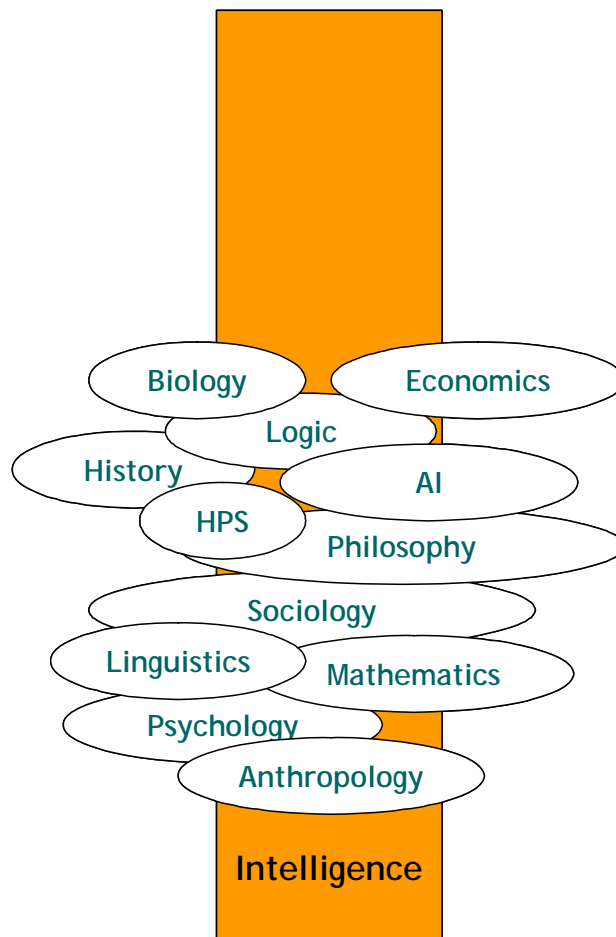


The Prometheus Manifesto



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1. Science And Human Nature

If there is one phrase that scientific students of human nature studiously avoid, it is 'human nature'. Yet it is human nature, above all else, that haunts contemporary science. Ever since human beings became aware of their own existence it has puzzled, thrilled and frightened them, and their craving for self-knowledge has not abated with the rise of science. On the contrary, the astonishing success with which science has dealt with the rest of reality has only encouraged us to imagine that science ought to be able to answer the question of what it means to be a human being too.

1.1. The science of human nature

Unfortunately science is still a very long way from any such answer. It is not at all clear that the sciences even know what the question is. They have spent a century and more working through many possible versions of the question in the hope that one of them will turn out to be the right one. A small number of basic themes recur: to seek a kernel of rationality in various forms of calculation (eg, classical economics and information processing); to find the underlying biological drives that regulate the everyday surfaces of activity and experience (eg, drive theory, psychoanalysis and evolutionary psychology); to establish how behaviour is conditioned by the conditions in which it takes place (eg, cultural and learning theories of one kind or another); and so on.

Some of these are attempts to assimilate human nature to an existing sciences, while others try to solve the problem of human nature by narrowing it down to one specific aspect of human activity and experience, on the assumption that if we could only explain that, the rest would follow. But this approach always starts from a somewhat arbitrary origin, always far short of a fully rounded analysis of human nature, and equally inexorably results in the more or less arbitrary distortions. Thus, human beings are 'really' economic rationalists balancing costs and benefits, a science of human nature 'must' start from (or end in) reproductive fitness, and so on. When it is recognised – as it inevitably must be – that such an approach is not really compatible with some important aspect of that nature (eg, consciousness or moral autonomy), it is not unusual for that aspect to be denounced as secondary, scientifically insoluble or simply non-existent. No wonder that the result has so often been an image of human nature that no one but its acolytes recognises as human.

In fact there are two fundamental problems here, neither of which any would-be science of human nature has yet solved successfully.

Firstly, we are still very far from a consensus as to what a science of human nature would look like. Within the natural sciences there may be a degree of consensus (at the moment, around a combination of Darwinism and information processing), but the philosophers and social scientists whose work is focused directly on human beings are by no means in agreement. Although in some disciplines (notably psychology and anthropology – ie, biology's closest neighbours) there is some enthusiasm for evolutionism or information processing 'modules', enthusiasts are very thin on the ground among sociologists, historians, and elsewhere in the humanities. And even where there is a recognition that whatever the answer turns out to be, it will have to be compatible with (say) Darwinism, this does not amount to much in practice. After all, much the same could be said of its need to be compatible with the facts of gravity: this may be an ultimate goal, but it has no detectable effect on how any actual theories or methodologies are shaped. And it is hard to be convinced by any would-be science that cannot convince those who deal most directly with the subject at hand.

Secondly – and much more profoundly – not only is there no consensus about what the answer might be, but it is far from clear what the *problem* of human nature actually is. What exactly is it we are supposed to be explaining? What *is* a human being? Are we, first and foremost, social beings? Language-users? Moralists? Featherless bipeds? A mass of adaptations subservient to reproductive fitness? All have been favoured by one important thinker or another, but none has ever really 'stuck'. To a very large extent the reason for this is clear, namely that we are plainly all these things (and

more), but we have yet to arrive at an account of our humanity as a whole that would allow us to pull all these elements into a single plausible picture.

1.2. The human nature of science

So science has not so far had the triumphant success with human nature that it has had with nature of practically every other kind. But in what sense does human nature 'haunt' science? First and foremost, scientists are human beings, and often entered science precisely in order to understand human nature. This is, in the most profound possible sense, science in which every scientist is a profoundly interested party, and that interest is in no way assuaged by the recognition that it has no scientific solution. On the contrary, it only makes it harder to bear, even to the point (for some) of transforming fascination into tragedy. Like a painful tooth or the object of a jealous rage, for many individuals the thought that human nature cannot have a scientific explanation would be impossible to bear and impossible to escape.

But there is another reason why the sciences should feel taunted by the problem of human nature, and this reason reflects the nature of science rather than scientists. For until science can explain human nature, science cannot explain itself. After all, science is what real scientists – real human beings – do, and to the extent that we cannot account for any aspect of human nature that might bear on what we, as scientists, actually do, science itself dandles in mid-air, without foundations. Of course, science has long since recognised this problem – this is after all the problem scientific method is designed to address. But scientific method itself is conceived of in a very definite (and quite limited) way that reflects the relationship of science to the human world in which it is embedded. In particular, scientific method is concerned with the *logic* of scientific activity – with concepts such as *ceteribus paribus*, and so on – which have proved extremely effective at preventing any number of illegitimate intrusions into research. However, philosophers of science are often very impatient with any suggestion that the fact that scientists are human beings may distort their objectivity. So there are wide swathes of scientific activity that are very properly regulated by scientific method, but there are at least three limits to methodology itself.

Firstly, scientific method itself is a system of controls over cognition, considered in its broadest sense. But we are by no means certain either of the internal mechanisms of cognition or of the external connection between cognition and the wider universe of objects and other subjects to which scientific cognition addresses itself. So the adequacy of scientific method even to control scientific activity in the narrow sense is open to dispute, and indeed has been disputed by cognitive theories of every stripe, from phenomenology to mysticism. Few of these disputes can be considered settled, not least because the various sides are often as unable as they are unwilling to engage on one another's terms. But this is itself only another expression of the lack of integration between the various images of human nature. So even taken on its own terms, scientific method is constantly undermined by its own limitations.

Secondly, even if scientific method as it is currently understood were completely adequate on its own terms, it could not be claimed that scientific method on its own was sufficient to eliminate bias of all kinds. We have always had to add new controls designed to control external influences (eg, institutional and financial interests) that have very little to do with scientific method, in order to prevent the more gross forms of prejudice and presupposition. And until we can be quite certain not only that we know what all the relevant forms of bias are but also that we have them under control, we cannot be certain of the objectivity of science. Yet we do not have an adequate account of exactly which factors lead to prejudice, how they affect scientists or how their effects can be prevented or undone. Given that problems of this kind beset sciences that have practically nothing to say about human nature, how much harder must it be to raise the science of human nature itself to the level of complete scientific objectivity.

The third limitation on scientific method is inherently more difficult to accept: that science and scientists are not merely influenced by external factors but directly informed by them. This is the problem of ideology. It is not necessary to imagine conspiracies here: even the most superficial awareness of the sociology of knowledge makes it hard to avoid concluding that essentially ideological notions of human nature routinely permeate science. The radical individualism that pervades psychology, economics and other disciplines (and which makes it extremely hard to

recognise properly the social aspect of the social sciences) is perhaps the most obvious candidate for ideological interpretation, but there are others. In some cases, such as rational choice theory, the boundary between research methodology and ideology has disappeared altogether, and there have are many points at which quasi-Darwinian notions have fused with conservative political discourses of one kind or another – often to the dismay of the Darwinians in question. Of course, the ideological misappropriation of notions such as ‘selfish genes’ is scarcely science’s fault; however, when the process starts to move in the opposite direction, scientists themselves become culpable. But whatever part it may actually play, our grasp of the origins, nature, significance and analysis of ideology is simultaneously fundamental to ensuring the validity of scientific method and central to our understanding of human nature.

