to the point where the urban regions are growing more rapidly than ever before in history. On the other hand, in many developing societies (such as Mozambique and Bangladesh) families have become smaller but they tend to be smaller in urban than rural areas (Rosling, 2013). In moving beyond the theory of the demographic transition it has proved useful to give separate consideration to particular aspects thus focusing on transitions in health and mortality, fertility, migration, age distribution, urbanism, and family and household. The average annual rate of growth of the world's population peaked in 1970 at 2.04 percent but it has exceeded a figure of 1 percent since 1950. (Weeks, 2008, Table 2.1, pp.33-4)

Population policies

While actions by the political authorities have had considerable implications for, and impact upon, population throughout prehistory and history (being mentioned, for instance, in the Bible), the phrase 'population policy' is most often taken to refer to the modern era. The usual context is where government or some supra-national body is led to formulate policies understood to bear directly or indirectly on population, which it then seeks to implement. In this connection there may be a – perhaps momentary - initial

tendency to take governmental action as in some sense definitive and determining which, of course, it is not. The government is no more or less than one 'actor' in the play of forces determining population outcomes in a particular society and, though it may be the single most influential such actor, it may also be – probably typically is - less powerful and determining than combinations of the other forces in play. Specifically, in respect of fertility, it is not at all easy for government to impact successfully upon the intimate familial sphere. A further point to note is that within a society government is not, of course, to be thought of as some primal or 'first cause', but rather its actions are to be understood as a resultant flowing from the various influences upon it. Thus the governments of (predominantly) Roman Catholic countries have tended to pursue pro-natalist policies, including making abortion illegal. Of course, it has frequently been the case that governmental policies and actions reflect the concerns of elites rather than those of the mass of the population. Not infrequently, too, governmental actions are informed by current theories or doctrines within which population notions are strategic such as Malthusian, Neo-Malthusian or even eugenic theories.

In this study it is vital to focus on tendencies and a further basic one must be noted here. Given an absence of world government and a relatively 'anarchic' international scene (Waltz, 1959, 1979) with competing and potentially conflicting nations and blocs, national governments seek to increase their relative external power rather than see it diminished; no doubt there are a whole number of sources of power such as economic strength and military power, and power may sometimes be 'soft' as well as 'hard', but population numbers are understood to be implicated. Typically, political authorities wish

their states or societies (or blocs) to become (relatively) more powerful rather than less powerful and, most often, they see this objective as being served by a (relatively) growing rather than a declining population. In this connection, one of the basic facts about the modern era is that an increasing number of states collect reasonably reliable demographic data – most obviously in the census and the registration of births, marriages, deaths and migration - and hence are in a better position to assess the population position and can formulate and track the effectiveness of policies directed at it. Plainly relativities are judged as highly important. Thus in the period between the two world wars France pursued – not particularly successfully - pro-natalist welfare policies hoping to reduce the population gap, and ultimately the power gap, between herself and Germany. At least in the longer term, it tends to be understood to be in the political, economic and military interests of the government of a state for its population to grow relative to that of rivals.

This generalization plainly needs qualification in particular instances. Where a government is dependent for its own power upon a particular subpopulation, then its policy focus may be on the relative fertility of that part, or how it may be supplemented by net immigration. Thus, the government of modern Israel – a country viewed as a Jewish national home – has been concerned about the relative growth rates of her Jewish and Arab subpopulations. More generally, the government of a country may view or specify its population to be ethnically or racially of a certain kind and conduct its immigration policy accordingly; Australia with its policy in the early post-Second War decades of encouraging the immigration of European 'whites' provides an example. The above generalization also requires qualification in respect of (temporary) policies of the

two most populous countries. As is well-known, in 1979 China implemented a one-child policy. In that case it seems China felt she had 'the power of numbers' anyway and her government acted as it did in the attempt to reduce fertility for economic-development reasons and in the attempt to raise the average standard of living. Another country with a vast population, India, for a time and for not dissimilar reasons leant towards compulsory measures: from around 1976 there was effectively a programme of enforced sterilization. As a result the number of people who were sterilized rose from 13 million in 1976 to 22 million in 1977. (Weeks, 2008, p.512) Highly politically contentious, this approach was soon abandoned. There followed a sustained effort to reduce its rate of population growth by emphasizing a two-child family norm, but with limited success. Despite these important variations flowing from particular circumstances, the wider tendency is nevertheless for government to judge that (relative) growth of population serves the state in respect of its external relations.

Population policies are to be understood as strategies for achieving particular patterns of demographic change. They differ markedly in the overall impact intended and achieved. Two important thrusts in recent decades may be identified and are illustrated by the Programme of Action arising out of the 1994 International Conference on Population and Development. That programme addressed mortality by seeking a lowering of infant, child and maternal mortality and by bringing the AIDS pandemic under control. Secondly, it emphasized the importance of women's social and reproductive rights or, more specifically, the importance of 'empowering women at home, in society, and with respect to the availability of acceptable means of family planning' (Weeks, 2008, p.535)

However, while evidence suggests that the drive towards ‘empowering women’ might have the consequence of reducing their average fertility, the accompanying effort to tackle mortality (while being highly desirable) points in a different direction, for, in its impact on population, it might balance or even more then balance the other source of fertility reduction. At the time of writing a centrally-affirmed objective being addressed internationally is indeed reduction in child poverty and mortality. The point being made is that although there is much talk concerning the need for overall population control i.e. to get world population to stabilise, the programmes and policies actually being pursued on the widest cooperative – even global – basis are complex in respect of their implications and can hardly be said to be targeted on that goal. Transnational cooperation certainly manifests dominant values of our era (particularly humanitarian values which I wholly share), but while it contributes to demographic change, that change is essentially subsumed within a pattern of continuing overall population growth.

The significance of contraception and abortion

There is a tendency to consider that population control by intervention is recent (e.g. has followed the vulcanization of rubber in the nineteenth century) but, as noted already, the practice goes back into remote antiquity. On this point the evidence for the tribal society of Tikopia reviewed in Chapter 6 was particularly striking for the sheer number of methods of population control which were identified. The pattern appears to be that humans have always been prepared to cut off potential recruits to the population, again pointing to the importance of activity which is ‘at cost’ to the promulgation of certain genes; however, they tend differentially to deploy them when problems are anticipated,

such as famine. Of course it is the case that the precise type of intervention relates to the extent of practical knowledge. Early on in pre-history the significance of pregnancy is grasped, only later and then gradually is the link between penetrative sex and subsequent childbirth understood and acted upon. At all times human foresight is deployed.

This provides the context against which the modern use of contraception and abortion may be understood. In modern western societies the central fact is that most people aspire to have a number of children – perhaps none, but generally between one and six and averaging around two – which is considerably less than their potential maximum and certainly small when account is taken of the extent of their sexual contact; they have other related aspirations concerning such matters as the timing, gender composition and setting in which they will have them e.g. within marriage or a permanent relationship. Of course aspirations may be vague and people may fail to achieve their objectives but the salient point is that the average of the outcomes is not far away from the replacement value. The use of mechanical and chemical contraceptives or abortion is to be viewed primarily as a means by which they may achieve their goals, but those ends are essentially independent of the means.

It is common for people to expect the rate of natural increase in Roman Catholic countries to exceed that in predominantly (or traditionally) Protestant countries because the former church adopts the more critical stance on the use of 'non-natural' methods of contraception and abortion, while allowing the 'rhythm' method. It is notable, however, that in 2007 the crude birth rate per 1,000 and the rate of natural increase per 1,000 in the

United Kingdom were respectively 10.7 and 0.6 while in Spain the corresponding figures were 10.0 and 0.2, and in Italy 8.5 and -2.0, the two latter countries being heavily Roman Catholic (for the data of this paragraph see Weeks, 2008, Appendix). These are population data for nations belonging to the European Community and when one takes the figures for another Catholic country of a different type they may be seen to vary considerably; for instance, in 2007 Brazil had figures of 16.3 for the crude birth rate and 10.1 for the rate of natural increase. No doubt part of the explanation for these differences lies in the shape of the population pyramid: for instance, at that date the percentage of each population aged 65+ were for the United Kingdom 15.8, Spain 17.8, Italy 19.9 while for Brazil it was a much lower 6.3. The conclusion must be that it is the type of society which is determining the broad pattern of the population data, not the favoured or selected method for limiting births (although the latter would contribute to some degree through its being a more- or less- effective or efficient method)

No doubt once one proceeds to micro-analysis, decision-making by individuals, e.g. by the male or female alone, needs to be distinguished from joint decision-making such as that involved in 'family planning' (Beshers, 1967, pp.60-1). A related analytical distinction in respect of marriages – also applying to other longer-term unions - is that between those where there are predominantly independent or segregated role relationships between husband and wife and those where there are joint role relationships (Bott, 1957), but, either way, the foundation of marriage and other unions still consists of cooperation (even when sometimes coerced). No doubt too the development of particular techniques of birth control – such as the use of the oral contraceptive - requiring action by

the female alone is implicated in wide-ranging social and cultural change. In recent decades in western societies married-couple households have tended to become a declining fraction of all households. Also the age of marriage has tended to rise; there is an increase in co-habitation and out-of-wedlock births and a rise in the propensity to divorce. Women's life chances have improved and their labour force participation has grown. (Weeks, 2008, p.436) The coming of the oral contraceptive is indirectly a factor in women tending to have children later.

Thus no one could reasonably doubt that in recent decades there have been many changes in respect of the position of women and the structure of families and households, but the societies experiencing these changes have, nevertheless, still tended to experience positive rates of natural increase. As with other technical advances the development over the last two hundred years of effective contraception increases the range of options. There is a whole number of proximate factors which could influence decision making in respect of fertility such as housing stock, and distribution of houses by number of bedrooms. Significantly, during the period marked by innovations in effective contraception, there have also been technical and scientific advances affecting mortality and extending longevity (and ones even affecting migration). Regarding population policy, an influential view in the light of European historical experience suggests that, 'the decisive factors are social and economic change, and the availability of contraceptive technology is of little importance' (Casterline, 2002, p.215). Significantly, many but not all of those societies where contraception and abortion have been substantially practised have tended to expand in population. In sum, the last two centuries are marked by rapid

extensions in the practice of 'family planning' but also by historically high rates of natural increase.

These demographic patterns only become explicable once one foregrounds the impact of cooperative genes, which – as already noted in Chapter 2 – points to the importance of aggregates as against individuals. Evidently individuals are rarely acting in ways which maximize the likelihood of the promulgation of their own genes, but, nevertheless, the overall population continues to grow, even at an historically high rate. Strikingly, *the populations of Western societies tend to be rising but the overall demographic pattern can nevertheless be said to be substantially 'at cost' to the propagation of the genes of the majority of individuals who choose to limit their own fertility*.

Basic and perennial concerns

Animals shy away from or actively combat threats to life and limb; so do humans. The effect is to extend individual life further into the future. At the human level extension to life and long-life are generally valued. Importantly, given human foresight, the tendency for longevity to be promoted has an underlying source which has to do with *the completion or furtherance of projects which occupy time*. If seeds are planted in a garden the whole point is that they should flower or bear fruit; delayed gratification is implicit. Supposing one is attending an Open University course to deepen one's understanding of modern art; the hope and expectation is that the course will be completed and subsequent visits to art galleries enriched. Up to a point children and grandchildren may be viewed as 'projects', or at least potentials that may be realized; their upbringing 'bears fruit' when

they are fully functioning adults. Grandparents contribute to the upbringing of their grandchildren and would welcome following them through to adulthood; but sadly this may be overtaken by events. So humans may be thought of as hoping gradually to be carried towards – and as far as possible, if and when they get there, to enjoy – old age. Yet at the same time there is the realization that the main way of departing this world is through progressive loss of powers. Preferably life may be even further extended in almost any event, but it is fully recognized that the older person will tend progressively to become dependent on younger people.

It was noted above that in patriarchal societies heads of families wish to have male children because these may ultimately provide security in old-age. In preliterate and traditional societies the issue is addressed via the obligations of kin and certain principles of reciprocity operate between generations. The tendency is to think that things are essentially different in advanced societies because of the coming of 'Welfare State' provisions including pensions, which bear both upon the (considerably extended) costs of raising children and the prospects and care of the elderly. What has happened in Western societies is that 'solutions' have partly been collectivised via state action. Focusing particularly on the situation of the elderly, the availability of first-rate health care at a time of particular need depends upon the availability of qualified, non-elderly staff. A pension in this context is to be thought of as a claim on the labour of younger generations. Fundamentally, we all hope eventually to become elderly and the elderly have a vested interest in there being enough younger people around to provide for their old age. Hence, the underlying pattern of potential dependency of each generation on the

following one is basic and perennial and provides a fundamental link between mortality and fertility. In connection with that link it is also of course significant that where the elderly have control over property and resources, their departure necessarily involves a reallocation of that control ('succession') which is generally favourable to the interests of future generations. (The departure of the elderly may well be 'in the material interests' of the next generation.)

Now, against the background of all the uncertainties in life, it is worth asking certain rhetorical questions. If one is the head of a joint family seeking to provide for one's old age would one rather have (slightly) too many sons (children) to achieve this or (slightly) too few, for it cannot be weighed to a nicety? (Of course, cost considerations militate against there being considerably too many.) Again, if you anticipate being an aging member of the population in an advanced western society would you rather the quantity of labour in the next generation is more than sufficient to meet your health needs and underpin the value of your pension or that the quantity of that labour is less than sufficient, for, again, it cannot be weighed to a nicety? (Again, cost considerations come into play.) The former alternative in each case is the more attractive. This is a basic mechanism tending towards fertility (somewhat) outstripping mortality in any integrated social context: the needs of each earlier generation promise to be best served if a (slightly) larger one is following it. Now, of course it is the case that in respect of modern western societies the problem identified is not wholly solved within each particular society. For instance, health workers may be 'imported' from developing societies and the value of pensions may be underpinned by the labour of workers abroad;

but that is simply to say that the underlying problem is being addressed within an international rather than a national framework. This consideration tends to justify the (theoretical) position taken here which implies that growth of population may be expected not so much within individual societies, but within the widest population brought together within a cooperating framework.

In Chapter 10 the question is addressed as to whether humans are 'naturally' selfish, but it is appropriate here to point up a pattern where a dispassionate observer might be tempted to conclude selfishness is involved. The central point is that foresight gives rise to a search for greater security. It is not just that we want to eat today but preferably we want to be sure we can eat tomorrow, next month and next year; the same goes for having a roof over one's head. Sexual access is typically desired not simply in the present but preferably repetitively into the future. Also in respect of basic needs there are those of dependants to consider with all their future implications. Kin are potentially more reliable as providers of assistance into the future but they may also require help themselves. Hence there is a marked tendency to seek to 'store up' value in the form of bank balances, pension entitlements and tradable resources; indeed part of the intention is usually to advantage one's own children through into the future. People are inclined, and indeed feel entitled, to accumulate assets in this way despite the fact that they know of others elsewhere who have virtually no assets and may even be starving. The problem is often attributed to capitalism and there is reason to believe that that particular institutional system sharpens it, whilst also generating massive inequalities. However, the search for individual and family security is a marked tendency within virtually any

economic system and tends to produce some relativities which might reasonably be considered to express selfishness. What is involved here though is by no means simply individual 'selfishness' but the equivalent in relation to one's own group e.g. 'selfishness' on behalf of one's own children.

Despite this judgment, the pattern is conducive to steady overall population growth locally. Importantly, it expresses reciprocity between generations: the earlier generation, whose welfare ultimately depends upon the later, looks to, and seeks to promote, the interests of the latter while it can. In addition, the 'selfishness' on behalf of one's own children means that these offspring are best placed to 'repeat the dose' in their relation with the subsequent generation. (Correlatively, it can be seen that when the elderly are required to fund their own old-age care it generates controversy because it threatens to a degree to undermine the generational pattern as between kin.)

Migratory patterns in recent decades

A marked tendency in recent decades has been for there to be illegal and other types of relatively 'unwelcome' immigration into the developed world, particularly the USA and the European Community, where the migrants may, roughly speaking, be said to be in search of a 'better life'. People – especially young adults – are drawn towards resources and economic opportunities, but of course when they move they take their potential fertility with them. Indeed had all those who have succeeded in entering these countries against the will of the authorities been repelled – say, since the Second World War - there is every reason to judge that the populations of these territories would be much less than

they are today. Of the future it is judged that, '[d]ealing with the globalization of migration will present an extraordinarily difficult set of policy dilemmas for virtually all of the wealthier countries of the world…' (Weeks, 2008, p.534) This type of phenomenon has been important historically and may be subsumed under the tendency for the scope of human cooperation to be extended with positive implications for population growth. But – it may be objected – surely some or even most of the populations of the receiving countries have no wish to cooperate with these potential newcomers? That may indeed be the case, which makes it plain that in this instance, as in many others, the cooperation which is giving rise to population growth is not actively sought on all sides, or not undertaken on a wholly voluntary basis.

To understand this phenomenon in the present context, a way of putting it is to say that the migrants are bringing about a type of forced or coerced cooperation between themselves and members of the existing populations of the countries into which they are moving. The point is that once they are installed they tend gradually to be integrated into the social and economic system of the receiving country; of course, essential twentieth and twenty-first century context is provided by various laws and conventions concerning human rights. In general the newcomers maintain ties to their societies of origin though these may sometimes become attenuated through physical distance. Highly significantly, they may 'lever' additional members of their community of origin into the receiving country, particularly people with whom they have ties of kinship and marriage.

Quite often the fertility rates of the migrants are higher than those of their new neighbours partly because, for a time at least, they continue to reflect the higher fertility of the society of origin. In effect, some of the considerable, and typically growing, resources of the receiving society (to which migrants contribute) are diverted into coping with a population which is experiencing a greater rate of growth, than it would otherwise have had. Since these migrants originate from societies with markedly growing populations despite their lower living standards, the net result is to increase the likelihood - or even to ensure - that the populations of both the originating and receiving societies are rising. The general position taken here is that there is a tendency for the scope of human cooperation to be extended with positive implications for population growth. A major way in which this is manifested in human experience is in the persistent tendency for there to be a re-distribution of the potential for population growth in space and in relation to economic resources which tends to keep overall population numbers on an upward trajectory. This pattern is illustrated by the early tendency for hunter-gatherers to spread throughout the habitable regions of the globe; but it is also manifested in the migratory patterns of today.

Summarizing conclusion

The theory of the demographic transition continues to be of value by usefully encapsulating important demographic patterns, but the increases in population experienced in differing types of society since the war have tended to exceed those anticipated from the theory. Once one foregrounds the impact of cooperative genes,

patterns become that much more explicable. It is of the essence that western societies exist within a global system, but, in that context, they have indeed exhibited a striking demographic pattern. Most individuals in those countries could behave in ways calculated to produce much larger numbers of children than they at present typically do. Given the existence of welfare state conditions, were any one person to breed in this relatively uninhibited way there is every reason to suppose that they would have twenty or more of their own offspring survive into adulthood, which would certainly propagate their own genes effectively. On the other hand, were most to do so it would create a crisis. Yet any underlying tendency in this direction has been arrested, partly by normative regulation; important, too, would be emphasis on other values such as achieving a high standard of living. Nevertheless, although there are exceptions, the populations of western societies tend to continue to grow steadily. This pattern provides an indication of the extent to which the selfishness of the cooperative genes is tending to predominate over that of the other human genes.

Yet this very pattern could conceivably 'go global'. In fact, an increasing number of non-western societies are exhibiting the pattern of fertility limitation which originated in the west. That pattern is strongly associated with the advance of a normatively-governed notion of 'family-planning'. In this connection, the advent of effective contraceptive devices and the ready availability of (and legalization of) abortion may be a striking phenomenon of recent centuries, but it is to be viewed as a means towards fertility objectives, which are substantially independent of the means.

Globalization means that the vast majority of the world's population is drawn together by frameworks and networks of cooperation. As already indicated, geopolitics has been shaped by the emergence of a comprehensive nation state system, together with – particularly in the last century – a massive build-up of transnational governance, but without, of course, world government. In this context political authorities tend to wish their states or societies (or blocs) to become (relatively) more powerful rather than less powerful and, most often, they see this objective as being served by a (relatively) growing rather than a declining population. The causes and consequences of national and international population policies are various and some of the latter undoubtedly embrace humanitarian values (such as reduction in child poverty and mortality) but cooperation at these elevated levels amounts to one among a set of factors generating a pattern of overall population growth; plainly, intimate cooperation continues to bear most directly on fertility.

In the explanation of population increase full account must also be taken of the interdependence of generations – most notably in the early and later years of life – which is basic and perennial and provides a fundamental link between fertility and mortality, but the needs of each generation promise to be best served if a (slightly) larger one is following it. In western societies this need is in part met by an inflow of young adult migrants contributing to the staffing of health services and care homes for the elderly. However, over and above this, a very important phenomenon of our time is substantial but sometimes relatively 'unwelcome' influxes of migrants to the richer or more developed countries. Here again extension in the scope of human cooperation – even if

in some respects coerced - tends to have positive implications for population growth. A major way in which that extension is manifested in human experience is in the persistent tendency for there to be a re-distribution of the potential for population growth in space and in relation to economic resources which tends to keep overall population numbers on an upward trajectory.

Chapter 10: Understanding Advanced Societies and Culture

Advanced societies: the 'hospital ward' and the 'brave new world'

In advanced societies a marked pattern of at least the last two centuries has been the relatively steady increase in the expectation of life. In Chapter 9, relevant factors such as higher living standards, better sanitary facilities and improved medical care have already been noted. It is fair to say that the impact of science-based medicine has been to sustain people who might have died in former times. (I am one such since I had an operation for acute appendicitis on my eleventh birthday.) The decline in infant and child mortality has been especially marked but it is not just the already living who are helped for foetuses which might have died previously are successfully taken to term. The impact goes even further back onto fecundity and fertility for couples who are encountering problems conceiving are now helped e.g. by *in vitro* fertilization. The pattern in this respect is thus to increase fecundity and then to enable everyone to lead as full a life as possible, which includes being able to have children themselves.

It is evident too that people are helped by the health services with all manner of conditions which are not immediately life-threatening but they might have impacted on their fertility and mortality in earlier centuries. This would be true, for instance, in respect of something as familiar as deficient eyesight or hearing, solutions to which may now tend to be taken for granted. Substantial help is extended too towards psychiatric conditions and it may be noted in passing that in former centuries such sufferers might well have fared particularly badly at the hands of their fellow citizens. Associated with this it is accurate to say that significant sections of the population at any one time are

being enabled to lead a full life only because of their continuing access to health-related facilities. This gives point to a simile likening society to a hospital ward.

Now there is every reason to believe that this pattern has overtime the effect of retaining what are popularly termed ‘genetic defects’ in the population. Patently where there is any underlying genetic factor predisposing to a condition, helping sufferers to survive and reproduce is helping to propagate the relevant genes, whereas in former centuries this might not have happened to the same extent. Of course it is only as a result of scientific advance that the genetically-rooted nature of some medical conditions is fully recognized, although it may have been dimly discerned even in the remote past, since problems might have been felt ‘to run in families’. So here there is a pattern whereby cooperative behaviour is leading to the retention in the population of genes, whose action is viewed in negative terms. In sum, one would say an unintended long-term consequence of medical intervention from the remote past has been to retain in the population the action of genes whose contribution might now be felt to be undesirable.

By contrast, partly flowing from the increasing understanding of genetics, there is a quite different tendency beginning to be evident. This is exemplified by processes where selection is made amongst embryos and only some are allowed to develop as foetuses. Termed ‘genetic screening’ the idea is that selection be made so that only embryos lacking certain defects are allowed to develop. These types of intervention are radically different in that they tend to decrease the presence in the population of genes felt to be making a negative contribution.

Without getting in an unjustified way into futurology, given the scope of the thesis under consideration, it is valuable to note possible future developments. One notion is that genetic screening or some other genetic intervention might be used not simply to eliminate 'negative' qualities but to promote 'positive' ones e.g. to produce individuals who are more intelligent or more beautiful. Patently this is because would-be parents want to have children who are likely to be more 'successful' i.e. better placed to express or realize certain values while participating in the cooperative life of the community. When this kind of possibility is first mooted a common reaction is rather to pooh-pooh the idea and to expect governments to ban it, with the full support of the churches. In fact, once procedures become technically straightforward they are very difficult to ban where people are strongly motivated and they may be carried out anywhere in the world (which could also become true for human cloning). The opinion is ventured here that genetic screening for positive qualities is quite likely to happen and may even become routine.

The various patterns identified in this section fit in with the thesis under consideration. Cooperative behaviour addressed to morbidity and early mortality has led to lower age-specific mortality rates and thereby boosted numbers. The aim has been to get and keep people out of 'the sick role', meaning to return them to a position where they may play a full part in the cooperative life of the community, including being able to work. However, there has been a 'downside' in the form of a tendency to retain or increase what are later recognized to be 'undesirable' genes in the gene pool. It seems not simply

that this problem will be overcome, but progressively the gene pool will be consciously reshaped, in such a way as to increase the likelihood of there being a large and increasing population with a distribution of qualities which will enable them to cooperate even more effectively, thereby promising further population growth.

Other fauna and flora

The selfish gene theory applied to human beings is here being evaluated, a theory concerned with the propagation of genes. In this connection there is a distinctive process proceeding on the planet whose significance needs to be evaluated. This is the process whereby progressively the genes of other flora and fauna essentially exist and propagate on human terms. There is a sense in which the genes of other life forms come to act as hand-maidens to human cooperative genes. The long-term phenomenon at the heart of this process is domestication already considered above: animals and plants have been genetically changed through their contact with human beings so that they fit in with the developing human way of life. As part of this they are made to conform to the spatial division of labour which also includes physical culture and artifacts. A whole vocabulary links to this as we speak, for instance, of animals which are ‘pets’ or, alternatively, ‘pests’, while others inhabit ‘zoos’. Again, raising our crops and tending our gardens has led us to define certain plants as ‘weeds’ which must be excluded.

Farm animals and crops essentially exist to supply humans with food; they play their part in propagating the totality of human genes, both those concerned with cooperation and those not so concerned. Human control is exercised over even the most ‘intimate’

aspects of their lives such as how they reproduce (which is often now by artificial insemination). To use demographic terms one can say of farm animals that humans exercise total control over their fertility, mortality and migration; they would largely not be on this planet were we all to become vegetarians. Although the same could not be said of the larger animals in such places as safari parks and protected areas, those are still typical confined, may be 'culled' and have an assigned place within the leisure industry. Even when humans act to protect species or promote biodiversity, it is still the case that the existence of these other fauna and flora is on human terms; temporarily, at least, they have an assigned place within the framework of our own cooperative life. (In Appendix 4 there is further comment on the position of the human species within the ecological system as a whole.)

Of course, there remains the 'Achilles heel' of micro-organisms; here the underlying problems posed for humanity appear intractable. In connection with human morbidity and mortality there is now something of a race going on between medical researchers developing new medicines and organisms which evolve in the context of those medicines so as to pose a new threat. Of course, genetic engineering now plays its part but that is all to do with producing life-forms which (normally unseen) fit in with or enhance the human way of life. Zoologists have referred to the equivalent of 'an arms race' proceeding between the evolving genes of predators and prey in promoting, for instance, fleetness of foot. In the human case it is not that the cooperative genes are (necessarily) evolving; rather the behaviour to which they give rise includes 'taking up arms' on their behalf against the threat posed by evolving micro-organisms.

Memes

Following upon the development of thinking regarding the selfish gene, the notion of the 'meme' was introduced, viewed as a second kind of replicator. The meme is a cultural item with a putative tendency to replicate i.e. to be passed on by non-genetic means, especially imitation. In one exposition Blackmore (1999, p.43) affirms that, 'Imitation includes any kind of copying of ideas and behaviour from one person to another.' (See also Dawkins, 2003.) Further to the present study and its concern with cooperative genes it may be helpful to inquire into possible implications for the study of memes. In this connection one key point is whether light may be thrown on the factors leading to increase or decrease in the copies of particular memes or combinations of memes.

The pattern of explanation developed here is that the cooperative genes give rise to cooperation which tends to propagate the genes themselves. The cooperative activity is not viewed as static but has an open-ended potentiality for growth and development. An example may help to illustrate the link between changing patterns of cooperation and meme propagation. There has been a relative advance in the global use of the English language since the Second World War (for example, relative to French) and it is instructive to point to one 'growth area'. Air travel both of passengers and freight has built up substantially during the period leading to the emergence of a dense and complex web of routes. There are large numbers of airplanes and also of airports with their attendant ground control systems. Normally in connection with take-off and landing there is a need for there to be communication between pilots and ground crew. The

potential problem is the sheer multiplicity of languages facility with which would be needed were everyone involved to be able to use the first language of those they might encounter. The problem has been surmounted by the agreement to use English in many of these contexts. Of course those concerned will need to be taught at least some English and this forms part of the pattern whereby English has come to dominate in non-native speakers' choice of a second language.

It is worth pausing for a moment to consider what is even meant by the relevant memes in this case of air-travel. Is one referring to the English language or the particular phrases and sentences which pilots and ground crews tend to utter or is one referring to the meanings of those phrases (which meanings could be rendered in languages other than English)? Those using the notion of a meme do not always make this clear. However, whatever precisely is meant, a point to arise from the example is that replication of memes is an aspect of the growth of instances of cooperation between pilots and ground crews. Hence it is suggestive of the conclusion that the fate of memes is fundamentally bound up with associated cooperative activity.

It is informative to ask whether the same type of link is evident in other institutional spheres. There are a whole number of situations shaped by technological advance which have implications for vocabulary and patterns of communication. Consider that aspect of the use of the hansom cab. There would have been a technical vocabulary to do with building, maintaining and improving hansom cabs, but so would there have been one more specifically directed at the teams of horses providing the motive power; also one to

do with the interface between potential travellers and that system of transport. Of course, with the use of the hansom cab giving way to rail and then car transport one set of communicative tools would tend to recede while others would come to the fore. No doubt other innovations in technology exhibit the same pattern: the coming of computers has been marked by the emergence not just of sophisticated technical vocabularies but also by less technical ones arising out of the use of various devices by the general public. Looked at from one point of view half the words in the English language are now scientific and technical terms, but this primarily points up that the growth of terms is associated with a growth of cooperative contexts in which they are employed.

Science and technology at the present time are among the largest institutionalized contexts of cooperative activity and this gives rise to a highly patterned growth of memes. Consider from this point of view the terminology of natural history or biology. Major figures such as Linnaeus and Darwin in effect inaugurated or developed further taxonomic programmes. The latter proposed that all species have descended from common ancestors and that the branching pattern of evolution resulted from a process he called natural selection. It followed that from that point in time – if not earlier - there would be a general interest in discovering new species and adopting and using names for them (possibly latinised) which would reflect their newly understood relationships. Again, the specific assertion that humans are descended from apes which are also ancestors of other living primates is essentially an invitation to identify (e.g. from fossils) intermediate forms and to name them in ways which assist understanding of their intermediate status. The development and use of the set of memes is hence essentially

subordinate to a cooperatively undertaken scientific programme, to which individual investigators would understand themselves to be contributing.