So again, the problem of human nature haunts science in a sense that no other problem can match. Indeed, nothing science says will have any ultimate justification until science can explain how it is that the very creatures who carry it out – the scientists who literally *embody* science – are capable of bearing the extraordinary, unprecedented burdens science itself brings. And again, no wonder scientists find it so painful to use this term.

2. What Is The Problem?

2.1. What do we need to achieve?

If what is required is a science of human nature that overcomes all these problems, what specifically must be accomplished to create that science? Presumably, a general science of human nature must answer at least these three questions:

- How can the humanities, the social sciences and all the other disciplines that deal specifically with human nature be united?
- How can the resulting human science can be united with the natural sciences as a whole?
- How can the science of human nature help us direct the further realisation of that nature?

Each of these questions can be further analysed into innumerable sub-questions. For example:

- How can the humanities, the social sciences and all the other disciplines that deal specifically with human nature be united?
 - What are the fundamental dimensions of human activity and experience, and how do they relate to one another?
 - Why do human activity and experience express themselves in the various forms represented by, for example, the existing humanities and social sciences?
 - How do these relationships influence how human nature changes and develops? How do this development change these relationships?
 - What conceptual framework is capable of comprehending these dimensions, forms, relationships, changes and developments?
- How can the resulting human science can be united with the natural sciences as a whole?
 - How did human nature emerged from its predecessors, not only through evolution but also in the individual's development and through the formation of various social systems?
 - How does for emergence and development human nature relate to structure, activity, organisation and development of its substrate in the body as a whole and the central nervous system in particular?
 - How did this emergence affect or alter the general principles of material structure and activity?
 - How does human nature transform the non-human world (eg, through work, technology, economic development, and so on), and how do these changes affect human nature, activity and experience in their turn?
- How can the science of human nature help us direct the further realisation of that nature?
 - To the extent that it is able to answer such questions, how can the science of human nature enable human beings to make sense of their existence – and, where necessary, enable them to make that existence make sense? In other words, the first step in creating the future is taming – if that is not too negative a word – the present.
 - Insofar as responsibility can be shown to be an element of human nature, how should the science of human nature identify, accept and pursue its own responsibilities regarding the furtherance of that nature (eg, through education or therapy)?
 - Given that all non-scientific doctrines, ideals and policies are based on fundamental assumptions about human beings, how does – and how should – the science of human nature impinge on and engage with areas of human activity such as religion and politics?

This final question is likely to be contentious, but it is unavoidable, Firstly, to ignore it would be to assume that areas like religion and politics, which are often treated as immune to science's attentions, are fundamentally different from education and therapy, where science is usually welcome. But all areas of policy-making, politics as well as education, rely on assumptions about the nature, current

state and possible futures of human beings and human society, and about suitable means for passing from the current to the desired state of affairs. These assumptions are frequently matters of fact on whose truthfulness which any advanced science of human nature is likely to be able to comment.

Secondly, to deny that a science of human nature must engage with politics and religion is to ignore the basic difference between science in general and any possible science of human nature. Compare, for example, the significance of Darwinism with one possible outcome of a science of human nature. In the case of Darwinism, its most serious consequence was that, like Galileo and Newton in preceding centuries, it rendered religious explanations of broad areas of nature quite superfluous. This had a significant effect on religion's status because it had previously been taken for granted that only religion could explain life. However, depriving religion of this privilege did not detract the much more profound existential reasons for religion, namely its ability to 'explain' - or at least give reassurances about - not only the presence of human beings in the world but also their value and significance. Notwithstanding various Darwinians' claims to the contrary, this function of religion was not usurped by Darwinism, even in the negative form of proving that human existence has no value and significance, as religious doctrine interprets those terms. However, if the human nature sciences were able to explain why and how human beings had religious sentiments, and also that such sentiments had nothing to do with the divine reality to which religion itself refers and aspires, the results would be far more catastrophic. Leaving aside the precise form such an explanation would take (eg, religion-as-delusion, religion-as-adaptation, religion-as-immature-form, and so on), it would simply be impossible for religion and science *not* to come to blows, or for scientifically minded individuals to accept religion at any level.

In other words, a science of human nature must engage all aspects of human nature existence, and must do so not for external philosophical or moral reasons, but because its most central areas of study are the very premises, arguments and conclusions on which education, therapy, religion and politics are all grounded. So it can choose neither to engage or not engage, for it cannot help being engaged: it will be engaged, whether it likes it or not.

2.2. What are human beings?

All the preceding questions themselves depend on another, much simpler question. What is a human being? Without at least a provisional answer to this question, it is impossible to start. And in this context, such a question cannot be answered in the terms already set by any single humanity or social science, whose own definitions (usually wholly implicit) are characterised by inherently partial and one-sided concepts - ideal for discrete disciplines, but fatal if a unified science of human nature is ever to be established.

Of course, human beings have been studying themselves for millennia, and even if it is not possible to answer this question at all scientifically, it is possible to identify some basic dimensions of human activity and experience whose reality is more or less established. So, human beings have imaginations, are political, practice art and medicine, are capable of moral judgement, employ rites of passage, create speculate about their own natures, produce their means of subsistence (as opposed to taking them directly from nature), and so on. All these qualities are either uniquely human or occur in other species in only the most undeveloped form.

Unfortunately, any such list would inevitably be immensely long and extremely diverse, and so far no one has managed to work out its overall logic. As a result, simply listing the phenomena of human nature has proved to be no more helpful than listing the images presented by a kaleidoscope - and for much the same reason. Even if there is a very abstract level on which all 'human natures', like kaleidoscope images, are 'the same', one does not have to look very hard at individuals or societies to find a diversity that is quite without parallel among other species. For example, it may well be that all societies are united in having artificial economic systems (a fact that sets human beings apart from all other species), but if biologists were to come across two populations of non-humans engaged in methods of economic reproduction as different as hunting, scavenging and gathering on the one hand and contemporary consumerism on the other, they would surely have no hesitation in declaring that they belonged to different species. Likewise for cognition, which may present universal features at the

level of, say, Piaget's cognitive stages, but is also sufficiently Protean to take in both animistic magic and quantum mechanics.

Unfortunately, it has proved equally unfruitful to try to impose order on this diversity by insisting on the pre-eminence of this or that aspect of human activity or experience. Quite a few attempts have been made to find the touchstone of human nature, the kernel of human existence. So, depending on who you ask, we are first and foremost moralists, first and foremost linguists, first and foremost phenomenologists, first and foremost politicians, first and foremost economists, first and foremost information processors, and so on – and on and on. But the implications of such models have always forced their exponents into rather narrow corners, not only driving them to discount or even deny apparently common aspects of human nature but also revealing profound internal contradictions. Not the least of these is the resulting inability either to support a convincing notion of human nature considered as a whole or to explain how the most crucial aspects of our self-knowledge, such as the scientific objectivity on which such claims inevitably rest, is possible. So the haunting continues.

Yet it is still possible to posit a preliminary definition of human nature that captures its breadth and profundity and yet still leaves the scientific study of human nature to do than simply fill in the detail. For example, one could define human nature as a nature that knows itself to be that nature, and which is that nature by virtue of that knowledge. Of course, it is well known that human beings are not quite alone in their self-knowledge. At least since Gallup's pioneering work we have known that other primates can achieve a degree of self-knowledge, and a great deal of subsequent research has amplified this point. That is, however, no bar to defining human nature in such terms. Firstly, it is quite unnecessary to define human nature in exclusive terms, as though something miraculous occurred when human beings first appeared. On the contrary, everything which we know about evolution in general, human development in particular and even the organisation and re-organisation of matter as a whole confirms that there are practically no features of any consequence that are absolutely unique to any particular kind of structure, and human beings are no exception.

However, when this self-knowledge and its corollary, self-control, are pushed to the quite unparalleled extent we find in human beings, then radically new things start to happen. In the case of human beings, self-knowledge extends beyond the present moment (the moment in which, for example, Gallup's chimpanzees noticed the spot of red paint on the forehead of their reflection in a mirror), and begins to pose questions about one's nature, one's place in the world, and one's fate; and conversely, the nature of the things to which our existences connect us, the principles by which they operate, the fate of the world itself, and so on. And between these two poles arises the question of how one is to live in the world – the instrumental rules and techniques by which the world is to be engaged, the values and principles through to which the two sides should regard one another, and so on. When such an unprecedented suite of questions starts to be asked – as they must, once self-knowledge has developed far enough – one has plainly unleashed a quite new world-view that not even the most sophisticated non-human species shares – unless, that is, it inhabits another planet. For this is the world of means-end relationships, experimentation and concepts, and of mysterious differences between appearances and reality, self and other, the present and the absent, and so on. As a result, when such questions start to be answered, the scope and magnitude of the actions that are likely to follow will completely transform not only the world but human nature too.