It may be objected that so far in this consideration of memes and their replication that the emphasis has been on ‘instrumental’ or ‘utilitarian’ rather than ‘expressive’ contexts, so it is valuable briefly to consider the rather different example of religion. A moment’s thought is sufficient to remind oneself that religions are marked by seemingly endless repetition in connection with, for instance, prayer, ritual and ceremony; also reciting or perusal of sacred texts. Now although believers may well act in religiously meaningful ways in private the activity is fundamentally anchored by the common life of the religious community. Significantly, children are inducted into the religious community and even from the outset labelled as members; there may also be the practice of recruiting through proselytizing. All these kinds of activity are valued within the community. However, it is apparent that the fate of religious ‘memes’ is interdependent with the fate of the associated community. Religions exhibit growth and decline. Zoroastrianism flourished for a time with all its distinctive memes but they have receded as has the associated context of cooperation. The difference from earlier examples concerns not the link between cooperation and memes but rather the differing kinds of factors which would need to be cited to explain the fate of a religion, an understanding of which would take one way beyond the meme concept itself.

Turning to a further area with some expressive content, it has been suggested that an architectural style or motif is an example of a meme. Plainly, it is of the essence that this

type of meme is expressed in physical form, not simply held in mind. However, the relevant objects are not manifestations of an idea in isolated minds. Constructions expressive of the style will tend to have arisen out of particular relationships, such as that between client and architect, and have been physically constructed by teams. Although a particular individual may perhaps have suggested a name for it, the style or motif is fundamentally cooperatively defined: it does not have any substantive existence unless people are agreed about it. It may be worth adding that although a particular style is typically expressed in many objects, the extent to which straightforward copying is involved is probably limited. Supposing reference is made to such a phenomenon as 'The Arts and Crafts Movement', while it is the case that particular individuals (such as William Morris) were prominent exponents, it has the status of a movement because it arose out of patterns of cooperation and networks of artists, craftsmen, clients and others through extended time and is, again, cooperatively defined (such movements not infrequently produce manifestoes). As was true for religion, in any sense to explain or account for the phenomenon would take one way beyond the notion of a meme: that concept in itself seems meager and hardly suggestive of an explanatory framework.

Focusing particularly on language, one must remind oneself that there are primary and secondary usages. A main way in which languages grow is through metaphor and simile. In the middle ages a substantial vocabulary surrounded the practice of torture. Happily that practice substantially died out along with some of its vocabulary, but this does not mean every reference to it has disappeared from linguistic usage. Thus we could say – just as Francis Bacon did – that scientific method involves 'putting nature on the rack', or

that a particular theory or policy suffered ‘the death of a thousand cuts’, without necessarily feeling the horror at corresponding human suffering. However, it is quite evident that metaphor and simile are simply the fabric of communication in a whole number of cooperative contexts, far removed from those of their linguistic origins. Those metaphors and similes survive and prosper which do valued work within a developing way of life.

Given the foregoing discussion, it may be objected that memes are instead to be construed as being in individual brains and that they have a substantial life outside contexts of cooperation. Thus any one of us may spend hours musing on various topics, often but not always using language; again, an individual may frequently engage in private prayer. It has always been something of a problem with memes as to how one ‘keeps the score’ i.e. strictly determines how their numbers are increasing or decreasing. If someone thinks the same thought or prays one hundred times is that to count as one or a hundred in the total for memes? In fact it would be distinctly odd to take the higher figure. The more helpful way of putting it would be to say that that person is familiar with and uses a particular idea or that person engages in daily worship using (say) the Lord’s Prayer. The more pertinent point then hinges on when one would consider some sort of replication has taken place. This would have occurred when the relevant idea or practice has been conveyed to another person previously unfamiliar with it and they become fully able to use it. Thus were a believer to introduce their own child to the notion of prayer and the child came to understand it and engage in (perhaps private) prayer themselves one would say replication had taken place. However, that pattern

simply points up the role of cooperative relationships. The relevant – indeed definitional - point is that a cultural item is something shared rather than simply confined to an individual.

From these examples it is important not to draw the conclusion that changes in cooperative relationships somehow *produce* changes in cultural items such as vocabulary or patterns in language usage; rather these latter changes are an aspect of the former ones. But this itself leads to an interesting tentative conclusion. It is not that one is presented with two 'replicators', the gene and the meme, which have their own distinctive lives but rather that the fate of the latter is interdependent with the activity to which the former gives rise, the gene being the single controlling replicator. *The picture is of cooperative genes giving rise to cooperative behaviour which tends to propagate the genes, while the differing types of meme inhere in differing classes of cooperative relationship*.

Even given this consideration of memes, the reader may continue to muse on the scope and character of human culture. How is its sheer diversity and elaboration to be explained and understood? It is this last question which tends to mystify observers, particularly when a comparison with the life of other closely related animals is being made. This question is next briefly taken up.

The elaboration of culture

In the understanding of human behaviour the notion of value is perhaps most strategic. As already indicated, with the advent of cooperation a main contrast is between the

purely animal level, with its sources of gratification, discomfort and pain, and the human level where there are defined values. Importantly the values are shared or at least cooperatively defined, while being expressed through the behaviour of individuals as well as groups. Following on from this, some sense may be given to the rather rough and ready idea that among humans culture 'takes over'. A key point here is that values – which may become highly refined – come to structure the detail of human life to the point where the animal-level sources of gratification, discomfort and pain seem to be buried, although one remains confident they are in there somewhere. Thus among humans having a meal takes a highly elaborate, even ritualized form, although it does involve getting food and drink down people's necks. One may also note the phenomenon whereby gratification, discomfort and pain come into play but the source this time is itself cultural, as when humans find a musical composition pleasing or discordant. In this connection it may be worth saying that commitment to a value is not so much simply asserted by an individual, but rather that which may properly be inferred from the totality of their behaviour. My own behaviour bears witness to the value placed on wine consumption (the finer the wine the greater the value, although quality is always relative to price). A human life differs from that of a wild animal because it is essentially shaped by adherence to values. However, one may reasonably go on to inquire as to why culture comes to be so elaborated. (Boyd and Richerson, 2005)

Culture consists of shared ideas, values and norms; there is also physical culture - including artifacts – the status of which is an expression of those ideas. These elements are to be viewed as an aspect of the cooperative life of a population. The explanation for

its diversity and elaboration lies in the fact that particular aspects of culture have an essentially open-ended character; also, any increment in or augmentation of culture changes the whole which then constitutes a different starting point from which further augmentation may take place; differing aspects of culture also inter-affect one another (as with religion impacting on art and music). In this process the main impetus for change at a given point in time is the scope of human interests (in both senses: what they are interested in e.g. music; what serves their interests e.g. a higher standard of living) and the main constraint is the 'given' nature of the external world. (Regarding human interests it must never be forgotten that humans were entertained by the horrors of the Roman arena and even took children to watch public executions.) What follows is intended to be suggestive and illustrative.

Language use is the most strategic aspect. While at any time speakers (for instance) invoke already understood vocabulary and existing conventions, the use made of recursive rules implies that they can produce a potentially infinite number of new sentences. Also, given the existence of suitable conventions and rules, language enables users to extend vocabulary; also, there is the potentiality for development from the present indicative (say) towards other tenses and modalities. Speakers are thereby enabled to think new thoughts and perform new speech acts. Any extension or augmentation of language itself changes the universe of subject matter and hence provides extended scope for the practical production of new sentences. Also, since there is generally no essential, intrinsic link between linguistic symbol and that which is

symbolized, there is great scope for differing languages and variants on a particular language.

The scope of human knowledge of the external world is primarily limited by human interest. Even should there be developed a physical 'theory of everything', the universe is endlessly interesting in its particulars. We know more about the surface of the Earth than we do about that of Mercury; we seek to know more about the working of the human body, especially as employed in medicine, than we do that of the crocodile. (An infinite number of differing, but factually true, statements could in principle be formulated about a finite area of the Earth's surface, so there is clearly a need for selectivity!) However, it is of the essence that the human population is distributed, from which it follows that people require, acquire and lose considerable knowledge germane to their particular circumstances. Knowledge of the present and future always has a different significance from knowledge of the past, so what is of interest and the type of interest changes with time. (I am a tall person; my wife and I know which ceiling lamps in our present house I am likely to hit with my head; this knowledge will tend to recede and be lost should we move house, when it will lose even its local interest.) Particularly vital is knowledge of other people; hence the importance of gossip. There is always motivation to acquire more.

There are second-order, more abstract developments of ideas. Some similar processes are evident in mathematics as in language (the subject is to a degree an extension of logic), but given our own modern understanding of this subject there is no real scope for

recognizing cultural ‘alternatives’. Recursive rules and iterative processes come into play. Arithmetic arises out of discreteness and geometry from the continuity of space. There are cardinals and ordinals built up essentially from one (or first) together with the idea of a successor: two (second) is the successor of one (first); three is the successor of two etc. Of course, at a particular time human interest may not extend much beyond the first four or five ordinal or cardinals, but the process of number production may continue without limit. It proves possible to understand the development of positive and negative integers and (even) complex numbers as a process of ‘unfolding’ i.e. in a certain type of evolutionary way. Geometry is in part an abstraction from mensuration and originates in such observations as that a (rope-made) triangle with sides of lengths 3, 4 and 5 units has a right-angle.

In the arts once values begin to be defined they are subject to augmentation and possible refinement in a potentially open-ended way. Suppose, for instance, a cave-drawing has been made as an expression of some human interest (perhaps religious or artistic). Plainly some capacity to produce such drawings exists from that point. However once that work is acknowledged, the visual character of the world can be said to have undergone a change: it consists essentially of everything it consisted of previously plus the cave-drawing. Now at that point one can say that whatever interest led to the production of that work may come into play afresh but the visual stimulus for its expression has been augmented. It may be, for instance, that the initial drawing was recognized and valued, but crude; hence the production of a slightly less crude representation of the same animal or object might be appreciated. Again, once it is

recognized that a picture of a bison is valued; perhaps the same may be true for a horse. It is easy to see how cultural differences may arise. Where bison are of central religious significance they may be the sole subject; where a larger range of animals are religiously significant this may be reflected in art.

It can be suggested that this type of model has application even to the rather different context of the development of modern art, particularly given the value placed on originality. Thus the work of Cézanne probably owed something to that of earlier Impressionist artists but later Cubist painters gained some of their inspiration in turn from the contribution of Cézanne. Of course it was the case, in addition, that artists of the time innovated in choice of subject matter partly because the visual impact of the non-artistic environment was itself changing under the impact of urbanization and industrialization.

For present purposes it is also germane that the interest and greatness of art in substantial part derives from the fact that such ingredients as scenes and the positions of people are interpretable by the viewer in potentially elaborated ways. A painting of Abraham and Isaac may, for instance, convey to us understanding of what may just have happened or what is about to happen. Just as we search for meaning when confronted with an actual human group, we find ourselves searching for life in the picture or sculpture. (Bockemühl, 2001, pp. 66-77) It is crucial that theory of mind is thus deployed in our responses to representations of people

In engineering and design many cultural features and artifacts are to be understood as consequent upon the development of earlier elements together with concerns arising out of shared experience. Glass windows are a design feature consequent upon the construction of dwellings. The bikini – a development from the fuller bathing costume - is a compromise reflecting the tension between (potential) sexual interest and the concerns of modesty or prudery. Humans have an interest in getting rapidly from A to B, hence the invention of cars, but once there are many, they are often crashing into one another. Hence the development of rules of the road as expressed in the Highway Code.

Within historical time and particularly in western societies, there is a discernible pattern in the changing organization of what may be termed 'intellectual labour', although it has innumerable practical implications as well. Today all manner of academic disciplines and associated practitioners may be distinguished: an indication as to the importance judged to attach to them is provided by their forming part of school and university curricula. However, many such academic subjects will be found to be of recent origin – such as biochemistry, statistics and linguistics - and almost none will be found to have existed in ancient times in anything like their existing forms. As is particularly well-known many disciplines arose as off-shoots of philosophy/theology as it existed among the Ancient Greeks; to an important extent this is true of the sciences as they developed within western European societies.

What seems to happen is that at a particular time intellectual activity and investigation within a particular field is associated with a particular community, but as that activity

continues there is increasing realization that it is generating, or should be treating, issues of rather different types. Thus the concerns of a philosopher such as Socrates may be judged to range between the conceptual, theological, moral and empirical. Progressively the underlying issues have been understood to require rather different kinds of treatment and approach. As is well-known the term ‘natural philosophy’ came to refer to empirical science (more nearly physics) by the time of Newton, but since then the individual scientific disciplines have emerged and become more sharply distinguished. Interests both ‘internal’ and ‘external’ to a particular discipline may impact on its direction of development. Even within a clearly identifiable subject, for instance mathematics, new fields – such as topology – emerge requiring the attentions of specialized practitioners. There can also be growth points bridging between particular disciplines. The underlying process, at least to some degree, appears to be open-ended (and through the production of technical vocabularies is a source of the open-ended character of language itself).

Finally, in this section, it is pertinent to give attention to the highly strategic phenomenon of play in human life. The reference is to a behaviour pattern patently evident at both the primate and the human level, and there are underlying continuities. Two young children having a pillow fight may recall not dissimilar behaviour among young chimpanzees. Again, in understanding play among humans, there is a need to appreciate that that which is intrinsically enjoyable becomes valued and that which is valued may become elaborated. Characteristically human cooperative behaviour is the underlying creative force.

Regarding play it may initially be worth reflecting on the character of human sexual behaviour, a topic already briefly taken up in Chapter 4; the notion of fore*play* is suggestive. Typically, cooperation through romantic episodes and sexual activity gives rise to a persistent cooperative relationship. The knowledge of the two parties of each other and themselves grows in interdependent ways giving rise to a deeper understanding informing any instance of sexual intercourse. Plainly a basic method is to try to understand what the other party particularly enjoys and to deploy it strategically; one's actions are quintessentially informed by 'taking the role' of the other. Again, pleasure may be increased by delaying what each person anticipates will be the culmination of the activity viz. coitus. (Delay plays its part much more generally in human enjoyment as is exemplified by drama.) Sex may be more exciting when one party is 'surprised' or through a limited 'acting out' of a role; it may be recognized that some are stimulated by being in a semi-public place where there is an outside chance of observation by third parties. Importantly too there develops a shared conception of what it would be 'right' or 'wrong' to do in connection with a couple's love-making; the relationship exhibits normative integration. It is not too far-fetched to suggest that the shared ideas underlying an ongoing sexual or loving relationship (which may or may not be expressly articulated) together with the clothing and other pertinent objects and material circumstances constitute a kind of 'mini-culture' associated with the couple, although it may remain purely private to them and is of limited duration. A consideration of sex may even help one to tease out elements and a framework for analysis of relevance even to other apparently totally dissimilar areas of life. (It is possible that characteristically-human cooperation even has its origins in intimate sexual contact.)

Vocabulary and etymology assist an understanding of developments: children *play*, but children and young adults *play* football; as noted, adults may engage in fore*play*; the members of an orchestra *play* their instruments; while many of us enjoy watching a *play*. These usages bear witness to patterns of cultural elaboration whereby the focus may change from the intrinsic interest of the activity itself to the interest of witnessing it, or a combination of both. Interest may derive from the exercise of great skill or it may involve the element of humour (with skill as a possible sub-text) which in part is a derivative of teasing. Even in connection with pillow fights there is recognition that some children are better than others; also, it would not be so much fun to match a very large strong child with a small weak one; also some children may be so good at the activity, it becomes even of interest for spectators. From these types of beginnings develop the patterns of a modern society. Football plainly originates in the interest of kicking an object around a field or through the legs of another person, seeing how far one can kick it or how accurately and so on, but the actual game has been subject to an incremental process of rationalization: at higher 'levels' it is now precisely rule governed, including in the allocation of space and time. Getting teams to play under the same conditions enables one more readily to rank them; also enjoyment derives from the uncertainty of the outcome given that teams are highly skilled but equally matched. Audience interest may partly derive from its own identification with a team, which may even be said to 'represent' a town, or country.

The theatre as we know it in western societies appears – like much of art - to have religious origins, although it is now generally secular in its character. In connection with religious ceremonial there may well be both important ways in which everyone actively participates but also stages where the vital element involves witnessing something particularly significant or meaningful performed by priests or other specialists, which typically has a relatively stylized character. In subsequent developments the relative value placed on participation or witness may gradually vary; also greater attention may be given to individuality. Added point is given to the theatre from the capacity of virtually everyone to act with varying degrees of competence, taken together with the fact that discernible role-playing is evident both on and off the stage (hence one can readily appreciate the Seven Ages of Man speech in Shakespeare's *As You Like It* as well as that writer's use of the device of 'the play within a play'). In English theatre there was considerable freeing up of subject matter in the passage from medieval 'miracle' or 'mystery' plays to the relatively secular Elizabethan theatre; in a relatively short time it became an arena for the most profound reflection on life experience. Remarkably, witnessing Shakespeare 'at play' constitutes one of the most highly valued elements of one's total life-experience. That this can be so reminds us that cooperative role-playing and the witnessing thereof is central to the human situation.

Summarizing conclusion

In seeking further to situate advanced complex societies in relation to the main theme a couple of images have been used: the hospital ward and the brave new world. 'Society

as hospital ward' dramatises the fact that nowadays large numbers survive and prosper only with continuing medical help. Through their long-term cooperative action – notably in the form of medical intervention - humans have borne down upon morbidity and mortality, but an unintended consequence has been to retain in the population the action of genes whose contribution might now be felt to be undesirable. On the other hand, looking forward in time, the opinion may be ventured that genetic screening for 'positive' qualities is quite likely to happen and may even become routine. Hence the gene pool will be consciously reshaped, in such a way as to increase the likelihood of there being a large and increasing population with a distribution of qualities which will enable them to cooperate even more effectively.

It has also been argued that there is a process underway whereby progressively the genes of other flora and fauna exist and propagate on human terms, perhaps primarily because human ownership of territory implies actual or potential control of habitat e.g. of ants in your garden. Importantly, however, while control over larger land animals is near total, humans have cooperatively 'taken up arms' against the threat posed by micro-organisms.

Following upon the successful introduction and development of the idea of the selfish gene, the notion of the 'meme' was introduced, viewed as a second kind of replicator. The meme is a cultural item with a putative tendency to replicate. However, that idea lacks explanatory power and cannot perform the role which has been assigned to it. Rather, the introduction and propagation of what have been termed memes is itself an aspect of the behaviour to which the cooperative genes give rise; hence the only

satisfactory explanatory framework involves a single replicator. The picture that arises from the evidence and argument presented here is that of cooperative genes giving rise to cooperative behaviour which tends to propagate the genes, while the differing types of meme *inter alia* inhere in differing classes of cooperative activity and relationship.

The explanation for the diversity and elaboration of culture lies in the fact that particular aspects have an essentially open-ended character; also, any increment in, or augmentation of culture, changes the whole which then constitutes a different starting point from which further augmentation may take place; differing aspects of culture also inter-affect one another. Incremental elaboration is exhibited in differing ways by language, the scope of human knowledge, mathematics and the arts. The highly strategic phenomenon of play is also subject to incremental elaboration, ramifying in several ways and giving rise to sport and the theatre; sexual play may be understood as generating a ‘mini-culture’.

Chapter 11: Human Nature and Modern Life

A reflection on cooperation and competition

For several reasons there is a perceptible tendency for both zoologists and social scientists to overrate the importance of competition and underrate that of cooperation when considering the broad character of human life. For zoologists the whole framework of Darwinian evolution and the 'survival of the fittest' idea predisposes them in that direction. For sociologists and others it is probably the perceived character of the capitalist economic system which inclines their thinking in that same direction. There can be little doubt that the development of modern capitalism with competition as a central feature - which also gave rise to industrialization and urbanization of a modern type – played its part in the extended period of European global domination. Indeed, the fate of the whole world now seems to be bound up with that economic system – perhaps in some modified form - continuing to survive and prosper. It is only too easy to begin to liken the behaviour of firms and individuals in a capitalist context to that of animals in the wild, referring for instance to company takeovers using terms such as 'predator' and 'prey'. There can also be seen to be competition between political parties within a nation and between nation states e.g. in respect of their economic growth rates. It may be worth adding that in their thinking about human life modern observers may also even be influenced by the evident importance of sport and such a phenomenon as the Olympic Games. In various spheres competition is seen as being a vital stimulus and humans may therefore be felt to be 'naturally' competitive.

The error – at least in emphasis – is to fail to see that the reference is to *human institutions*; one is concerned in fact with an extended cooperative framework. The competitive arrangements have been set up by humans with specific objectives in mind. In respect of capitalism, arrangements ensure people compete on a 'fair basis', and that the laws of contract are adhered to, and so on; activity takes place within a legal framework. The authorities are indeed only too well aware that capitalism only really 'works' where it is hedged around with all manner of rules and regulations: it turns out, for instance, that the average capitalist would prefer to be in a monopolistic position rather than to 'enjoy' the stimulus of competition. The whole point is that from the perspective of government - and in a democracy in particular in some sense the population as a whole - *carefully regulated capitalism* is judged to be broadly beneficial. Again, in politics carefully regulated competition between political parties, and associated with it the system of government and opposition, is felt to serve the population well, for instance by bringing abuses of power by government to light. In respect of sport given that it too is carefully regulated (so as, for instance, to eliminate or at any rate reduce the use of artificial stimulants), the same view is held that it is broadly of value to participants and spectators, that it acts as a stimulus to the development of young people etc. Importantly, firms, political parties and sporting teams themselves function on the basis of internal cooperation. However, the cleverness of human institutions resides in the fact that while benefits are felt to flow from the institutional arrangements, the competition between humans is usually confined to a very narrow area and is relatively harmless even to losers: it is anything but a fight to the death. Indeed, the precise nature of the elaboration of the division and specialization of labour found within these

institutions serves in fact to diminish the likelihood of out and out conflict between humans, so any easy analogy with nature 'red in tooth and claw' is notably inapt.

Central to the life of the society is the reaching of agreement regarding how competition in these various areas is to proceed; clearly the law is at the heart of this and part of the role of government is to promote reform of the law where necessary. There must be agreement on sets of rules and then adherence to them; disciplinary procedures play an important part. In politics the mistake is to consider that this is 'all about' competition between political parties while failing to see that at the deepest level there is agreement e.g. about how elections are to be conducted, who is in government and who in opposition. Thus cooperation in arriving at sets of rules and the procedures for reforming them lies at the heart of the society and not competition.

There is a certain irony in scientists failing to grasp the central importance of cooperation in human life. It is true that scientific advance is itself widely associated with the contributions of particular individuals such as Newton, Einstein and Darwin, but Newton is well-known for stating that he had, 'stood on the shoulders of giants'. It is true, too, that scientists have in recent centuries competed for recognition by, for instance, placing reports of their researches (as 'gifts' - they are typically unpaid) in learned journals; they also compete for funds to continue their researches. (Hagstrom, 1965) However, the latter activities belong to a period when science has become institutionalized (initially in Western societies, then more widely), and, in particular, when the role of scientist has itself become established (Ben-David, 1971); thus individual scientists carry on their

researches within a wider cooperative framework incorporating, for instance, peer review. Evidently, too, at many of its leading edges scientific work is now being furthered in large – even massive - teams such as that associated with CERN and the Large Hadron Collider at Geneva. (De Solla Price, 1963; Galison, 1992) In sum, science is in essence a joint enterprise concerned with investigating systematically the totality of what is held in common (the 'external world').

Are humans to be characterized as naturally selfish?

Following the publication in 1976 of Dawkins's book *The Selfish Gene*, there was controversy regarding the issue of human selfishness. Some of this was misplaced since confusion arose between the attributes of genes and of people. The primary meaning of selfish refers to having concern for one's own welfare and interests (usually) when accompanied by a disregard for others. In this connection one must distinguish carefully between behaviour which is simply oriented to meeting personal needs – perhaps to be termed 'self-oriented' behaviour – and behaviour which is correctly to be characterized as 'selfish'. If an individual wakes up during the night and feels like urinating it is no use their banging on the wall to get a neighbour to visit the lavatory for them, they must do so themselves and in so doing they are hardly to be characterized as selfish, even if at the same time people are dying of starvation elsewhere in the world. This is but one example: in fact we spend quite an amount of time meeting personal needs. No, selfishness is exhibited by situations where people are similarly placed but particular individuals advance their concerns or interests excessively and at cost to others.

To clarify further it is important to note three patterned aspects of human behaviour: a tendency to be selfish; a tendency to react unfavourably to being a victim of the selfishness of others; the existence of a normative framework discouraging selfishness (e.g. exhibited in the socialisation of children which is geared to inhibiting that type of behaviour). A helpful orienting idea is that humans do not create norms or rules against behaviour which shows no tendency to occur. Thus there are rules and laws prohibiting stealing but plainly many – even most – people occasionally steal, and would do so rather more were the normative framework (involving agents of social control such as the courts and the police) weaker. Similarly, the existence of a norm against selfishness is itself powerful evidence of a behavioural tendency in that direction. However, it is equally common to feel injured and react against the selfishness of others; nor do people take kindly to an accusation of selfishness. Since all the behaviour humans exhibit may be equally construed as 'natural', it is appropriate to say that humans are naturally (a) sometimes selfish, (b) sometimes may be seen to react unfavourably towards selfishness, (c) maintain norms against it.

The error which is often made is to give overmuch attention to (a) and altogether less to (b) and (c); significantly too there is an underlying bias towards individualism since (a) tends to be understood primarily in individualistic terms while (c) is manifestly a collective phenomenon. Once (b) and (c) are wrongly bracketed out there is a discernible tendency for commentators to come forward with assertions such as 'humans (i.e. individuals) are basically selfish'. However, this is inadequate as a summary because of the existence of (b) and (c) and given also that cooperative behaviour is as 'natural' as

individual behaviour. Now (a) and (b) include instances of cooperative as well as individual behaviour, while (c) is plainly to be understood as an overarching cooperative phenomenon. An appropriate complementary assertion would be that 'humans naturally create norms of behaviour tending to restrict or eliminate selfishness'.

There are, in fact, distinctive patterns in human behaviour discernible at both a micro- and macro-level. Suppose, for instance, three children are attending a party and three cakes are supplied for their consumption. One child is discernibly 'selfish' because he or she quickly grabs hold of, and consumes, two of them. What typically happens? The other two children come spontaneously together to voice a complaint and appeal directly to any adult arbiters in the vicinity. Consider next the seemingly very different example of nineteenth century capitalism. In that case employers and employees came together in productive activity but the rewards were divided up extremely unequally, with the former often becoming wealthy while the latter were on the breadline, despite the fact that, as human beings, their needs were essentially similar. What happened? A main consequence was the development of countervailing trade union power accompanied by demands for changes in the laws relating to the labour contract and working conditions. Thirdly, consider instances in geo-politics where individual countries become over-mighty and inconsiderate of their neighbours: a spectacular example would be Nazi Germany at least from the time in 1938 at which she commenced dismembering Czechoslovakia. As is often remarked, this generated a response almost impossible to imagine in other circumstances: alliance between the capitalist USA and the communist USSR. Not just that, but in the aftermath politicians strove to create overarching

structures such as the United Nations with its security council to deter the kinds of behaviour exhibited by Nazi Germany. These examples illustrate the way in which 'selfish' behaviour can bring into play cooperatively arrived at structures designed to curb it. It follows that a perspective on human behaviour which finds a place for the former type of behaviour while neglecting the latter must be seriously incomplete.

As a footnote one can usefully draw attention to a not infrequent bias arising from Christian thought. The general impression given is that humans are a pretty awful lot because they spend much of their time breaking the Ten Commandments e.g. stealing from others, killing others and 'lusting after their neighbour's wife'. However, again one could just as easily say humans dislike or oppose theft, murder and the lasciviousness of neighbours. More importantly they have established systems of norms in opposition to these kinds of behaviours. As a counterweight to the traditional emphasis, one could as easily say that humans deserve credit for having created the Ten Commandments and other ethical or ethically informed systems of ideas and law.

Tension between cooperative and other genes

Broadly speaking the human past, present and future are to be understood as involving the working out of the 'conflict of interest' between two sets of genes. As stressed, the 'interests' of the cooperative genes are served by a steady and sustainable increase in the aggregate human population, a tendency which may be at cost to the interests of the genes located in specific individuals. On the other hand, the tendencies flowing from all the other genes located in individuals continue to express themselves in the kinds of ways

evident in other animals, through individual behaviour (most obviously in fending off or reducing threats to life and limb) and patterns of behaviour involving blood relatives.

Given the need to make sense of a multiplicity of types of human behaviour, a useful orienting feature is the key assertion made in Chapter 1 that an (incipient) normative element inheres in cooperative behaviour from the outset. The point is that presented with patterns in human behaviour, it is helpful to inquire as to whether, and if so to what extent, these are fundamentally secured by the normative element. Where that element may be identified as being present then there is a thrust in the direction of serving the interests of the propagation of the cooperative genes, although that need not be the only interest so served. It has already been noted that that element is present in speech from the outset, so, as expected, that basic type of communication – together with other types - tends to serve interests at least to some extent going beyond those of the genes of individuals. The action of the other genes is not such as to attach a normative element.

As already affirmed, in the absence of blood ties or sexual interest, there is no naturally given attachment between human beings, but there are many potential gains to be had from cooperation. (The custom of minimally greeting others – even relative strangers - on their appearance implicitly acknowledges a potential need for cooperation; rules regarding politeness have somewhat similar import.) There is also a tendency for the action of the cooperative genes to extend the scope of cooperation, other things being equal, conceivably to embrace all those capable of cooperation. A key reason for this is that random others may impinge and adversely affect an existing cooperative

relationship. At the very least it would be welcome were those in the vicinity to cooperate to the extent of at least coordinating their activities so as to avoid interference. An important additional principle is that the greater the scope of the normatively-governed cooperation or co-action, the greater is the scope for potential population increase and hence the propagation of the cooperative genes.

As regards the interests of the other genes, these are manifested through the other patterns of behaviour manifested by individuals and as between blood relatives. It follows that these interests are often served through behaviour which is in a sense 'local' and on a face-to-face basis, for example within a domestic group. This may give rise to the expectation that among humans one is essentially referring to the contexts of the family, marriage and kinship. Undoubtedly the behaviour at issue is manifested in that context. However, one must constantly bear in mind the distinction between the existence of blood ties on the one hand and kinship, which is concerned with their social recognition, on the other (see Chapter 4). The point is that patterns among those with blood ties were an essential element in the emergence of kinship organization, but kinship organization always goes further than that in terms of its significance as is evidenced by the existence of heavy normative elements. For instance, it has a great deal to do with the maintenance of orderly arrangements both among those who have blood ties but also between those who are not close in terms of blood ties (such as a man and his neighbour's wife). It enables people to 'know where they stand' and to identify responsibilities and appropriate ways of behaving. This is evident in a pre-literate society but also in a modern one.