However, before addressing this issue in detail, it may be worth considering what happens when the main alternative ways of thinking about human nature are adopted.

2.3. Misconceptions of human nature

Of course, this is a great burden for such a simple definition to bear. Perhaps it cannot bear it on its own, and it certainly requires a great deal of support from the humanities and social sciences to explain just how it can be done. However, I suspect it bears as close a resemblance to the human nature by which we are surrounded everyday than the partial and one-sided images of human nature that are to be obtained from the various humanities and social sciences as they currently stand. Not that the latter intend to present a complete picture of human nature; yet it is striking that much the greater part of would-be scientific research into human beings is based on no explicit formulation of human nature. The 'bottom-up' approach of empirical study is very seldom regulated by – or even

used to shape – a more abstract or more general ‘top-down’ vision of just what it means to be human. On the contrary, the dominant general theories of human nature currently seem to be borrowed from technology (eg, information processing theory) and the natural sciences (eg, neo-Darwinism).

So perhaps it is not very surprising how little effect each individual discipline in the humanities and social sciences has outside its own borders. Nor is it very surprising how often the general theories of human nature that have historically emerged from existing disciplines or methods – behaviourism, psychoanalysis, rational choice theory, and so on – have done little more than try to impose their own narrow principles on human nature as a whole, or ‘explained’ the phenomena that constitute its neighbours’ subject-matter by insisting that they are merely illusions, secondary effects or ‘nothing but’ misunderstood versions of problems in its own field.

But what ultimately is the problem? What are the misconceptions that prevent science in general from grasping human nature in particular? Many of these problems seem to stem from two major issues: that science has generally treated human nature either too concretely or too mechanistically. Practically all would-be ‘scientific’ theories are guilty of at least one of these fallacies, and many of both.

2.3.1. Concrete conceptions of human nature

An overly concrete approach would be one that assumed that human nature consisted of a more or less fixed list of features, and neglected human nature’s propensity to change according to context and opportunity. Not that human nature is not concrete, as though human beings floated in some ethereal way above the cares of the world. On the contrary, all natures are concrete, if only because all concrete reality consists of different ‘natures’ relating to one another. But there seems to be little in human history to support the view that there is a *single* concrete nature by which human beings can be defined or, *a fortiori*, to which they can be reduced.

A prominent example can be found in contemporary evolutionary theory, where the concept of an Evolutionary Environment of Adaptation (EEA) is widely employed to analyse human activity and experience. Basically, this approach argues that human nature as it currently operates can best be explained by its adaptiveness to the environment in which it evolved. This, it is usually hypothesised, is the savannah environment of east Africa of many thousands of years ago. This explanation is concrete in that it assumes that the particular forms of activity and experience that appeared then are expressed in broadly the same forms now. Of course, no version of EEA-theory assumes that human beings are directly driven to act in ways that really only suit hunting, gathering and scavenging on lightly wooded grasslands. In fact quite a lot of evolutionary psychology seems to consist of exculpating itself from any such conclusion. But at the same time, the possibility that human beings are not constrained by the concrete characteristics of this ‘original’ EEA simply are not considered, not least because they would flatly contradict the basic assumption that human beings could have something like an EEA.

Leaving aside the limited acceptability of this line of argument among evolutionists themselves,¹ the principle justifications for this approach seem to be, on the one hand, the evidence that is compatible with this type of explanation, and on the other hand, the authority of its Darwinian origins. Nevertheless, what is most conspicuous about this style of argument is that it certainly cannot be justified either by the constancy of the adaptive niche within which human beings actually operate or any observable consistency of behaviour. In fact it is specifically designed to deal with facts that concepts of adaptation do not normally address in any precise way – the fact that contemporary human behaviour often seems to be quite *maladaptive* to their current environment, and the fact that the environment in which human beings now live is quite different from the environment in which they evolved. It is an elegant method for navigating some of the more obvious exceptions to straightforward adaptationism, by drawing from adaptationist premises explanations for why human activity is *not* adaptive.

¹ Eg, for critical comments see Tooby and DeVore (1987).

Yet the excessive concreteness of this approach when applied to human beings becomes clear when the niches to which human beings are evidently adapted and the specific forms of activity in which human beings actually engage are considered. For there are many aspects of contemporary human activity and experience that are problematic, even pathological, but they by no means outweigh the remarkable success with which human beings have succeeded in 'adapting' to large-scale industrial societies. On the contrary, it is not obvious that *Homo sapiens sapiens* is noticeably less well adapted to downtown Detroit than to the savannahs of east Africa. So, far from requiring an explanation for why we have not adapted to contemporary social conditions, we need to explain a far more remarkable phenomenon – the fact that we seem to be equally well adapted to life in both hunter-gatherer societies *and* to industrial capitalism. But whatever the explanation of this dramatic (and quite unprecedented) fact, we can certainly assume that the solutions created in our nominal EEA can (if, as EEA theory implies, they are still operative) be generalised to utterly different circumstances surely implies that the 'adaptations' in question lack *any* particular concrete content or context. As a result, the savannahs of Africa may be the environment in which human nature first came into existence, but the concrete character of that particular environment explains nothing about human nature. Likewise, there are innumerable aspects of contemporary that are simply unintelligible if one insists that human nature evolved in the concrete conditions defined by this EEA – or any other.

Indeed, if human nature is determined by its concrete fit to concrete conditions of one kind of another, it is hard to see how such radically abstract structures such as logic or mathematics could possibly have arisen. At a low level (basic arithmetic, for example) it is possible to envisage how they might contribute to reproductive fitness. However, given that mathematics proper seems to have played no part whatsoever in reproductive fitness before the industrial revolution (and it is very debatable whether the very notion of reproductive fitness has any relevance whatsoever in an era of high technology and massively formalised economic systems, with all their startling demographic consequences), it is difficult to envisage a pressure that would drive its development. The speculation that things like higher mathematics and formal logic (not to mention scientific method) are serendipitous spin-offs from lower level adaptations is hardly tenable. On the one hand, lower-level shaped by the pragmatic, eclectic and ambiguous forces of evolution are scarcely likely to be so pure as to permit the proliferation of such luxuriantly abstract overgrowths; and on the other, if such wonderful outgrowths are possible even though they cannot be explained in terms of their contribution to reproductive fitness, this surely undermines any would-be Darwinian explanation of any of the many similarly abstract superstructures of human nature. Conversely, if there are proliferations that cannot be accounted for in Darwinian terms, what is this process of proliferation? Judged by its consequences (eg, humanities' rapid transformation of the entire surface of the earth, its self-promotion to the most important single selection factor in the environment of literally every multi-cellular organism on the entire planet and its invasion of space – an environment from which strictly organic organisms are absolutely banned), this is not a trivial process, yet it appears to lack any serious analysis or explanation.

Of course, EEA is by no means the only fundamentally over-concrete theory. In fact, any model that attempts to list universal concrete attributes of human activity, organisation, feeling or experience falls into the same basic contradiction to which I have already alluded: that the range of human experience and activity in different historical contexts is so vast that if it occurred in any other species, it would be grounds for denying that it was actually a single species. But there being no grounds for denying the unity of *Homo sapiens sapiens*, any concrete analysis must fall.

2.3.2. Mechanistic conceptions of human nature

The fundamental assumption made by mechanistic accounts of human nature (at least as they affect the present argument) is that the structure of that nature is unaffected by its own functioning. Action, intention, causal activity, social sensitivity and so on may all be proper to human beings, but from a mechanistic point of view the exercise of these faculties has no serious effect on that being. Even learning or adaptation have only a limited power to bring about change.

The most common version of mechanism is to postulate that human beings consist of fixed components that relate to the world and to one another through predetermined interfaces and

relationships. Like a machine, their actions may have vast consequences, but not for themselves. If they are changed by their own actions, it is not in ways that provide either insight into or criticism of the nature of those actions, so to speak, and as a result contribute to their qualitative development. They may be 'tuned' or quantitatively modified to suit local conditions, personal history, and so on, but otherwise they are limited to a pre-existing design.

True development, by contrast, is anathema to mechanism. Firstly, development does indeed require some form of learning or adaptation. It must consist of improvement, enhancement or enrichment in the specific functions the developing structure performs, relative to the specific conditions in which it acts, or perhaps in the more general pre-conditions of that specific type of activity. In other words, development means more than merely becoming different: in the language of engineering, the *functioning* of a developing structure must also improve its *functionality*. That is, of course, why no non-living structure can be said to develop – there are no types of functioning (a molecule has reactions but no functions), no independent criteria comparable to effectiveness or performance by which an improvement could be defined, and no measure analogous to 'reproductive fitness' or 'success' by which one atomic particle or molecule could be said to be better than another. To achieve real development, it is necessary that change be both more or less perfectly correlated with and more or less directly caused by the actions, desires, experiences, feelings and their consequences of the structure undergoing that change.