Furthermore the population of a given area is in need of much more than just an orderly family and kinship system in order to survive. There is a need for an orderly and understood pattern of life which keeps to a minimum the tendency for non-kin to interfere with one another in ways which might provoke conflict. This is particularly evident within a modern society. For instance, the whole institution of property and real estate is geared to people knowing where they stand in respect of entitlements or the need for permission.

A couple of examples are next presented to try to illustrate how the conflict of interest between the two sets of genes may express itself and work itself out in practice. As stressed, that conflict is manifested through time, as much in a tribal society as in our own. There is no merit in striving to select examples which seem archaic, so those chosen have clear contemporary relevance.

Example (a) Theft by a Gang. A perennial phenomenon in the human situation is theft but at this point one is considering its commission not by a single individual but by a group of two or more; bank robbery by a gang might be illustrative. A basic point is that for this activity even to be referred to as 'theft' implies the existence of a wider normative order concerned with property and access to it within which theft is defined and proscribed. That normative order serves the interests of the wider community; significantly, no-one wishes themselves to be the victim of theft. To be pedantic one could even say that the non-commission of the theft would serve the interests of the genes

of the individuals belonging to the wider population, and the cooperation implied by the existence of that wider normative order stems from the cooperative genes.

A further basic point is that people stand to gain by theft: it serves their interests jointly and severally and probably also those of lovers and close relatives. It is a meaningful assertion – if, again, seemingly pedantic - that the acquisition of greater resources serves the interests of the genes of the two or more individuals. However, attention must also be given to the normative element inhering in their cooperative behaviour. Essentially, two or more persons support each other in the planning and commission of the crime and there is, to a degree, 'honour among thieves'; this last notion typically underpins the cooperation which sustains the activity itself. Of course, their individual interests diverge to some extent and they may quarrel over the 'division of the spoils'. In addition, it might well be that the widely-held feeling that theft is wrong is, to a degree at least, shared by the thieves themselves (they might protest were their own houses burgled), but not to the point where it leads them to refrain from committing it. (Many people 'fiddle' their tax returns and insurance claims while feeling a bit rotten about so doing.)

Hence in this example the tension between the interests of the two sets of genes is evident. However, an associated complication of the analysis is that individual interests and cooperative elements are involved on 'both sides', both that of the thieves and that of the wider population The key difference though is that the normative element in the former case is narrower and particularistic in that it simply operates between the thieves, while the normative element in the latter case applies more widely, even potentially

universally. The key assertion being made here is that it is the cooperation proceeding on the wider basis which tends to hold out most promise for overall population growth, and the maximal realization of that cooperation implies people refraining from theft. (The same would apply to the filling in of tax returns and insurance claim forms.)

Theft is a ubiquitous problem where the institution of property exists. It may properly be thought that the next selected example is altogether more parochial in place and time. Since the argument is intended to have the widest possible application, why on earth choose an institution of recent origin in a particular western society for illustration? Part of the explanation is that it demonstrates the kinds of issues involved in a particularly pure form and is centrally concerned with population, or, more specifically, the way in which society may bear down on morbidity and mortality; a further reason for the choice is that the reader of this work is likely to be 'familiar with the territory' i.e. someone abreast of social issues in western societies and readily familiar with how these are debated; finally, the underlying issues are in fact perennial because the tension between obligations to kin as opposed to obligations to non-kin is centrally involved.

Example (b) The United Kingdom's National Health Service. The UK government created in 1948 and has subsequently maintained the NHS providing medical treatment to Britons at the point of need and irrespective of their means. It is in everyone's interest to be in good health and this constitutes a collective solution to the problem of providing health care. The institution embraces many normative elements, including notably the overarching notions that society should address the health needs of individuals

irrespective of their means and should do so in a way which is ‘fair to all’. Put in this form one could say that it serves the interest of the propagation of all the genes, both cooperative and other. (In fact, there is a qualification to be made here: there would be particular genes whose propagation is directly furthered or directly threatened by medical intervention itself; but that does not undermine the argument being made.)

However, some of the wealthier members of society seek to gain an advantage by ‘going private’. For many this amounts simply to furthering their own interests i.e. it is non-normative in that there is no claim that they ‘ought’ to do it. For others there is a normative element, for instance when parents say they should do this because it is their duty as parents to do the best for their children; hence a behavioural tendency is reinforced by the particularistic norms associated with the kinship system. The latter behaviour serves the interests of the parental genes. However, the scope of cooperation is greater in respect of the NHS as a whole than that manifested in the family lives of those ‘going private’.

Again, as in the previous example, there is a need to scrutinise a certain complexity in the normative structure. The notion that parents ought to look after their own children is a universalistic principle – we very widely adhere to it - but its application is particularistic in the sense that it applies to people only in respect of their own particular others. In effect this is an ‘approved’ way the naturally given tendency for people to favour their own children and relatives is properly allowed to express itself within a modern kinship system. On the other hand, the normative notion that a health service should be provided

which is fair to all is a purely universalistic one which applies equally to all; there is no inbuilt particularistic element. Hence there is parallelism with the previous example where the notion that theft is wrong and should be against the law is a purely universalistic one, while the 'honour among thieves' idea is particularistic in its application.

The general assertion that may be made is that the universalism inhering in a normative order strains towards having wider application and it is that tendency which maximally serves to propagate the cooperative genes. The tendency for principles to go wider in their application may indeed be illustrated from the above. Supposing one holds that there should be an NHS which is 'fair to all'. Already, by implication, the application of this principle is understood to go wider than the existing population, because it is felt that it should have application to generations yet unborn or continue to apply to a population changed by immigration or emigration. Again, the NHS is simply a particular institution within the UK, but once the underlying principle is agreed its application may be judged to be extendable without limit to embrace all mankind. Similarly, the notion that robbery is wrong is not one which anyone who articulates it believes should be confined in its application to one country or people or to one era. (In this connection it may be noted that religions – typically transnational cooperating groups - in their articulation of moral principles, typically seek to extend the application of those principles more widely. A religious group is typically to be found occupying a particular geographical area, but it virtually never understands the scope of application of its moral principles to be similarly limited or confined, even where it is not committed to proselytizing.)

The emerging structural form of geo-politics

It can help in the evaluation of the perspective developed here to consider the world's (possible) emerging political and economic structural form. (In this connection, again, there is no intention to engage in futurology.) Noting Francis Fukuyama's (1992) 'end of history' thesis, let us imagine that in political-geographical terms the whole of the Earth's surface is covered by liberal and social democratic (capitalistic) nations and supranational units (such as a politically integrated European Community), together with an elaborated system of world governance with the United Nations at its strategic centre. On what core principles are human affairs then being conducted?

To assist in addressing this question, first let us specify the arrangements in rather more detail. Let it be said that the nation states are formed on the basis of self-determination, so they are meaningful in a cultural sense. Next, for all the complexities and variations of institutional democracy, each nation state possesses as its overarching governmental structure an entity derived from treating its adult citizens as formal equals i.e. they have governments elected through the ballot box. Adult citizens are formally equal and the whole is governed by considerations of fairness and justice: thus there is a drawing together to give a sense of direction to the national group while expressing the principle of (adult) equality. Hence there is a definite sense in which *the overarching governmental framework and action derives from the collectivity which is the aggregated population of the nation.* Now within that context the notion that citizens are free to act as they please within the law is affirmed. Flowing from this they are free to act in their

own interests and they may seek to gain all manner of relative advantages for themselves and their relatives. Each economy has a capitalistic nature but there are regulations secured by government to prevent citizens taking undue advantage of each other and an elaborate system of welfare arrangements for those falling upon hard times (which makes it more meaningful to speak of equality of opportunity for children). The division between public and private expenditure (the former dependent upon taxation) is an indicator of the relative emphasis being placed upon collectively-defined as distinguished from privately-defined interests (and public expenditure is around 40 percent in western European democracies). Subject to the governmentally-maintained (including legal) framework and action, *individuals and families are free to pursue their own interests.*

Meanwhile the system of transnational governance operates on the basis of universalistic principles. It is fully recognized that states differ in respect of political and economic power but there is determination to hold the balance between any and all of them. Machinery exists to deter and mediate when aggression is threatened by one state or group of states against another. The World Trade Organization seeks to liberalise trade. From the highest level – that of the International Monetary Fund and World Bank - through into the individual nation states efforts are made to promote economic growth, taking due account of the interdependence of economies. Importantly, the rights of individuals are affirmed through a series of documents commencing with the UN Declaration of Human Rights (1948). At the highest level interventions are such as to place *all citizens of the world on a formally equal basis*. Thus the UN High Commission for Refugees acts to secure the interests of refugees simply on the basis of their plight and

circumstances and regardless of their nationality. The World Health Organization and individual nations' health services address the health needs of their citizens in a formally egalitarian manner. Age specific mortality rates are also kept low given that arrangements are in place to make the likelihood of war minimal.

Let us explicitly add to this picture a further element. This is to the effect that there is a comprehensive commitment at the highest UN level and down into the individual states to safeguard the interests of future generations. There is a determination that each generation will leave the world and the environment as far as possible either in the same or preferably a better state than it found it. This places the environment and considerations of ecology at the forefront. As far as possible human life is to be sustained upon the basis of replaceable resources or ones never likely to be in short supply. A UN Declaration of Human Responsibilities affirms the more detailed implications for individuals and groups. Hence it may be judged that at the supra-national level, *the overarching framework of international governance derives from the coordinated action of the aggregated populations of the nations typically mediated through the actions of their national governments.*

Attention may be drawn to a further feature of this configuration: it is one which tends to keep coerced cooperation at a low level. A residual way in which coerced cooperation persists is, of course, in respect of containment of the prison populations. However, the generally low level of coercion contributes to the overall stability of the system, for it is generally the case that those subject to coercion radically alter their behaviour once its

source is removed. Probably the major overall way in which people are linked within the model is through the world capitalist system within which their relations are maintained on a voluntary rather than a coerced basis. (It is probably the case that the long-term use of money in transactions tends towards the overall reduction of coercion: where everything tends to have its price there is at least in principle a legal route to obtaining it.) It may be objected that capitalism tends to generate gross inequalities forcing people into work roles for demeaning rates of pay; but this rarely amounts to coercion in the strict sense. Furthermore, although it is certainly the case that capitalism tends to generate great inequalities, a further feature of the model being considered is that it provides scope for these to be addressed politically. Hence it represents a relatively stable framework giving expression to world-wide cooperation, but substantially not of the coerced type.

The reader may well find that the arrangements being described in this putative world structural model are hardly startling, but essentially amount to the state of affairs to which many liberal-minded people aspire in present circumstances. That can serve to indicate that dominant systems of values in our time underpin efforts to approach and realise that state. In effect the accumulated experience of humanity down the centuries points to the desirability of moving to that state. Yet when one reflects on it, *its structural form nicely articulates the tension between the cooperative and the other genes*. There is a clear sense in which population members are considered as formal equals and their aggregated position is secured as far as possible by coordinated action at the highest (governmental or supra-national) level. In addition, however, within that cooperatively-defined framework, there is manifestly scope for interests and concerns

originating from the level of the individual and the family to be expressed. It is not too much to claim that the character of these national and international arrangements recapitulates something of the dynamic tension of the structure of the genes, *but, significantly, the overarching framework derives from coordinated action conducted on the widest possible basis.* The cooperative genes are therefore arguably 'in the driving seat'. Notice a further feature: given the argument and evidence of earlier chapters, there is every expectation that within the context of these arrangements *the human population would tend to continue steadily to increase.* At the same time the human presence would continue to be interdependent with a continually changing pattern of other life forms, including, perhaps notably, the microscopic.

It is important to be as precise as possible. Of course when one is concerned with populations numbered in millions there can be co-action (as when people vote in an election held on a specific day) but that does not amount to cooperation between them all as originally defined; rather, they are agreeing to conform to a framework of rules and with an understanding of its purpose and significance. In government and in the arenas of international governance it is representatives and delegates who enact the various measures: that is the level where cooperation in the strict sense takes place. To use Lincoln's phraseology, what is going on is 'government of the people, by the people, and for the people' mediated through the cooperative activities of the representatives and delegates. Thus the strategic (higher-level) cooperation derives from and is oriented towards the largest possible human population.

Summarizing conclusion

Reasons have been given as to why zoologists and social scientists may have tended to overrate the importance of competition and underrate that of cooperation when seeking to grasp the broad character of human life. Competition is an essential ingredient but the failure is to grasp the fundamental contribution of the cooperatively-created institutional setting. With respect to modern democratic societies, for instance, there is plainly competition between firms, between political parties and between athletes, but the controlling power resides in the legally-secured institutional settings of these activities which ensure competition is carefully regulated and wider public interests thereby served.

Confronted with the topic of the selfish gene, sitting-room discussion often moves to a consideration of whether humans are 'naturally selfish'. As already pointed out, the connection being made is faulty, but the issue of selfishness is strategic; it is important to describe the associated patterns of behaviour in an accurate and comprehensive way. Human behaviour often needs to be self-oriented but, beyond that, it is as true to say that humans are sometimes selfish as it is to say that humans tend to react unfavourably to selfishness in others and 'naturally' create norms of behaviour tending to restrict or eliminate selfishness.

There is, to an identifiable degree, what may be termed a 'conflict of interests' between the cooperative and the other human genes, which is working itself out in human experience. Where a normative element inheres in patterned behaviour, that is a sign that

the behaviour tends to favour the propagation of the cooperative genes. Two examples have been presented to illustrate how the conflict of interest may work itself out in practice, one concerning theft by a gang, the other the UK's National Health Service. From the examples it may be seen that a normative structure may incorporate both what are termed 'particularistic' and 'universalistic' elements. It is significant that it is the universalism inhering in a normative order which (in an identifiable sense) 'strains' towards having wider application and it is that tendency which maximally serves to propagate the cooperative genes.

With the help of Fukuyama's 'end of history thesis', a model has been constructed representing the (possible) emerging structural form of geo-politics. It is argued that the structural form nicely articulates – and in a sense resolves - the tension between the cooperative and the other genes. Significantly though, within the overarching political framework, the various key functions, activities and initiatives are normatively-governed on the basis of universalistic principles. Again, this implies cooperation on the widest basis is of a type tending to give rise to population growth.

Chapter 12: Conclusion

At the outset it was indicated that this work has the form of a 'feasibility study' whereby there is an attempt to test the theory of the selfish gene in relation to the human population. It is now judged that quite a lot of evidence – direct and indirect – as well as associated argument may be assembled in support of the selfish gene theory as applied to humans. With a focus on genes giving rise to characteristically-human cooperation it proves possible to situate a whole range of patterned behaviour and phenomena, even including celibacy, the use of contraception, and war, which at first glance seem to present insuperable difficulties. The key to so doing is to note that the behaviour to which the new 'cooperative' genes give rise necessarily involves more than one person: it is not to be analyzed as a summation of individual behaviours. Crucially, it follows that the behaviour which tends to propagate the cooperative genes may be 'at cost' to the genes of some who may be party to the cooperation itself (see Chapter 1). That being so, evaluation of the selfish gene theory hinges on whether or not it can be shown that cooperation tends to give rise to growth in the aggregate population of cooperating people; a weight of evidence suggests that it does.

An insight of primary importance (see Chapter 2) is that cooperation itself gives rise to full human conceptualization of the external world and their own place in it as embodied beings, which conceptual advance inheres in human practical activity. Also strategic – and arising out of theory of mind – is a tendency towards bifurcation in respect of types of explanation or understanding, between explanation by reference to purposive causation and explanation by reference to non-purposive causation; among other things, the

existence of this bifurcation helps to explain the origin of religion. Rational action puts these types of understanding to effective use.

It is also of the essence that cooperation has itself a core normative element (typically expressed using the word 'ought') while also giving rise to, and expressing, values and interests; it is also the source of the socially regulative pattern, morality. The existence of these elements makes behaviour within a locality more understandable and predictable, providing context for population growth. Significantly too, human behaviour acquires flexibility from the fact that action may be 'desire-independent', as when means are chosen to reach an identifiable goal. Again, in seeking to understand the implications for population growth, full account must be taken of the phenomenon of coerced cooperation and of the pattern whereby cooperation between embodied persons may, in its turn, give rise to extended cooperative frameworks.

Given full conceptualization of the external world, humans are thereby empowered: in particular, they implicitly, and progressively explicitly, grasp the three-dimensionality of their physical surroundings, which are also understood to change with time, itself initially grasped in a serial sense. Practical action in respect of the vital processes is thereby shaped (see Chapter 3). Cooperation impacts on fertility through a pattern of increasing control informed by foresight, for instance of potentially failing food supplies (illustrated for the tribal society of Tikopia in Chapter 6). Cooperation leads to population growth because it tends to bear down on morbidity and mortality (with the important exception of cooperation in violence and war, considered below), often in small increments but with

substantial cumulative effect in extended time. Reductions in morbidity and in the occurrence of accidental injury – particularly in younger age-groups – have positive implications for subsequent fecundity and fertility. The impact of cooperation on migration is such as to increase potential numbers in association with extension in space, while also redistributing population within a (potentially relatively stable) overall spatial division of labour. Population growth may also be understood to be interdependent with incremental enhancement of the human forces and relations of production.

A vitally important longer-term process - the domestication of animals and plants - is made possible by human capacities underlying the ability to cooperate; the geographical redistribution of such species means that the Earth is able to sustain a progressively larger human population. A further basic point is that, in the human case, the widest but appropriate context within which judgments as to the 'fitness' of particular categories of humans are to be made is increasingly the human cooperative framework itself: it is that feature which places the cooperative genes fundamentally 'in the driving seat'. Indeed in assessing fitness in relation to the human position within the ecological system as a whole, consideration must be given (even) to the expression of moral and aesthetic values, since these bear upon how humans re-shape the environment. (Appendix 4)

In understanding how human life has developed it is only to be expected that extended consideration is given to the implications of the 'biological basics' of sex and of the existence of blood ties. However, it is also essential to grasp that those implications change fundamentally with the advent of characteristically-human cooperation (Chapter

4). Evaluation of the significance of that element enables one to understand the difference between animal and human sexual behaviour, while bridging the gap between a zoological focus on blood-ties and the social anthropological focus on kinship, meaning the social recognition of blood ties. With regard to sex a key point is that there arises a range of options with the implication that sex may be an ingredient of differing types of cooperative relationship and may become economically significant, as when a couple (or family) is a unit of economic production or consumption (or - rather different – economically significant in the relation between prostitute and client). While understanding how cooperation gives rise to kinship and marriage, one is also led to understand how it is the origin of differing kinship systems, thereby providing insight into a source of cultural variation. An expanding framework of affinal and kinship ties renews and integrates society: it is the primary system of cooperation, co-action and coordination.

Economic and property relations are as basic as kinship and marriage. Taking full account of the cooperation involved in the development of various modes of production together with that involved in their use, it is evident that they arise from human cooperation and are sustained by it. Domestic cooperation in food preparation and the rearing of children is ubiquitous. Importantly, patterns of exchange are often of more than narrowly-conceived economic significance, thereby making an additional contribution to conflict reduction. Kinship and economic considerations bear heavily on the bases of differentiation found in early societies: sex (or gender); age-grading; ranking, hierarchy and stratification.

Also basic in the generality of the human situation is the neighbouring relation. This type of relation tends to exist between equals or near-equals and those people who find they can sustain cooperative relations with neighbours (even when this involves a degree of coercion) will tend to survive and flourish as compared with those for whom this is not possible. Kinship, economic ties and neighbouring shape local communities and there are associated patterns in the outlook on 'insiders' and 'outsiders'. Rising population numbers have important consequences, but – notwithstanding the value of the idea of an 'imagined community' (Anderson, 1991) - larger as well as smaller groups arise out of cooperation and continue to depend upon it.

Cooperative activity may express or concern speculative thought just as it may be directed at more immediately practical concerns. In this connection, religion is important for several reasons (see Chapter 5). It is highly systemic with many 'degrees of freedom' as to the precise form that it may take, but it is strategically vital in that it legitimates the widest range of behaviour; there are also good reasons to believe that the religious outlook is inevitable in the early circumstances of mankind. Religions have also brought together the largest human groups, the largest contexts of cooperative activity. Despite variations in their detailed regulation of practices bearing upon population (including marriage, timing of sexual intercourse, celibacy and monasticism), there is good reason to judge that the predominating influence on fertility of those religions which have tended to survive long-term, is such as to incline population firmly on an upward trajectory. Plainly a practice of historical importance with contrary implications is religiously-

inspired human sacrifice. Given a particular world view that can be a meaningful way of acting, but there is nevertheless reason to judge that where it is viewed as a means to an end, the practice will tend to decline in the longer term; in the short term, it may tend to be undermined by countervailing interests.

An anthropological study of an island-based tribal society – Tikopia – lays bear the many mechanisms of population control used even in a relatively simple society, a crucial influence on their deployment being consideration of potential food supplies (see Chapter 6). Future-time reference is evidently crucial in maintaining the condition of the population, so that numbers may recover quickly once a sustainable increase in food supplies is achieved. Importantly, pre-literate cultures have the ability to limit family size but they exercise it not to maintain a balance between fertility and mortality at a subsistence level, but to maintain an economic surplus.

Understanding the transition from simple to complex societies is challenging particularly given that between non-relatives – in the absence of sexual interest – there is no naturally given affective tie, so as the population grows there is greater risk of quarrels and violence. Hence in the larger group there is a need for centralized authority which seeks to monopolize the use of force and promote conflict resolution. The central authority may also usefully receive and re-distribute surpluses of goods. Associated with this, there are good reasons for thinking that competition between societies at one level of complexity tends to lead to societies of a greater level of complexity where conditions permit. In this connection, the broader picture is not that various independent variables simply ‘cause’

growth in the dependent variable of population size but rather that various analytically distinguishable elements – such as societal complexity, the rate of technological innovation (seen as evolutionary), food production, and population size and density inter-affect each other. Perhaps the most strategic aspect of all is development in respect of the division and specialization of labour; crucially, that development tends to increase average product per person while reducing the tendency for conflict to occur, conflict which might lead to maiming and increased mortality. Interestingly, in settled societies the designation of space from which people are substantially excluded may indirectly give rise to population growth. An abstracted model has been presented (Chapter 6) to assist understanding of the interdependence between change in the cooperative framework and the tendency for population numbers to grow.

In evaluating the thesis being advanced here against the fully-rounded evidence of prehistory and history, attention must be directed at the significance of patterns and developments (as in Chapter 7). Everywhere humans gain access to the means of their subsistence cooperatively, but how they organize to do so develops in patterned ways. The tendency for the population of hunter-gatherers to spread is one such, as is the crucially important phenomenon whereby agriculture arose independently in at least seven different regions of the world. The emergence of agriculture may be situated given that it is understood that various incremental stages are involved as are differing associated phenomena such as domestication, cultivation, herding and sedentism; also important is the distinction between hoe and plough agriculture and the contribution made by technologies of intensification.

A further evident tendency was for there to emerge more institutionalized social formations (states) and complex concentrated settlements (cities). That the same trends – towards food production, social complexity and urbanism – are found as independent developments in different parts of the globe points to the contribution of basic facets of human cooperative behaviour. There evidently occurred patterned change in the structure of cooperation, a key aspect being change in the division or specialization of labour, with an important spatial dimension. These developments push further the relative decline of kinship as a structural principle. That relative decline leads, for instance, to an increasing problem in legitimating leadership and hence helps one to understand the elaborate social organization concerned with the stylized or idealized portrayal of leaders and deities, together with the evident propaganda and stage-managed public performances (not entirely absent from a modern democracy – consider the State Opening of Parliament!)

Of considerable prominence too, through extended time, have been the phenomena of empire and of the nation state. It is argued that empire, despite the contribution of the use of force to its creation and maintenance, tended to have positive implications for expansion of cooperation and longer-term population growth; the European expansion into the relatively sparsely populated continents of North America and Australia would be the most spectacular example. While enlarging the scope of its rule, the paramount power may confer various 'public goods' such as language, the law, a common currency and relative peace on it territories (even despite a frequent need to suppress local

rebellions and defend or extend boundaries). An institutional basis is thereby provided upon which commercial and other types of cooperation may develop; a case study of China illustrates the links between expansion of an institutional base and population growth. Significantly too, the importance of its institutions may sometimes outlive the empire as with Roman law and the Greek and Latin languages and their associated cultures.

There may be an initial – but perhaps mistaken - tendency to associate the nation-state system with the occurrence of war and high mortality (epitomized by the First World War). Yet that development points in another direction, towards the clarification of individual governmental responsibility for a defined area; a fully developed system also reduces the occurrence of squabbles over resources since these are firmly allocated on a near-global basis: in this respect the system is much more stable than is empire, since it has greater legitimacy. Hence the nation state may be viewed as an institutional development introducing greater clarity and predictability into lives, providing a context for more intensive cooperation and population growth. Significantly too, associated with the emergence of that system, there has been an ever-developing system of transnational governance, although this has not – perhaps significantly - extended into world government. This elaboration of governance is illustrative of the general pattern in human affairs whereby systems of higher-level cooperation tend to be instituted which resolve sources of conflict at lower levels. There is plainly too a pattern whereby larger and more stable political entities tend to emerge over extended time – states, empires,

nation states – providing a more predictable and secure context within which populations may grow.

In the account – particularly with an eye to complex societies with large populations - attention has been drawn (in Chapter 8) to ways in which orderly cooperation is sustained and extended. Particularly important is the semi-permanent, built environment. Most obviously this at once facilitates and constrains use, but it also functions as a system of signs and communication implying permissions and prohibitions which facilitate orderly co-action. The significance of writing, as opposed to oral communication, concerns time and objectively-given, potentially public, shared reference. Writing also facilitates every kind of second- or higher-order, shared, 'mental' activity such as that involved in mathematical, scientific and technical enquiry, as well as administration. The institution of money has powerfully promoted the expansion of the production, distribution and exchange of goods and services; significantly, transactions are typically consensual so money represents a vital step away from (potentially unstable) coerced cooperation. The advent of money may be viewed as a harbinger not just of capitalism, but of globalization.

Proceeding further, it is argued that the more widespread and systematic adoption of a rational approach to many aspects of life – often highlighted as progressively developing within western societies or judged characteristic of our times - is grounded in the emergence of particular institutional forms. Regarding population, a rational orientation finds particular expression through the idea of family planning. No doubt, too, it is the

development of an elaborated configuration of institutional and other elements – including new forms of transport and communication – which underpin the process of globalization. A marked feature is the way in which interaction and cooperation can become 'extended' in space and time, with the parties no longer being co-present. It is not too much to claim that while cooperation gives rise to human conceptualization of the external world, through their activity humans are proceeding to reconfigure the external world so as to maximize the possibilities for their own cooperation within it. In particular, cooperation has given rise to technologies and expert systems which in their turn maximize the scope and nature of possible further cooperation and extended cooperative frameworks. The dynamism inherent in globalization bears upon the tendency for the world's population to grow steadily.

It may be felt that the frequent occurrence of violence and war is evidence against the thesis advanced here, most obviously because cooperation against an adversary typically increases mortality and loss of potential fertility. However, there are reasons for judging that the threat or actuality of violence has played its part in creating the conditions for population growth (just as has coerced cooperation) (see Chapter 8). Where a settled agricultural population extends its range by force to displace hunter-gatherers this might well lead to overall population increase; again, as implied above, when European settlers used force to displace Amerindians and Australian aborigines it opened the way to more rapid population growth across whole continents. This must be taken in conjunction with the general point that the threat or actuality of war may lead to the amalgamation of societies or creation of empires, drawing together previously conflicting parties within a

more integrated system of control, and thereby creating conditions for extension in the scope of cooperation. It is notable too that for extended periods wars led to the rise and fall of particular states and empires without arresting the tendency for there to be overall population growth within a particular region of the world.

The threat of war and its frequent occurrence also led to the development of the nation-state system which provided political context for the unprecedented population increases of recent centuries. Crucially, it is unclear that any political entity judged to be conducive to population growth – including states, empires and nation states – could have emerged and persisted without some use being made of violence and war. At the same time, there is also good reason to judge that societal and institutional change overtime has tended increasingly to realize a latent potential for cooperation without recourse to violence and war. The magnitude of losses in war may for extended periods have tended to keep in step with a rising population without arresting it, but since the Second World War it has dropped considerably below that level.

Globalization means that the vast majority of the world's population is drawn together by frameworks of cooperation. Therefore to evaluate the thesis under consideration by reference to the evidence of recent centuries, attention must be directed at population patterns across the world, rather than simply those within individual societies. The main way in which those patterns have been encapsulated is in the theory of the demographic transition (Chapter 9). In that connection social processes have been identified which help to explain why falling mortality leads to falling fertility, but post-war evidence

shows a tendency for populations unexpectedly to go on rising even after completing the transition. The greater part of the population growth of recent decades originates in less-developed nations, but part of that growth is effectively transferred to the developed by net migration.

Despite the massive build-up of transnational governance it is an essential fact that there is no world government. An individual national government is an important, but by no means decisive, 'actor' in the play of forces determining population outcomes in its own society, and also to a limited extent elsewhere. Given a relatively anarchic international scene, there is a tendency for individual political authorities to wish their states or blocs to become (relatively) more powerful and, most often, they see this objective as served by a (relatively) growing population. In recent decades a widely agreed and centrally-affirmed objective is to reduce child poverty and mortality, but in itself that directly points to increasing rather than decreasing numbers.

Fertility limitation is not an invention of recent centuries but the modern era is marked by important technical advances in that respect, together with – particularly in western societies – the advance of a normatively-governed notion of 'family-planning'. There is little doubt that the advent of the contraceptive pill is heavily implicated in change in family life and, particularly, in the position of women. Nonetheless, the populations of these societies have in the main continued to rise relatively steadily. In respect of contraception and abortion there is plainly a developing range of options, yet it appears that these methods essentially constitute means by which fertility goals are achieved, but

the goals are essentially independent of the means. Strikingly, overall populations are increasing but this is 'at cost' to the propagation of the genes of the majority of individuals who choose to limit their own fertility.

A basic and perennial concern is hoped-for security in old age when one's powers are waning. While in traditional societies the issue is addressed via obligations of kin and involves a principle of reciprocity between generations, to a degree in modern western societies the solution to the problem has been collectivized via state action. However, there continues to be a pattern of potential dependency in old-age of each generation on the subsequent one. This contributes to fertility tending to outstrip mortality because the needs of each earlier generation promise to be best served if a (slightly) larger one is following it. A further salient issue of the modern world is that of persistent, but sometimes 'unwelcome' and even forced, immigration into developed or wealthier nations. Again, this provides an example of a ubiquitous tendency which is for there to be an – often partially coerced - re-distribution of population in space and in relation to economic resources which tends to keep overall population numbers on an upward trajectory. As regards the present position of 'island Earth', overall population expansion continues but looks likely to become increasingly difficult in the medium term, but some people even now speculate about 'colonising' and populating other planets. One thing is certain: were a planet faintly resembling an unpopulated Earth to appear nearby our population would rapidly expand on to it.