But learning and adaptation do not exhaust development as far as human beings are concerned. Improvement alone can be accomplished by relatively limited forms of efficiency, learning, and so on. To qualify as development, improvement must be capable of putting into question the appropriateness and perhaps even the validity of the very terms from which the structure in question's activity, experience and so on proceed. At the very least, it is a very paltry definition of development that does not include the possibility that the results of this functioning will eventually raise the question of what function this functioning serves and why we engage in this kind of functioning at all. It certainly would not capture the full range of human development – it is after all a universal fact of human experience that we pose such questions, and on the basis of the answer, change the terms on which we exist. Why else do we have values, judgement, philosophy, religion or even science?

Of course, in any given situation and for any given individual or group there are in practice always limits to how much development (or even change) is possible over any limited timescale, and in the case of any non-intelligent organism that limit is at least partially inscribed in the organism itself, so to speak. In the case of human beings, however, it is very difficult to identify any *absolute* limit to the development of which we are capable. Of course, such limits are often assumed or explicitly postulated, but they are seldom if ever proved. If one rejects the assumption that, for example, human cognition is an adaptation to particular concrete conditions (as adaptationists generally believe), but is rather a universal capability (as the mere existence of mathematics or science implies, and Darwinism does not contradict), then absolute limits of this kind may be exactly what human nature does not have. And if there are no insurmountable limits to the extent and aspects of human nature that can be developed in this strong sense, then no mechanical model can capture, even in principle, the wealth, potential or fundamental architecture and processes of human nature.

Nevertheless, mechanism remains a very common position – so much so that entire schools have assumed it without the least debate. For example, it is arguable that any theory that assumes that human beings are definable as the sum of pre-existing adaptations is bound to be mechanistic,² and so is a great deal of academic psychology. Indeed, any discipline is likely to make certain assumptions about the boundaries of human activity and experience, so one might well argue that the mere fact that human nature is the topic of multiple mutually indifferent disciplines implies a pervasive

² It should be noted how very different these theories are from more recent biological models such as Edelman's 'neural Darwinism', which has demonstrated how even the central nervous system is actively shaped by the actions and experience of the organism in question.

mechanism. Conversely, perhaps that is why anti-mechanistic approaches always seem to end by rejecting traditional academic frontiers.

Mechanism's clearest, most important and most self-conscious contemporary instantiation is probably information processing theory. With the rise of computers, information technology has proved to be not only an important theoretical model for complex but mechanistic activity but also perhaps the most powerful new method of extending human capabilities since the invention of writing or even fire. Computing systems have allowed us to design and build strictly mechanical systems that are nevertheless able to mimic many – perhaps all – forms of human activity with (in principle) unlimited precision. Although their performance to date remains severely limited³ - it is after all only a few decades since their invention – there seems to be little reason to assume that information processing systems of some kind will eventually be able to create a very convincing impression of purpose, value, meaning, adaptation, and many other signs of humanity.

Nevertheless, although information processing theory allows for the possibility both of unlimited internal complexity and of unlimited change over time, it does not admit the possibility of development as defined here. This can be shown by analysing two of the central concepts of contemporary information processing theory: information and data.

The original definition of information was as a measure of uncertainty – a wholly negative concept. Although Shannon's original papers concerned the transmission of messages, the focus was on the predictability and reliability of the process, the clarity of the channel, the probabilistic control of disorder, error and noise, and so on. It was not about not the message's content, and still less was it concerned with that message's meaning or value. On the contrary, it was completely neutral as far such things were concerned, perhaps to the point of implying a fundamental divorce. This indifference to content is far from evident in recent application of information processing theory to human beings, however, which has been marked by a shift from the reduction of the uncertainty of transmission to the content of the message, and thence to the acquisition of positive knowledge. It is no wonder that Shannon was uneasy about the what he saw as the inappropriate elaboration of information processing theory to other domains.⁴

Of course, given that information processing theory was not originally concerned with the meaning or content of messages, this progressive intrusion of the positive processing of *data* is hardly surprising. Not even the lowliest organic activity can be reduced to the wholly negative act of differentiating between possibilities or distinguishing signal from noise. Rather, life engages its environment solely as a way of *doing* something – building and rebuilding organs, navigating the skies, mating, and so on. Its actions are relentlessly positive, and as such incapable of being captured by classical information processing theory.

And of course, data processing is no less mechanical than information processing. The result of data processing is never the qualitative transformation of the data processing system itself. Of course, it is possible that rules for self-adjustment of one kind of another may be built into the system itself, but the application of such rules would not amount to development. And certainly that is not how human beings develop. Even in the case of neural networks, the progressive adjustment of weights does not restructure the network as a whole. Even where the relationships within the network are reorganised, this would not amount to development in the strong sense defined above, for this assumes the ability not only to recognise the nature, structure and even existence of the 'network' through which activity, experience and feeling are organised, but also to use that recognition to reconstruct itself. That is, neither information nor data processing is capable of accomplishing the basic feat performed by every child in the course of its routine cognitive development.

Hence the yet more fundamental problem that neither information nor data processing ever augments the information given (indeed, classical information theory assumes constant entropic

³ Saygin, Cicekli, and Akman (2000).

⁴ Shannon (1956).

degradation), whereas the humblest organism may be constantly dissipating *energy*, but it is equally constantly *creating* novel 'information'. Even the simplest organism is endlessly creating as well as simply transmitting and translating 'information'.⁵ As for intelligent beings, we are so busy generating new 'information' that it is quite fatuous to imagine that any mechanistic model could possibly account for us. We are always going beyond the information given – as does any creature that amounts to more than the sum of its parts (ie, any organism at all), or that is capable of understanding terms such as paradox or contradiction (ie, any intelligent being). And without terms such as these, how is any mechanistic system to account for such elementary human notions as success and failure?

Of course, views of human nature seldom, if ever, espouse a radically mechanistic point of view. No-one would deny that we learn, adapt and otherwise adjust to changing conditions. But different theories make different allowances. So, just as there are degrees of mechanism, so there are degrees of development, and not all of them amount to the 'strong' form of development suggested here. On the contrary, they all impose more or less narrow limits on development. Firstly, many theories postulate specific limits on the human capacity for adjustment, asserting in effect that there are simply some things human beings either cannot learn or cannot unlearn, and so privileging and inhibiting adjustment in particular domains. Modular versions of information processing theory always involve some such assumption, as do most flavours of neo-Darwinism, as did most kinds of drive theory. Secondly, there are theories that limit not the domains that are open to modification but the 'level' of adjustment possible. For example, the various flavours of classical and operant conditioning often allowed for any degree of refinement in learning, yet did not allow for the possibility that the learning organism (including human beings) would come to reflect on its own actions, or use these reflections to infer general principles or rules, or synthesise new forms of activity from novel applications and combinations of those rules. Likewise, although neural networks are good at constant, non-deterministic adjustment to circumstance, there never seems to come a point at which the network has any insight into what it is itself doing, so enabling it to abstract from the empirical and functional details of its activity the principles on which that activity could – or should – be based.

Of course, the reality of genuinely innovative change in the course of human development is a clear enough, especially since Piaget's detailed examination of the development of individual cognition, moral judgement, the history of science, and so on. In fact, Piaget's evidence leaves little scope for residual limits at the most profound and central levels of activity and experience, which in turn implies that any theory that *does* assume such limits is ultimately incapable of explaining human beings or human nature. However valuable mechanistic models may be in certain limited respects (notably the analysis and simulation of the specifically *unintelligent* aspects of human nature, activity and experience), it is very difficult to see how they could ever succeed in explaining human beings at the most profound level.

Of course, there are regularities to human activity and development, but they do not seem to arise from built-in tendencies or limits. Rather, they reflect universal qualities of action that would be applicable to the functioning of any structure, had it any idea of how to apply them. A non-intelligent may be incapable of asking whether its actions were incoherent, inconsistent, incomplete or incorrect, but it is hard to imagine a more useful ability when it comes to reproductive (or any other kind of) fitness. And if such questions do not apply to non-organic systems, science and logic provide us with yet other universal truths of activity that even a proton and an electron could usefully employ if they wanted to make an atom. Conversely, the universality of these forms, of which all human beings are capable, can scarcely have been arrived at mechanistically, or indeed by any *neo-Darwinian* process.

It should be emphasised that this gap between human nature and information processing theory is a matter of principle, not a shortcoming of contemporary information processing concepts, methods or tools. All information processing solutions assume a fundamentally computational view of the method, including both concepts and technique, and the very mathematical basis of computationalism imposes a fundamentally mechanistic order on any resulting theory. For whereas it is normal for human development to proceed through insights that oblige us to doubt, criticise and change the very

⁵ Oyama (2000: 74–81).

terms on which we are currently acting, no mathematical function can change its own terms and still remain mathematically intelligible. Consequently, there can be no complete mathematics of human development. There may perhaps be a complete mathematical *description* of human activity and even its development, *after the fact*; but there is no possibility of explaining or building a computational system capable of actively generating such development in strictly mathematical terms, for the very process it would have to explain involves contradictions to one of the most basic assumptions of mathematics, namely the constancy of its terms. Hence a fundamental problem with computationalism generally: that, like any mathematical theory, it collapses if the terms of the mathematics in question are required to change – or, more precisely, develop – while the mathematics is being executed.