In the long term cooperative behaviour has borne down upon morbidity and early mortality thereby boosting numbers. However, there is point to the suggestion that advanced societies have tended to become like hospital wards, retaining what are termed 'genetic defects' in their populations, but a countervailing tendency is beginning to be evident (see Chapter 10). Genetically-informed interventions may lead to the elimination of these types of defects while also resulting in such 'positive qualities' as intelligence and beauty becoming more widespread in populations. However, the changed distribution of qualities will enable people to cooperate even more effectively, thereby indirectly giving rise to further population growth.

There is a developing contrast in the human relationship with macro- and micro-organisms. The importance of domestication has been pointed up more than once in this study, but a more general process is evident: the genes of other flora and fauna increasingly tend to exist and propagate on human terms. At least that tends to be true for macro-organisms such as lions and redwood trees, but it is some way off for the population of micro-organisms (!) Efforts in that direction are being hampered by the fact that the gene pool of micro-organisms changes rapidly in part interacting with the limited, but expanding, efforts of humans to exercise control.

Following upon the understanding flowing from the concept of the gene, the notion of the 'meme' was introduced as a putative second kind of replicator. However, changes in respect of memes – cultural items of various types - may be judged to be associated with changes in patterns of cooperative relationships. The position tentatively developed here

is that the gene is the single controlling replicator and that cooperative genes give rise to cooperative behaviour which tends to propagate the genes, while the differing types of meme inhere in differing classes of cooperative relationship. Nevertheless, without reference to the notion of the meme, it can be readily appreciated how human cultures have at times become so diverse and various.

Reasons may be advanced as to why both zoologists and social scientists have tended to overrate the importance of competition and underrate that of cooperation when considering the broad character of human life; it is hoped that this study contributes to restoring balance (Chapter 11). Further evidence of misdirected thinking has been evident in discussion, following upon the publication of *The Selfish Gene*, concerning whether human beings are naturally selfish. In this connection confusion results where there is a failure to distinguish between self-oriented behaviour – for instance, meeting personal needs (such as urinating) – and behaviour which is properly to be judged selfish. The key to further understanding resides in the use of the phrase 'properly to be judged' in the previous sentence. The whole point is that judgements of selfishness are made by reference to criteria which humans have themselves created. It is as true to say that 'humans are sometimes selfish' as it is to say that 'humans naturally create norms of behaviour tending to restrict or eliminate selfishness'. It would be similarly jejune to say, 'humans sometimes act unfairly' without adding that 'humans disapprove of unfairness': indeed, the only fairness in the world is that which humans have introduced into it (so we can't be that bad!). It is hoped that this is a further topic which is illuminated rather than obfuscated by the approach taken here.

The focus in this account is on the multiplication of human cooperation and the way in which it gives rise to systems of co-action and coordination. That structural elaboration is interdependent with the high degree of flexibility which humans exhibit. Fundamental to the latter is the aforementioned capacity to act in ways which are 'desire-independent': this gives rise to a behavioural 'range of options'. Even with regard to such a basic area as that of sexual behaviour, once it becomes cooperative there is a range of possibilities; for instance, as indicated, a couple (or family) may become a unit of economic production or consumption. The development of the division and specialization of labour – vital to the process whereby numbers grow – requires individuals progessively to play widely differing roles and one person often to play a variety of roles at different or even the same time. Although it is of the essence that cooperation develops in tandem with a normative order, it is judged too that humans are very 'flexible' normatively i.e. in radically changed circumstances their behaviour appears readily to involve the adoption of standards different from those seemingly adhered to previously (as for some whose lives included, but extended beyond, the Nazi period in Germany). Again, a striking aspect of human flexibility concerns the interplay between cooperation and power. The fact is that humans can be observed to survive – and propagate – in very unequal situations and even when subordinates in coercive-cooperative relationships such as slavery.

Human life is indeed notable for the co-existence of essentially different kinds of behaviour, including the self-oriented, the selfish, the routinely cooperative and the

altruistic; indeed the whole seems to comprise disparate kinds of elements in dynamic tension. The theory of the selfish gene in its existing form fails to grasp this complexity. It is the move to focus on co-operative genes which provides the needed additional element, the key to grasping complexity. The fact is that even the most altruistic type of person must occasionally simply orientate to their own needs. Again, seemingly highly selfish individuals may be seen sometimes spontaneously to cooperate in other-regarding ways: a member of the mafia may give directions to a stranger who is lost in a city. The mélange of tendencies evident in all of us is what is to be expected given that the human organism contains genes giving rise to cooperation alongside other genes and that the two sets of genes express their 'selfishness' in ways which are sometimes aligned and sometimes at variance. The perspective developed also sits easily with the notion that a lot of human brain power is concerned with understanding the minds of potential and actual friends and enemies, mapping relationships and the external world, and out-thinking other animals. (Radford, 2011, pp.8-9)

It is judged that the human past, present and future are to be understood as involving the working out of a *partial* 'conflict of interest' between two sets of genes: the cooperative genes and the others. In this connection, presented with patterns in human life, it is helpful to inquire as to whether, and if so to what extent, these are fundamentally secured by the normative element (i.e. involve 'ought'). Where that element may be identified as being present then there is a thrust in the direction of serving the interests of the propagation of the cooperative genes. A further, related tension concerns obligations to kin versus obligations to non-kin. This is illuminated in Chapter 11 by a consideration of

two examples: (a) theft by a gang; (b) (issues concerning) the U.K. National Health Service. The general assertion arising out of that discussion is that the universalism inhering in a normative order strains towards having wider application and that is a tendency which serves to propagate the cooperative genes. The first part of this assertion would be roughly illustrated by the way we in Britain feel it would be better for everyone in the world were they all to have the same rights and personal freedoms which we enjoy, and – even more – by the action tendencies which flow from that feeling. The second part is illustrated in this way: were we to reduce worldwide child mortality to the U.K. level this in itself would lead directly to overall population growth (of course, there would be additional indirect effects) .

In a related way and without getting inappropriately into futurology, further support for the position developed here, arises out of consideration of the world's (possible) emerging political and economic structural form. In Chapter 11, a model is presented, constructed with the help of Francis Fukuyama's (1992) 'end of history' thesis, whereby it is envisaged that the whole of the Earth's surface is covered by liberal and social democratic (capitalistic) nations and supranational units (such as a partially politically-integrated European Community), together with an elaborated system of world governance with the United Nations at its strategic centre. Following upon analysis of the core principles upon which human affairs would then be being conducted, the conclusion may be drawn that that the model's structural form nicely articulates – and in a sense resolves - the tension between the cooperative and the other genes. This is a

particularly striking feature of geopolitical arrangements which could conceivably come to embrace the totality of humankind.

This account has centered on the notion that the genes giving rise to characteristically-human cooperative behaviour are propagated ‘at cost’ to the genes of persons identifiable by reference to that cooperative behaviour itself. Attention has also been drawn to the phenomenon whereby in modern societies, given an understanding of genetics, a consciously undertaken restructuring of the human gene pool is beginning to get underway. In the consideration of the interaction with other fauna and flora it is noted that progressively the genes of other life forms exist and propagate on human terms. Hence, in a parallel way, one can say that the propagation of the ‘cooperative’ genes is ‘at cost’ to some of the genes of other life forms, which forms are identifiable by reference to human cooperative behaviour itself. What is unique about human beings is the way in which the propagation of their cooperative genes is potentially ‘at cost’ to the propagation of any of the other genes of other life forms on this planet (and conceivably also elsewhere). That is the full measure of the extent to which these genes concerned with cooperation are selfish.

On a final point arising out of this study, the reader may be inclined to inquire as to whether the view taken here is that the underlying pattern identified is the only transcendental purpose of human life. In response, since genes do not have purposes, the most that could be claimed is that what is being examined is the main transcendental tendency of a biological type. Nor is there good reason or evidence sufficient to justify

belief in the existence of any (more conventional) transcendental purposive agent. As regards purposes or the meaning of life more generally, the essential contrast is between the transcendental and immanent options, where the latter approach is that, '[t]here is nothing beyond or apart from the processes of life' (Blackburn, 2009, p.171). This last is the view taken here as is suggested by the way in which our values, knowledge and understanding have been treated as core elements of a life process arising from the action of cooperative, in conjunction with the other, human genes. However, the understanding of the origin and nature of that life process itself forms a not unimportant part of the meaning to be found within life itself.

Appendices

The four appendices which follow concern topics which may be fitted into the overall argument. However, it is judged that had they been incorporated into the main text they might have made that argument harder to follow – by seeming to interrupt its 'flow'. In Chapter 1 language use is situated within the broader context of cooperation. Some more detailed points regarding speech acts, language and cooperation are provided in Appendix 1. Proceeding further, cooperation between embodied persons – the focus of this study – may be distinguished from the important phenomena of coordination and co-action in social life. In Appendix 2 this distinction is clarified and it is indicated how the latter two are fundamentally dependent upon cooperation; the contribution of 'collective actors' is also situated in relation to the main discussion. Appendix 3 rather follows on from the consideration of morality in Chapter 2. The related phenomena of empathy, torture and coerced compliance are examined and situated in relation to the main argument. A rather different topic is addressed in Appendix 4. It forms a sequel to the consideration in Chapter 3 of fitness in social context, concerned with factors conducive to differential survival and reproduction. In the appendix further consideration is given to the human position in the light of the notion that fitness must be judged in relation to a species' position within the ecological system as a whole.

Appendix 1: Speech acts, language and cooperation

The focus of this study is on cooperation employing theory of mind. The linguistic content of cooperation varies: in some instances human cooperation may not be accompanied by spoken or written communication at all. However, the general position

appears to be that language inheres in most human cooperation and develops in conjunction with it. However, in properly situating it in relation to the overall argument, the complexity of linguistic usage must be noted. No doubt language is important for conveyance of information but its various uses extend considerably beyond that; for instance, the imperative mood employed in situations of dominance and submission comes to us from pre-history. A particular style of linguistic usage is typically embedded within a type of cooperation. Additional clarification is provided in this section.

For information to be imparted there must be involvement of both speaker and listener: effective conveyance of meaning is achieved jointly (despite, for instance, differences of power or status). Hence language use seeks to generate, or forms part of, at least a minimal type of cooperation. (Dunbar, 1996) A consideration of speech acts clarifies the differing ways in which language is deployed. There are indicative and interrogative uses and, reflecting on modern languages, Searle (2010, p.69) discerns five possible types of speech acts: assertives (descriptions etc); directives (orders etc); commissives (promises etc); expressives (apologies etc); declarations. In thinking about the evolution of linguistic representation no doubt it is strategic that what often gets communicated is information about the world. Searle suggests that sentence structure may reflect 'the object salience of our perceptual phenomenalism' (2010, p.78), objects with their attendant qualities being prominent features of the environment.

For our purposes here, it is an essential point that for meaningful communication to take place, speakers need to invoke already understood vocabulary and existing conventions

of a language. There is also the need for speakers (implicitly) to know how to produce a potentially infinite number of new sentences which involves them in utilizing recursive rules (Searle, 2010, p.79). These conventions and rules arise out of prior usage. Importantly, given the existence of suitable conventions and rules, language enables users to extend vocabulary, to use tenses and modalities and thereby to think in ways unthinkable without language. Where numbers (and numerals) are introduced, for instance, there is the potential to count indefinitely. Evidently a fundamental feature is the 'open-ended' character of language, which may be expected to move in step with the cooperative framework within which it is embedded.

Significantly in his analysis Searle (2010, p.80) goes on to point up the 'deontological' element in actual language use, which is here termed 'normative' i.e. that it necessarily involves social commitments. In this regard it is of the essence that speech is public (or at least shared with another) and the speaker is thereby *committed* to something in front of others. Searle points out that when one makes a statement one is committed to the existence of a fact, when making a promise one commits to the performance of a future action (2010, p.88). (Of course people sometimes lie, break promises etc but these are secondary phenomena made possible precisely because they are exceptional.) Hence speech may be said at root to involve a normative element, just as it is being asserted here that that is the case for cooperation in general. This helps us to understand the nature of speech as a particular type of cooperative activity while acknowledging that language may also be said to accompany or inhere in other types of cooperative activity.

Appendix 2: Cooperation, coordination and co-action; collective actors

In this study the notion of cooperation between identifiable, embodied persons is at the centre of an account which incorporates consideration of the emergence and functioning of larger groups and societies. The latter type of phenomenon is what is being got at, for instance, where there is reference to the creation or existence of a 'wider cooperative framework'. For the argument to be sound it must be shown in what sorts of way these larger entities and structures may emerge from cooperation as understood in the usual sense and how they continue to depend upon it. While the viability of organizations, institutions and social groups such as nation states plainly crucially depends upon cooperation, it is also apparent that they involve much more than some sort of quantitative expansion of what is going on in small face-to-face cooperative groups such as teams. In fact, in the generality of situations, care must be taken to distinguish cooperation from co-action and the co-ordination of activity. The intention in this section is to provide elucidation. It is judged that this topic is germane to widely differing types of societies and social groups, but partly for ease of exposition the illustrations are mostly taken from familiar western societies.

The first aim is to clarify how cooperation may be more sharply distinguished from other ways in which the actions of people are coordinated. The general intention is to use the notion of cooperation in as natural a way as possible, but there are nevertheless difficult or marginal cases to consider. Arising out of this, various other types of links are identified and distinguished from cooperation between embodied persons, for instance, those simply involving co-action or coordination of action, including, for instance, cases

where relationships are materially mediated (as with workers on a conveyor belt). Included too are some links implied by the existence and activities of so-called 'collective actors' e.g. organizations and institutions, which entities are not in themselves embodied persons. Then, having identified other kinds of link, the second aim is to show that these arise out of, or are products of, previous cooperation between embodied persons and also that they continue to be dependent upon that type of cooperation.

It may help to commence with a suggestive example. In a study seeking to link cooperation and population, consideration of transport systems is plainly relevant since they play a crucial role in sustaining large populations; so let us focus briefly on the road-traffic system. There is highly patterned behaviour of drivers and associated movements of their vehicles on our roads. Cars are using lanes and overtaking in orderly ways; they can be seen to be conforming to the dictates of traffic lights. However, one would not wish to say that all the motorists in a given area are cooperating with each other; that would somehow be to claim too much. Instead, we would say this is primarily to be considered as *a context of co-action and coordination rather than cooperation*. (There is, for instance, co-action in that they are all driving on the left in the U.K. and coordination between vehicles when overtaking.) The point is that drivers are most of the time acting in patterned ways because they understand and are conforming to the rules of the road (expressed in *The Highway Code*). However it is instructive to go beyond this to inquire into two further highly strategic aspects: how *The Highway Code* is compiled and its status ratified; what happens when things go wrong on the roads.

On the first point one can be reasonably confident that, although its creation would arise within the context of an official bureaucratic process involving consultation of interested parties such as the Automobile Association, the finalization and confirmation of the status of a particular formulation of *The Highway Code* would emerge from the type of actual human cooperation involved in the meeting of committees. Similarly, on the second point, one can feel confident that in the event of, for instance, a serious accident, actual cooperation will come into play in response, as when phone calls are made, police temporarily redirect traffic and ancillary health workers attend to injured persons. The conclusion to be drawn is that the system of co-action and coordination that is road-traffic is fundamentally created and maintained by actual human cooperation. In this connection it is significant that where the content of a task involving many people is at least to a degree non-routine, it is controlled by cooperation between embodied people.