Having said all this, it is quite clear that there are many aspects of human activity, organisation, feeling and experience that are somewhat mechanical. But when human beings are acting mechanically they are not applying any of the quintessentially human characteristics of human nature. Indeed, even Turing had no intention of mimicking real intelligence; rather, it was a model for dealing with ‘problems which can be solved by human clerical labour, working to fixed rules, and without understanding’.⁶ In other words, Turing’s starting point was not a machine that could model a human being but rather that a human being could model a machine, and do so by pretending to be the very opposite of intelligent. But like Shannon’s concerns with the inflation of information processing theory, Turing’s self-imposed limitations have long since been forgotten by information processing theorists.

2.3.3. Reductionism

The assumption that reduction is an integral part of scientific method is as prevalent as mechanism, and equally hard to reconcile with human activity and experience. There are many versions of reductionism, of which a variety have been applied to this or that aspect of human nature. Two are particularly significant here. Firstly, there is the view that the *explanandum* – consciousness, intentionality, and so on – is an effect but not a cause, or at least not a cause of any great consequence. In the classical analogy, such phenomena stand in the same relation to matter (or even ‘reality’) as the whistle on a steam engine does to the steam – a token of its presence, but of no effect. Secondly, there is the version of reductionism that declares the thing to be reduced as not requiring explanation, as it is illusory, or at best an effect of perspective. Again, sunsets provide a standard example: real enough on some level, but inexplicable in terms of colours painting the sky.

If true, either of these forms of reductionism would render a specific science of human nature redundant, if not actually pernicious. Unfortunately, neither of them is necessary, sufficient or even adequate to perform any such role.

The problem with the idea that anything is an effect but not a cause is that it violates the very notion of materialism, and with it the very possibility of science. To be the effect of a (presumably) material cause is to be material, and to be material is to have a material existence – which is to say, to have effects. So to be a *pure* effect is completely self-contradictory. The alternative, namely that the effects of this effect are not significant is doubly problematic, since it is either an assertion that, like any other negative, it is difficult, if not impossible, to prove, or else it implies that the effect is qualitatively different from its cause. This is conceivable, but the assertion that such an effect is therefore insignificant is again only an assertion until a proper analysis of the change in quality has been provided – which, in the case of any example of this method of reduction, is quite lacking, and constantly threatens to lapse back into the previous fallacy. Or if it only means that the insignificance of its effect lies in its small size, this may be true but it is hardly the basis for claiming to have reduced this to that.

As so often with misconceived conceptions of human nature, the idea that various aspects of human activity and experience can be shown to be illusory rests falls apart as soon as it is applied to

⁶ Quoted in Copeland (2002: ‘Some Key Remarks by Turing’).

any individual making this claim, especially scientists. If, for example, consciousness can be reduced to, say, a brain process, what does that make of science itself? For where is science taking place but in human consciousness? What is the significance of, say, method or evidence, other than the way in which they enter into our intentional awareness of the world under the controlled conditions set by scientific method – all of which are tools for the management of consciousness? Conversely, if human consciousness cannot claim to grasp its objects in the disinterested manner that science requires, but is instead constantly constrained and distorted, however remotely, by evolutionary preoccupations, then how is science possible? And even if it is in some sense possible, how can it claim any special value? And if it has no special or decisive value, and in particular does not offer an objective view of things and events, has science itself not been reduced to an illusion? And so on.

Regardless of 'flavour', however, the essential question all reductionists must answer is this: what aspect of that activity and experience can be dispensed with without violating its specifically *human* character. Consciousness? Intentionality? Objectivity? After all, if such elements cannot be dispensed with but one continues to assume that reductionism is 'right answer', then presumably one is willing to attribute these things to the lower level structures and functions in terms of which one plans to explain human activity and experience. However, this naturally raises two questions. Firstly, what lower level item is capable of consciousness, values, intentionality, goals, meaning, objectivity, let alone the various yet higher level elements such as sympathy, social relationships or notions such as truth, freedom or justice? If the answer to this questions is, None, then are the scientists who make this claim devoid of consciousness, values and objectivity? And secondly, what would be accomplished if it were possible to identify such lower level structures? After all, it is this capacity for intentionality, consciousness and all the rest that makes the higher level structures hard to explain, not their status as 'higher level structures' that makes consciousness *et al.* difficult.

A popular variant on reductionism is interactionism. Insofar as it assumes that action, feeling, experience, attitudes and so on are all more or less simple products of the interplay between external factors – currently usually biology and culture – and that, therefore, the 'subject' of action, feeling, etc., is in principle eliminable from explanations of human nature, interaction as only a special case of reduction. As it is if something like a subject, a psyche or an individual is postulated but it is either unexplained or incapable of introducing anything original into its own accomplishments over and above simple translations of the various factors impinging on it. Insofar as the subject is not required to, say, make sense of the forces that affect it, or the sense that it does make is little more than a term-by-term conversion of cultural or biological terms, with nothing of the subject's own perspective, interests, values, goals, assumptions, prejudices, and so on, then interactionism is distinguishable from a simpler reductionism only by the number of components into which the subject is partitioned.

2.4. Reason and human nature

There is no shortage of over-concrete, mechanistic, reductionist theories of human nature. Their authors are often quick to acknowledge the limitations of their own models, but they seldom seem to realise the basic corollary of their own concessions – that they eliminate them as explanations of human nature.

But if human nature is neither static nor concrete nor mechanical, what is it about human nature that enables it to escape? Or to put it another way, can anything be gleaned from adopting the opposite approach, as suggested before this diversion into the principle ways in which human nature has been misconceived? Can we get any further by assuming that there is neither an exhaustive list of specifically human characters nor a key feature that allows us to make sense of the rest, it is the totality of human nature that, if no more fundamental to human nature than its detailed concrete aspects, at least gives us a useful handle on it? Does it make more sense to assume that what must be explained about human beings is that they are human beings, as opposed to rough assemblages of adaptations, reinforcements, cultural values, unrequited desires, class interests, modules, and all the rest? If, so, is there anything we can say about human beings that captures their humanity in this way? Is there any aspect of human nature that is more than simply an aspect, that encapsulates this overall nature in all its richness, without hypothesising either a mysterious higher nature or a definitive list of attributes that science can never capture, let alone explain?

The aspect of human activity and experience that seems to fit this role best is probably reason. So long as it is not interpreted too narrowly – as the application of logic, as formal analysis, or even as Hegelian ‘Mind’ – reason seems to encompass some of the fundamentals of human activity, change and development, and to do so on across all scales of human organisation from the individual to the most complex social systems.

Reason can be provisionally defined as the ability (and the desire, if not the compulsion) to make sense of things. Human beings make sense of things, do things because they make sense, and when they don’t make sense, they strive to change them until they do. They classify, order, compare, integrate and analyse, contrast, and on a more practical plane they align, join, separate and oppose, and generally treat their world and themselves as though they have – or should have – a basic order. And although this is far from all that they do, a constructive interpretation of the notion of human beings as reasoning beings is far more productive than it seems to be at first sight.

Reason is the ability to abstract from situations, events and things the structures through which they exist and relate to themselves and to one another, including reason itself. These structures may be relationships, components, dimensions, aspects or any other element, and the form of the abstraction may be anything from a very superficial, transient and one-sided glimpse of some point about them to (in principle) the fully articulated comprehension of their every aspect.

In this very general sense, reason appears to be at least involved, and in many cases directly responsible for, a very wide range of what is most peculiarly human about human beings. On the other hand, it does not require that a rational individual or group possess explicit, articulated reasons for its activity. For example, it is well established that young children organise their activity on a practical plane in ways they will shortly articulate into reasons, and relatively simple human societies of all kinds (not solely ‘primitive’ societies) operate in an analogous manner, likewise developing into more articulated and ‘institutionalised’ forms (eg, through roles, the division of labour, political relationships, and so on) as the scale and complexity of their numbers, activity and organisation grows. So although not explicitly rational in themselves, even these ‘intuitive’ forms of organisation and activity are at least pre-rational in a sense that, say, non-intelligent organisms never are.

Nor is the concept of rationality by any means opposed to other forms of human experience and activity such as emotion, tradition or even irrationality. Certainly there has been no shortage of typologies of action through which real human activity and experience can be filtered and assimilated, and . On the other hand, it is remarkable how little about any of these alternative bases of action is in fact independent of reason of some kind or another. To love or to hate cannot be reduced to the sense we make of the things we love and hate, but neither is it possible to explain either without grasping what sense we make of those things. To be suddenly confronted by a tiger will cause very different feelings in me, a small child and a professional lion-tamer, not least because what a tiger ‘means’ is very different things to the three of us.

What this does not commit reason to: it may or may not be innate, pre-defined or fixed. It is not necessarily opposed to, though it may be independent of, emotion, existential commitment, or even the irrational. Calculation is only a very narrow aspect of rationality as a whole. All reasoning beings are individuals (not least because reasoning leads reason to identify itself, which at certain points means the delineation of a discrete individual), but their reasoning may both affected and be affected by higher level structures, be they the unintended consequences of individual actions or truly independent social systems. It is not committed or limited to any specific content or context. It may support a purely contemplative relationship to the world, but also, where the world does not make sufficient sense, it would also support the ability to make the world make sense. However, it is neither infallible nor invincible – this is a natural ability, not a miraculous power.

One obvious shortcoming of the idea that human beings could be understood in terms of reason is they are plainly not always rational, in the sense of having explicit reasons for their actions and judgements. However, there appear to be no forms of human activity or experience that are not amenable to reasoning, and it is a fundamental of human development that it eventually either incorporates all its previous forms of activity and experience within some system of reasons or rejects it as in some sense irrational. This seems to be true at all levels, from the individual development of progressively higher forms of cognition, moral judgement, and so on, to the progressive formation of

social ideologies (religious, political, ethical, cultural, and so on) that explain and justify social relationships and organisations more or less explicitly and more or less adequately. Eventually this can even reach the point where reason reasons about reason, often in the form of essays explaining how reason will eventually reason about reason.

Making sense of things also permits the possibility of objectivity, though it does not guarantee it. As such it makes science possible too.

Scientific premises of reason are equally widespread, but basically depends on intelligence.

Intelligence: not IQ, not personal cognition or any other narrowly psychological aspect of human beings.

- Insight and criticism
- Radical continuity and radical difference, which implies a fundamentally abstract nature

2.5. Science, reason and intelligence

Of course, 'reason' is no more a scientific concept than 'human being', although it is surely astonishing that this should be so. After all, far less central concepts to human nature ('visual perception', 'memory', and even 'brain') have all long since been turned into scientific notions – and how has it been possible to get so far without a scientific notion of reason too? On the other hand, there are scientific concepts through

Not IQ

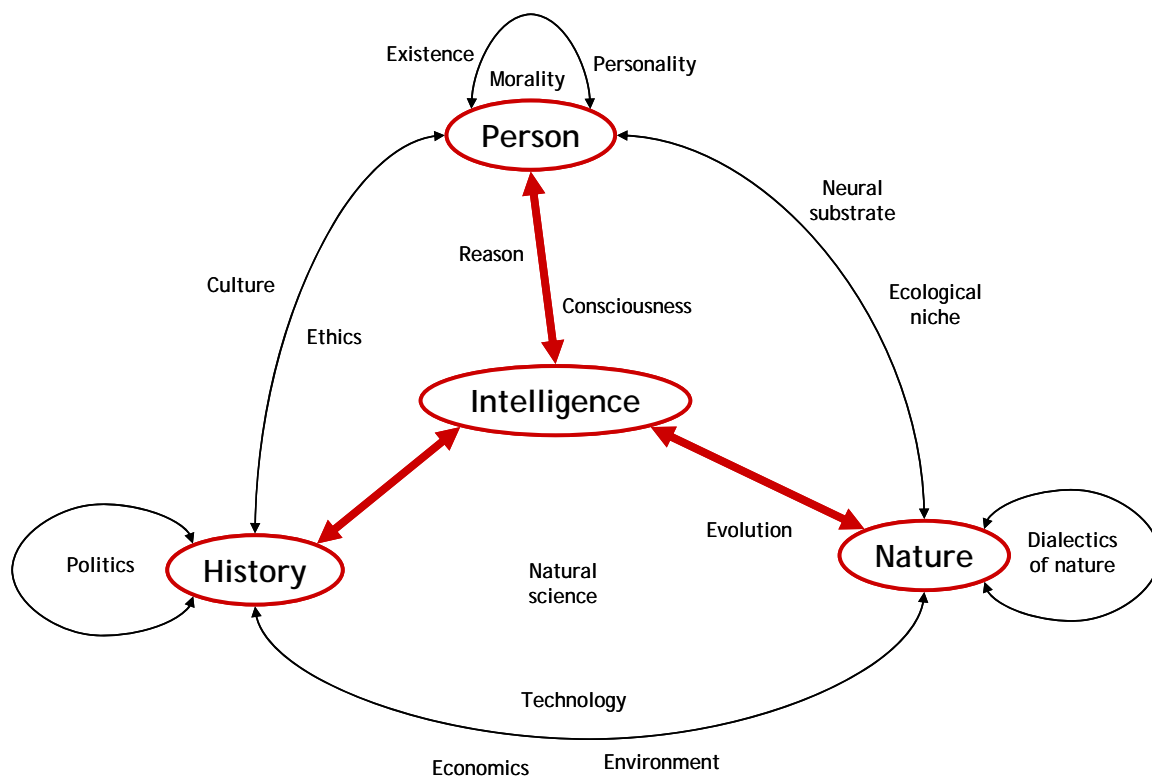
Not individual cognition, but a complete transformation of the content and context, structure and function of activity. As such it includes the transformation of not only the agent of intelligent activity – a subject rather than simply an organism – but also an innovative way of structuring with things and events – as objects rather than simply stimuli – and a comprehensive structure embracing the totality of all the subjects and objects to which any single subject relates, and indeed the totality of subjects and objects at all times and in all places, even if I, as a subject, have no relationship with them whatsoever – which is to say, the world rather than a niche, or indeed the entire environment.

3. The Questions

Taking together the generally accepted features of human nature alluded to above and the central role that may well be played by human intelligence, what questions should we expect a science of human nature to answer? The following is a short but quite comprehensive list:

- What is intelligence?
- What is the relationship between intelligence, reason and history?
- What is the relationship between intelligence and the rest of nature?
- What are the existential implications of intelligence?

This is summarised in the following diagram.



Nor should the seriousness of this problem be underestimated. If we are forced to admit that human beings are incapable of objectivity or any of the other attributes of scientific method, then so is science. For example, if our attempts to understand any of the facets of human nature set out above leads inexorably to the conclusion that human nature is indeed no more than a collection of contingent adaptations, pre-determined information processing devices, and so on, or even that human cognition is ultimately incapable of objectivity, then science itself falls, for it will be incapable of the objectivity on which its claims to precedence rest. Of course, that does not mean that human nature cannot be an adaptation or an information processing device (although it would mean that human beings could never know that such a conclusion was actually *true*). Nor does it imply that even a fallible science would not be a better form of knowledge than any other. However, it is vital that all those who so casually *assume* that human beings must be understood in terms of genes, cultural values, reinforcement or information processing modules also understand what this means for science itself.

Hence science's perennial struggle to ward off both the corrosive relativism of the adaptationists and many sociologists and the dogmatic absolutism of some of its own less circumspect devotees. Hence the perennial struggle of the existing sciences of human nature to navigate a channel between the reductionism and fatalism of scientism and the unsupportable idealism and special pleading of their own domestic metaphysicians.

It is inevitable that human biology will play an important role in the final explanation of human nature. To suggest otherwise would be to ignore the ocean of knowledge about human beings that has been constructed over the last century. It is also possible that some aspects of information processing theory will play a part, though this is much less clear. But whatever the final form a science of human nature takes, if it does not start with human beings, with the specifically human forms of activity and experience, then it cannot be true to human nature. It may well be that such a science would *end* by concluding that human nature was indistinguishable from the nature of other organisms, or artificial forms of intelligence, or with any number of other apparently non-human structures; but that would be a very different thing.

But what would being true to human activity and experience mean? History, consciousness, individuality, etc. Not least, science.

and intellectual prejudices become barriers through which nothing can be said to our intellectual neighbours. We cannot communicate through these barriers because we lack the tools to do so – and now, after a century and more of comfortably looking inward, we seems even to lack the desire to do so. A few pioneers aside – and even they are more honoured than followed – the very institutions through which science is pursued militate against the unification of the humanities, the social sciences and any other view that might possibly contribute to real understanding of who and what we human beings really are.

3.1. What is intelligence?

Despite the accomplishments of Piaget and his successors, there remain many crucial questions about the general nature of reason and its relationship to intelligence, consciousness, etc.

- How can we define intelligence?
 - Basic features & analysis.
 - 'Weak' vs 'strong' concepts of intelligence
 - intelligence as cognition > basis of psyche as a whole
 - intelligence as individual cognition vs global concept of human activity – intelligence // life > organism.
- What is the connection between intelligence and ...
 - rationality?
 - consciousness?
 - emotion?
 - norms and values?
- What are these phenomena?
- Are they not simply empirical/functional structures or adaptations?
 - Why do intelligent beings have them and not non-intelligence beings?
 - How does intelligence create them?
- How does intelligence develop?
- Are all intelligences the same?
 - Human, chimpanzee, dolphin, parrot?
- What are the real prospects for artificial intelligence?
 - Current models of 'strong' AI.
 - A post-Piagetian AI?