There are other instances where it is patent there is coordination between the actions of individuals but it falls short of cooperation. Consider the relations of workers on a moving production line. Of course their contributions may follow in a predetermined sequence but the workers may hardly converse or even acknowledge each other. This particular link between staff does not in itself amount to cooperation; rather it is mediated by a physical system. However, one may again fruitfully consider how this state of affairs was brought about and what happens when things go wrong. On the first point, it can readily be envisaged that much actual cooperation would have gone into even the decision to set up the production line and probably a cooperating team would also have directed its installation. Again, when things go wrong – perhaps the line breaks down –

although this possibility may well have been envisaged and even planned for, its solution cannot be 'programmed' as can the movements of the line itself. Actual people will cooperate in helping to put things right or in calling for technical help. The example is revealing in the respect that when things are proceeding in a predictable, programmed way the link is not that of cooperation, but when things go wrong it may soon become of that type. The conclusion is similar to that drawn earlier: that physically mediated systems of co-action are created and maintained on the basis of cooperation between actual people.

The last example naturally leads on to a more general consideration of the activities of 'collective actors' such as organizations and governments. These types of entities do all sorts of things: they can for instance be said to have interests; they cooperate with other organizations as well as with individuals, and so on. Nevertheless, they are fundamentally controlled by, and also derive from, the actions of cooperating embodied individuals. For instance, where an entity such as the U.K. government takes action the strategically relevant cooperating individuals are senior ministers and civil servants; where a firm it might be the managing director and the chairman of the board plus a few others. No doubt too there would be innumerable instances of cooperation at lower levels to carry forward work tasks (as well as many instances of informal contact not so motivated!). In this context a civil service bureaucracy or a firm's system of line management are to be thought of as the means by which things get done; a moving production line which coordinates workers is essentially an elaborate tool. Administrative and technical tools such as these are vital in sustaining the economy and

society of a highly populous modern state, but these coordinating arrangements between people have been instituted or set up by cooperating individuals (either directly or using other organizational tools) and their effective maintenance similarly derives from contemporaneous cooperation between embodied persons.

Again, the national entity the U.K., a particular type of social group, is a social fact fundamentally arising out of, and sustained by, cooperation between embodied persons, but it would be straining the use of the term to say that its reality consists of cooperation among all British people (leaving on one side the relations with those abroad). Rather, part of that reality consists of systems of co-action. Thus its governmental system has as a basic element not a gigantic mass meeting of its citizenry, but a system whereby formally atomized individual citizens vote in elections. The legal, administrative and indeed detailed practical working out of the electoral process exemplifies what is meant by an 'enlarged cooperative framework', in this case one underpinning the reality of a modern democratic nation state. The indicated phrase is referring to a wider group or system of relations fundamentally regulated by actual cooperation between embodied persons but also incorporating conformity to rules together giving rise to co-action and the coordination of action among larger numbers. As already indicated, it is strategic within the overall argument that even where very large systems of relations are involved – as in the case of the nation state – the creation and maintenance of that entity flows from cooperation between embodied persons. This is not presented as a particularly startling assertion, but rather because it is significant within a study concerned with the long-term implications of cooperation.

In a related way the influential idea of ‘imagined communities’ may be situated. The contribution of this widely-used concept may be dramatized through the contrast between a small community of (say) fewer than 150 people with one where the population is in the hundreds of thousands or even – as with a modern nation state – millions. Whereas in the small group such notions as ‘our people’ are underpinned by actual observation and experience of everyone, this cannot be the case for the larger group. To assist understanding of what is involved in these types of situations Benedict Anderson introduced the notion of ‘imagined communities’ (Anderson, 1991). This means roughly that members hold in their minds a mental image of their affinity. In a modern nation state, for instance, people recognize and respond in distinctive ways to the national flag, the national anthem and the actions and appearances of their leaders - perhaps most often accessed via the mass media. Plainly people can also operate with shared notions as to such characteristics of their fellow nationals as their typical appearance, language and accent; they may well understand themselves to have a shared history. Anderson sought particularly to understand the phenomenon of nationalism, but, more generally, it is plausible that people’s imaginations contribute rather differently when they orient in a whole variety of ways towards a large group than when they orient to a community whose members are all known individually.

While agreeing on the contribution of the imagination, an assertion of importance here is that, nevertheless, all the various actions and activities involved in the reality of the larger group arise out of actual human cooperation or are controlled by it. Imagination may

inform or inhere in behaviour but it is not in itself human action; rather it has to do with the content of individual action, or of cooperation or co-action. Thus it might be said: that two people are jointly raising the national flag (an instance of cooperation); that senior cabinet ministers are meeting (cooperation); that a general election is being held (involving cooperation, coordination and co-action); that there is a party-political rally (involving cooperation, coordination and co-action). Importantly, too, no assertion is here being made that other social scientific disciplines cannot contribute to the understanding of associated phenomena; far from it. To take an example: the charismatic influence of Hitler over his followers at mass meetings may be illuminated by the discipline of social psychology. That is true, but it nevertheless remains the case that the objective behavioural reality of such a phenomenon as the Nuremberg rally arises out of human cooperation and involves cooperation, co-action and coordination.

It is instructive briefly to proceed to note how complicated, in a society such as ours, the inter-connections are. Consider, for instance, the action of an individual who is withdrawing money from a cash-point. It is apparent that for this to occur involves all manner of conditions and preconditions. For instance, it may depend upon the previous joint action of two workmen who came round and fitted a cash machine securely into the wall; again, it depends upon there being a factory somewhere producing notes of currency and a firm delivering money to the machine. Not just this, but there are all the processes involved whereby sterling is itself secured as a currency involving the workings of the Bank of England. Without all these elements being in place one would not be withdrawing money from a cash-point. However, it would clearly be too much to

assert that all these parties – users of the cash-point, workmen, delivery men, the staff of the Bank of England - are ‘cooperating’, so instead one would refer to the coordination of action through time or perhaps ‘co-action’ when similar actions are (understood to be) proceeding at the same time. The action of withdrawing the money is possible given many conditions and pre-conditions which themselves arise out of cooperative activity.

Finally, on a rather different point, it is plainly also the case that, in the generality of the human situation, later cooperation within a persisting relationship is typically informed by understanding of earlier cooperation by the parties themselves as well as by associated cooperation involving others. In this connection formal processes (such as those involved in occupational appointment) and rites of passage are highly strategic. Suppose, for instance, two people have been processed through a marriage ceremony with its central cooperative elements. Subsequently they then know they are married which fundamentally shapes what they do. Most notably, they know that in their married state they are (normatively) expected to cooperate in patterned ways. This structures their behaviour even though subsequently there may be instances of antagonism or non-cooperation; again, actual conditions giving rise to breakdown of the relationship flow from the expectations integral to marriage. (It is relevant to the consideration of kinship and marriage – a topic of Chapter 4 - to note that an underlying source of problems for married people is that while they expect themselves and are expected by others to cooperate, this is made harder because they are not linked by a blood tie, whereas each is so linked to their own children and respective parents.)

Appendix 3: Empathy, torture and coerced compliance

As is often asserted, a sympathetic response to the plight of others may well be prompted by *empathy*. By this is meant the power of entering into another's personality or situation and imaginatively experiencing or identifying with his or her experiences. For present purposes it of the essence that this capacity is akin to, without being identical to, the ability to 'take the role of' the other; the former has more to do with feeling states, the latter, as indicated earlier, more to do with grasping intentionality in context. It can even be said that a response generated in this way almost amounts to the immediate commencement of cooperation with the other party. Suppose for instance one observes another person in a dangerous situation and about to be injured. Were one then prompted by empathy immediately to intervene to help them (perhaps at risk to oneself) this amounts to commencement of cooperation because it is implied that the other person *would* welcome help even though they may not have requested it: their situation is such as implicitly to ask for it. Hence given a genetic change making characteristically-human cooperation possible, altruistic behaviour underpinned by empathy becomes that much more readily explicable.

It is abundantly apparent, however, that quite other responses are possible to observation of the plight of others. Empathy implies sympathy but another possible response is *schadenfreude*. Sadly, it is also the case that humans not infrequently fully understand the unfortunate situation of others which they then seek to make worse (their response is spiteful): engaging in physical and mental torture of others is sadly by no means uncommon. However, it is again of the essence that the same capacities are involved as

in cooperation. For instance, frustrating someone typically involves fully understanding what would be involved in cooperating with them but then refraining from doing so or doing the opposite, which behaviour is itself typically understood by them. Sadly, torture, far from being 'unnatural', is a type of behaviour made possible by the genetic change highlighted here. Indeed as a practice it has been institutionalized in the treatment of suspected or actual miscreants for perhaps most of history. Happily, the morality of modern societies – particularly democracies – has come to point in the other direction: to condemn torture absolutely.

Yet that very development needs to be situated properly within the context of a study concerned with the implications of cooperation for population growth. Plainly, to torture someone is not to cooperate with that person. Hence the substantial elimination of torture within at least certain types of modern societies forms part of a wider pattern whereby it may be said that those societies are tending to maximize the possibilities for cooperation of the voluntary (i.e. non-coerced) type. It may be suggested that a consequence is that more stable and predictable conditions are created which are conducive to population growth.

It is appropriate in passing briefly to link the comments on empathy and torture, taking account of human understanding of the past. To put it directly we empathize with victims of torture; at the same time we are aware of the immense number of instances of torture which have occurred in the past. Those occasions are understood by us to be as real as present instances, yet we can do nothing to help. The screams of slaves being flogged to

death still ring in our ears. It is in the nature of the human situation that awareness of unalterable horrors hangs over us throughout our lives: as we seek to lead responsible and happy lives there is more to bear than awareness of the inevitability of personal death.

It is a familiar fact that the 'spirit' in which people cooperate is highly variable and it could be asymmetrical between the various parties. It could be whole-hearted but it will often fall short of that; there is also the particular case of coerced cooperation to consider. Someone could cooperate because it is spontaneously what they wish to do – it is intrinsically worthwhile – or they could proceed simply because they feel they 'ought to'. In addition, cooperative compliance could perhaps be gained on a utilitarian or calculative basis, or, alternatively, as with coerced cooperation, the disposition of a cooperating party could be negative or alienated. In a modern society cooperation between employer and employee is usually of the former, utilitarian type. In this case, an employee typically knows what is required of them but they may simultaneously operate with their own idea of what is a reasonable day's work; in addition there may be discernible periods – particularly when out of observation – when they manifestly fail to comply with the employer's expectations. At least, however, employees typically choose to be there and take part, in which respect they differ from subordinated parties to coerced cooperation. Even in this last case, however, where one may be focusing on master and slave or someone cooperating at gunpoint, within the framework of communicative cooperation there typically develops an implicit or explicit agreement as to what the subordinated party is supposed to be doing or needs to do to avoid negative

sanctions (at least temporarily) being applied. The expectation that such an agreement may hold – even in what are relatively extreme circumstances - often comes to have something of a normative flavour. However, of course it is the case that situations of coerced cooperation are less stable than others and could be discontinued abruptly. As already noted, a significant feature of modern western societies is the attempt to minimize the extent to which cooperation is of the coerced type.

Appendix 4: Fitness in relation to the ecological system as a whole

Brief consideration has been provided in Chapter 3 of fitness in social context, but additional insight may be gained by addressing directly a highly strategic issue. As Darwin himself stresses, fitness is to be judged by a species' position within the ecological system as a whole. As will be readily appreciated, the fate of a species is bound to be systemically interdependent not just with other local fauna and flora but also with the inanimate environment including such connected elements as soil, rainfall and hours of sunshine. At first sight it might seem that the same might be said in respect of the human species i.e. that fitness must be judged in relation to the ecological system as a whole; but there is an important difference. As regards animal species, one can make the distinction between, on the one hand, animal behaviour – where this is to be understood straightforwardly in an 'external' behavioural sense – and, on the other, the remainder of the objectively identifiable elements in the near-environment. (Significantly, though, some of these latter elements - such as dams produced by beavers - are themselves products of the animal's own activity, giving rise to the important concept of an extended

phenotype; Dawkins, 1982.) In the human but not in the animal case, however, behaviour and environment are mediated by, in particular, a normative system.

To illustrate: what has been called the 'new animism' arises particularly from the work of the anthropologist, Hallowell, who conducted research among the Ojibwe people at Berens River in central Canada in the early twentieth century. Hallowell (1960) draws attention to the outlook of some pre-literate peoples in viewing the world relationally and as a personal community, embracing not simply other species but even inanimate objects. The new animism may involve, for instance, 'acting respectfully towards rocks, animals, thunder and each other' (Harvey, 2013, p.142).

This may initially sound odd, but not dissimilar tendencies are evident in modern societies. Thus while humans generally are heavily into exploitative (but nevertheless rule-governed) food production, in the context of national parks and reserves they treat flora and fauna and even inanimate elements with 'respect', in a sense 'preserving' and 'maintaining' local ecological systems. In the human case the distinction between animal behaviour in an 'external' behavioural sense and the other objectively identifiable elements in the environment begins to disintegrate because of the contribution made by the human normative system. For one thing, under the impact of that system the environment itself changes – as it does following the designation of an area as a national park. Perhaps one can say that the human normative system mediates between that species and its changing environment.

Two other aspects regarding how humans interface with their environment may be noted. Some domesticated animals become effectively 'honorary' members of the human community. For instance, the dog – as befits an animal described as 'man's best friend' – is often not being treated instrumentally; instead it and its welfare are being treated as ends in themselves. Whereas such suppliers of food and clothing as cattle and sheep can be thought of as in the human-shaped environment, even this way of wording it seems inadequate for at least some pets. They may perhaps be characterised as beneficiaries of an extended human normative framework. Somewhat similar considerations seem to come into play regarding the status of India's 'sacred cows'.

Yet it is not simply the significance of the normative framework which needs to be appraised, for humans interface with the environment also through the use of aesthetic values. This is perhaps most obviously the case with landscaping and gardening, although, thankfully, there is no parallel need to consider flowers as 'honorary' members of the human community (!) Putting it generally, it is not just that humans sometimes in a moral or quasi-moral way 'respect' the environment, they also order it according to aesthetic preferences. However, that way of putting it still points to the importance of the wider cooperative framework within which moral and aesthetic values are expressed.

On a rather different point, it is evident that it is not just the ecological system which is important but also the degree of human understanding of it. Plainly there is an intimate connection between, on the one hand, the changing human way of life and its associated means of subsistence and, on the other, developing human understanding of elements of

the ecological system locally and more widely. In virtually any type of society humans are sometimes disruptive of ecological balances: that is not just a feature of the modern period. For instance, they hunted animals to extinction on the American prairies and (probably) destroyed the habitat (or consumed the eggs) of mega-fauna in Australia and on the island of Madagascar. These were substantially unintended consequences of human action. By contrast a degree of ecological understanding is exhibited by a farmer who allows sheep to graze a hill-side, who keeps foxes out of his hen-coop or who allows or encourages bees to pollinate fruit-plants. In that their population has tended to increase given changes in their way of life, humans do not form part of a conventional 'balance of nature'. In so far as there is an overall ecological system of which humans form part, they increasingly participate in it in ways informed by their developing understanding of elements of it.

More generally, the changing ways in which humans relate to everything in the 'external world' are informed by their developing understanding of it. It is a commonplace idea that humans are constrained by the 'laws of nature', but in actuality they are liberated and empowered by their very understanding of those laws. Very strikingly, while constrained by the laws of gravitation which prevent them flying like birds, humans have created heavier than air machines in which they and their possessions fly around. Indeed their potential 'reach' in this respect in the longer term seems indefinitely great. Already their cosmological understanding is considerable and they approach a physical 'theory of everything'. The potential applications of their developing knowledge are open-ended: they do not have power *over* nature, they have power *in* nature. Whereas, for other

animals the environment remains in effect the ‘near-environment’, that is only a temporary way-station for humans; and it is an environment which they progressively reshape.

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