3.2. Reason and history

History is the totality of intelligence's accomplishments, yet it remains unexplained by any existing concept of intelligence. Yet history presents many of the same problems and exhibits many of the same features as individual existence. For example, both are plainly highly contingent, yet it is impossible to sense an underlying order that allows not only to periodise the histories of particular societies but also to trace broad resemblances across whole swathes of civilisations. This pattern of resemblances is perhaps less surprising that it might seem at first, given that all societies are inhabited by individuals with apparently identical intelligences, and the areas where a marked degree of consistency has been identified are typically those closest to the basic well-springs of intelligent action: moral judgement, philosophical speculation, symbolic systems, and so on. Still more wide-ranging hypotheses have also been proposed, such as that it is our intelligence that makes history itself possible, or that social systems follow the same patterns as individual cognition, yet are irreducible to the cognitive terms.

It is very easy to mistake intelligence for individual cognition,⁷ but at least as understood by a whole swathe of major theorists from Hegel to Piaget, in reality it stands in much the same relationship to cognition as 'life' stands to the organism.

So what is the relationship between intelligence and history? This general question breaks into a number of more specific queries:

- Into what kinds of relationship with other intelligent beings does being intelligent cast us?
- What is history?
- What is the relationship between intelligence in general and the historical development of social systems?

3.2.1. Intelligence and social relationships

- How do intelligences relate to one another?
- How are relationships between abstracts such as subjects possible?
- What is the hierarchy of interactions between intelligences?
 - Eg, from psychic to the interpersonal to true trans-personal social systems (eg, feudalism, capitalism).
- How can the concept of intelligence be applied to key aspects of these relationships?
 - Intentional stance, etc.
 - Alienation, anomie, etc.

3.2.2. What is history?

- Why do intelligent beings have history – and not non-intelligent beings?
- Can intelligence explain the large-scale structure to history?
- Is history more than the sum of individual biographies, and if so, what does this tell us about intelligence?

⁷ Eg, Eller (2005).

3.2.3. Intelligence and historical development

- How do social changes influence the development of cognition?
 - Eg, Luria, Hallpike.
- How do cognitive changes influence the development of social systems?
 - Eg, Radding, LePan.
- Stages of intelligence and stages of history.
- Stages in art, etc.
- Eg, Gablik, LePan

That art has a history is self-evident, but the idea that it exhibits progress is much more contentious. Whether any such progress parallels the development of intelligence, even considered in its widest and most metaphorical sense, is a question that has scarcely been raised, let alone answered. Gablik's *Progress in Art*,⁸ which offers a brief but strongly Piagetian analysis of the progressive transformation of art from the static imagery of the ancient and medieval world to modern conceptual art, should have been a milestone in this area, but the crucial distinction she makes, between the aesthetic quality of art and the cognitive form that underlies any given period, school or work, has not been generally taken up. However,

3.3. Intelligence in nature

Is intelligence simply another adaptation? If so, where did it come from? If not, what is the relationship between biology and intelligence?

What is the relationship between intelligence and the rest of nature?

- What is the relationship between the science of intelligence and the natural sciences as a whole?
- Where does intelligence come from?
- Is our intelligence reducible to our biology?

3.3.1. Intelligence and the natural sciences

- Is there a circle or hierarchy of sciences?
- Why has the science of intelligence developed after all other sciences?

3.3.2. Where does intelligence come from?

- How did it evolve?
- What were its primate/hominid precursors?
- What are its neurological bases?
- How does it develop on the biological level?
- How does our biology influence our intelligence?

3.3.3. Is our intelligence reducible to our biology?

- If so, how?

⁸ Gablik (1977).

- If not, what is the relationship between the two sides?
- Intelligence and existence

3.4. The existential implications of intelligence

Intelligence is unique among forms of matter in knowing itself, including its origins, its nature and its fate. What exactly can the concept of intelligence tell intelligence about itself, and what difference would this make?

For all science's success, it remains a troubling fact that there is a sense in which the problem of human nature remains almost as unsolved today as it was millennia ago. Notwithstanding science's astonishing and historically utterly unprecedented success at plumbing the depths of the world's once unfathomable mystery have raised the expectation that human nature itself might be understood with similar simplicity, exactitude and clarity. We have made immense strides, especially over the last century and a half? Indeed we have, but it must be doubted exactly how much closer these strides have brought us to human nature. The mechanics of human biology, the events of human history, the phenomenal structure of human experience, and so on, but do we feel that we understand our lives any the better?

Perhaps this is an unfair question to ask of science, which is after all not designed to answer questions like that.

But why should that be? After all, what is science 'designed for'? In some ideal sense, to tell us the truth. But what the truth amounts to and what a truthful answer would be like depends fundamentally on what it is one is trying to find out the truth about. In the case of a physical structure, some kind of abstract statement of law is often all we are looking for. Even with an organism we are usually looking for knowledge about specifics or populations or about generic biological functions – not trying to understand the world from a particular organism's point of view. There is even an argument that, at least for organisms that stand a long way from intelligence proper, organisms don't have a 'point of view' anyway.

But for human beings, it is surely a defining feature of their nature that it is 'existential'. That is, intelligence proceeds from and orbits about its own existence, and the nature of that existence – its meaning, its value, its mortality – are absolutely central to it. Of course, the humanities and social sciences have always accepted this obliquely: for example, anthropologists have always happily studied the rites and ceremonies through which human beings try to express, symbolise, celebrate and transcend the most basic facts of human existence.

It is tempting to respond to this problem by denying that it can be studied objectively, and is therefore not accessible to science. And this argument has very often been made. But it is certainly invalid, because as Piaget noted many decades ago, even subjective actions and experience have objective expressions that are entirely open to scientific study.⁹ It may be impossible to penetrate pure contemplation, but all other forms of the consciousness have expressions and representations that are exactly as open to analysis and interpretation as a falling apple.

So, what are the existential implications of intelligence that a science of intelligence would have to address? In a perverse way this is a very easy question to answer, since the answer is clearly 'everything', including not only everything about human beings but also everything about their relationship to the universe. But that isn't a particularly helpful answer, even though it should never be forgotten. The following might be more fruitful:

- What is the nature of identity?
- Our intelligence drives us to make sense of things.

⁹ Searle (1998) offers a comparable interpretation.

- How does the concept of intelligence help us interpret and deal with the fundamental existential problems?
- Can we use the idea of intelligence to make our lives better?
- What, if any, are the intrinsic limits of intelligence?

3.4.1. What is the nature of identity?

- How well do we – or can we – know ourselves?
- Who is the person?
- How is identity experienced and used by intelligence itself?
- How much influence can intelligence exercise over its own nature?

3.4.2. Our intelligence drives us to make sense of things

- What kind of sense is this?
- Sense: feeling, direction, meaning, purpose.
- How do we do this?
- How valid or true is the sense we make?
- Is intelligence capable of truth or freedom?

3.4.3. How does the concept of intelligence help us deal with fundamental existential problems?

- What does the science of intelligence tell us about meaning, purpose, value, finitude, etc.?
- In what sense do intelligent beings exist on a different plane from non-intelligent beings?

3.4.4. Can we use the idea of intelligence to make our lives better?

- Through education, morality, politics, therapy, etc.

3.4.5. What, if any, are the intrinsic limits of intelligence?

- What are the upper limits of the development of intelligence?
- Are there any functional limits to intelligence's capabilities?
- Is 'closure' (cognitive or historical) possible?

3.5. The unity of human nature

Let us assume for the moment that every one of the problems mentioned in the preceding sections had been solved. Would that have solved the problem of human being? No. For there is one outstanding feature of human activity and experience that is especially impenetrable theoretically, especially to difficult to come to grips with methodologically and all but unimaginable empirically. This is the fundamental unity of human nature.

It may seem odd (if not downright perverse) to credit human nature with unity. There has probably never been a species so prone to diversity, conflict and breakdown. The facts of human *disunity* are plain to see on every level, from the individual psyche to the most complex social system. Yet the very fact that we are capable of conceiving of our own unity and, through a mass of different processes, overcoming the fractures and wars between and within ourselves, already implies that, even if unity is not the actual state of human nature, a capacity and desire for unification is always present. At the very least we actively seek to avoid and resolve contradictions of all kinds. Nor is this merely a matter of philosophical or aesthetic discomfort: the most basic properties of human development at all levels from the cognitive to the economic, suggest that all human 'systems' act to eliminate disunities, be it through the assimilation of all external reality to a single structure (eg, the current progress of capitalism) or the supersession of contending structures through the creation of a single, higher structure (eg, the stages of cognitive development).

So if unification is a fundamental process and unity (at whatever level) a fundamental outcome, it must be an integral part of any would-be science of human nature to explain the nature of that unity and to draw human nature as a single image. That would be an image of history, consciousness and individuality as not only coexisting but as actively invoking one another as complementary dimensions of the same reality - human reality.

4. Getting To The Answer

Note this section's choice of title: not 'getting to answers' or 'getting to *an* answer' but 'getting to *the* answer'. Would the question of human nature be worth asking if there were no right answer? And what other science would settle for fragments or relative truths?

4.1. Why 'reason'?

The title of our journal is *Reason & Science* and its purpose is to encourage scientific theories, research and practical applications of the concept of reason. But for all the reasons given above, in practice it will be about intelligence. Intelligence is after all the characteristic of human nature that is most often credited with the distance (such as it is) between human beings and their hominid forebears and primate cousins, and the relationship between intelligence and reason is clear, even if it is not usually explicit. In order to make it explicit, however, the concept of intelligence on which future research must rest must remain broad and open, to allow time not only to fill in the details but also to firm up the basic skeleton and scaffold. There are after all many concepts both of reason and of intelligence, and few have any scientific credentials. Conversely, although a very wide range of scientists have credited human beings with intelligence, few have managed to say exactly what they mean by this potent but imprecise term.

Our basic assumptions about intelligence are that:

- Intelligence is not to be limited to IQ, cognition or even psychology or any other similarly partial concept of human nature.
- Rather, it is our intelligence explains all the essential qualities and characteristics of 'human nature'.
 - This does not imply that no non-human organism is intelligent.

Intelligence itself can be understood by developing Piaget's ideas into other areas of human activity & existence.

- However, Piaget's approach is an invaluable starting point, not a credible conclusion.
 - Eg, its approach to social structure.
- The real conclusion will be the supersession of Piaget by a more general theory.
- So it is important that the central concept of intelligence not be over- or under-defined.

On the other hand, the term 'intelligence' is a problem because:

- It is under-defined.
 - As we want to use it.
- It is over-defined.
 - The term already carries massive intellectual baggage.
 - Piagetian purists, IQ, AI, etc.

So the shared term should perhaps not be *intelligence* but *reason*.

4.2. Where do we start?

If unification is a central process in human development as a whole and of the sciences of human nature in particular, then we could do a lot worse than starting from the specific feature of human activity and experience that allows that process to take place. This is the human capacity for recognising our current state, for projecting an alternative state to which we aspire, and then guiding

our own activity towards the achievement of that better state. For want of a better term, this can be called reason.

It should be emphasised that to be capable of reason (which should be an uncontentious claim for in a species that is capable of science) is not to be totally rational. The unity to which rationality points is at best the result of human development, and perhaps a partial result at that. And as with the question of human nature as a whole, it is far from obvious what terms like 'reason' and 'rationality' really mean. It is clear that a very narrow definition – pure logical consistency – would not fit human beings very well, yet the whole tradition of Piagetian research makes it very clear that logic and its associated normative disciplines are by no means merely by-products of development, and still less the preserve of logicians, philosophers and mathematicians. On the contrary, the Piagetian model of development has reason (as defined here) at its very core, and it would be extremely hard to find a more successful model of development than this.

On the other hand, one might be very reluctant to take the historical and phenomenal definition of reason to the point of emulating Hegel's Reason. But it is not at all clear to that this reluctance is explained by the ultimate unacceptability of the idea that rationality has a strong historical dimension, as opposed to resistance to Hegel's personal writings. There is ample evidence for genuine development (as opposed to simple change) in knowledge, morality, architecture and a dozen other areas as social systems change. Even the most central cognitive core of reasoning is demonstrably influenced by historical change.¹⁰

Understood in this light, reason is an extremely widespread, indeed universal feature of human activity and experience. It stands at the centre of all cognitive development, of all planned activity, of all our attempts, scientific, religious, philosophical, and so on, to understand the world, or all attempts to fashion artificial extensions and replacements for human nature (technology, artificial intelligence, and so on), all forms of art. In fact, where in human nature is it not the central feature of all we regard as specifically human?

Creativity. Idealism.

Assumptions

- Activity in general and activity as such > awarding priority to any specific aspect of human nature.
 - Here may be structured relationships and precedence between aspects of human activity, but that cannot be an *a priori* assumption.
 - On the other hand, we are not starting from scratch. There have been many attempts to analyse the relationships between the various aspect of human activity and experience, and we should be willing to learn from them all.

4.3. How do we proceed?

I suspect that the key to all this will be the identification of a framework of core concepts, and to explain the relationships between them. I expect the concepts themselves to be very familiar indeed - culture, technology, intelligence, imagination, politics, economics, and so on; but I also expect that the relationships between them will be much harder to distil (I make a rather abstract stab at them in my 'Nature of Intelligence' paper on the website). I also expect there to be a lot of argument (in both good and bad senses of the word) as we thrash out what is and is not sensible.

What does that mean? All Prometheus' founders have pretty strong opinions about the right way to solve this apparently eternal crisis, but we're not much interested in dogma. On the contrary, we think there are precious few assertions one could safely make about any area of human existence. Personally I never read a good book, no matter how opposed to my basic beliefs, that I couldn't get something from. At the very least, I always want to make sure I can really say why things I don't

¹⁰ Hallpike (1979); LePan (1989); Luria (1976); Radding (1985); Radding and Clark (1992).

agree with are wrong. Nor are we keen on 'more scientific than thou' recriminations between entrenched positions. We want to get people to look outward from their specialisms, not inwards.

4.4. What will the right answer look like?

Going back to the last feature of the problem referred to above (in section 3.5), a final feature of a true and valid image of human nature to which a science of human nature should aspire is its unity. That is not to propose a sort of insipid mutual consistency or lack of conflict between disciplines. As we know to our cost, as much can be achieved by simply creating barriers between disciplines, and so preventing any disunity ever expressing itself.

Rather, a science of human nature can only know that it is on the right track when it exhibits the unity across all its branches.

Active calling of one solution for all the others.

Of course, this active integration will only be another instance of the very rationality that is .

4.5. Will we succeed?

We are not unduly optimistic. Constructing a Grand Unification Theory of human nature is comparable to uniting relativity and quantum mechanics in physics or natural selection, genetics and epigenetics in biology. It has always been an ideal of the social sciences and humanities, but better thinkers than anyone at Prometheus have always failed to realise it so far.

But that is not an excuse not to try. If we do not even try, what are we in science for? What is more, if we do not try to supersede the practical commonsense of contemporary thought about human nature and human beings, we become complicit in the perpetuation of conceptual, theoretical and methodological systems that are inherently incapable of solving the most important problem in science. We would be perpetuating failure. In the absence of a clear route to success comparable to the intellectual breakthroughs in physics, chemistry and biology in the twentieth century, the conventional organisation of intellectual effort will continue to prevail, notwithstanding the occasional endowment of a new chair even a new cross-disciplinary department. The principle exception to this rule has been in the realm of 'cognitive science' and AI, but even this seems to be as much driven by the vast economic interests that seek to exploit the unprecedented powers of computers as by a successful model of human cognition.

Of course, disciplinary divisions are a good deal more than mere conventions. Such divisions of what should be common labour become barriers across which cooperation is difficult and the collective form of expression is often a Babel-like roar. Where cooperation does emerge it is often on the terms of one discipline at the expense of others. For example, recent decades have seen immense spread of the language of Darwinian, but this has often been achieved by swamping one discipline with adaptationism of quite inappropriate kinds. As a result, it is perfectly possible to read innumerable articles about altruism without reading a single word about the nature and experience of *human* altruism. It is simply taken for granted that examples from other species are equally applicable to human beings. More recently a degree of subtlety has entered into the debate, but the basic method continues to be to assume that human nature must be reduced to biological terms before it can be explained. In such cases, the possibility of studying human altruism on its own terms seldom arises. Likewise for parenthood or social organisation any of a dozen other central topics in the study of human nature, and likewise for other attempts to assimilate human nature to the concepts of other disciplines or techniques, such as information processing.

5. Making It Work

5.1. Approach

- To create an integrating framework for the humanities and social sciences.
- To do this by promoting research on the wider significance of the concept of intelligence.
- To support a growing community of scholars interested in scientific study of the concepts of intelligence and reason.
- To do this by creating a leading trans-disciplinary journal in the social sciences & humanities.

It is also important not to replicate other journals, or stray into areas that do not reflect our overall goals.

To this end, we will not positively encourage narrowly Piagetian research (eg, detailed developmental psychology, education, etc.) or single-discipline papers. However, all contributions will be considered on their individual merits.

5.2. Creating an integrating framework

- Defining intelligence
- Accounting for the disciplines that comprise the human sciences
- Using the concept of intelligence and its corollaries to explain their relationships:
 - With one another;
 - With the natural sciences;
 - With philosophy;
 - With everyday activity and experience, so that human beings can recognise the intelligence of their own lives, and so make them both more intelligent and more intelligible.

It is very doubtful whether this can be accomplished by merely setting out intelligence's stall, so to speak, and expecting others to simply accept it. The concept of intelligence must be actively developed to show how the humanities and social sciences form a unified totality that is adequate to the study of human nature. Nor is it to be expected either that this process will be simple or clean, that the results will leave the basic premises and assumptions of other disciplines intact, or that our concept of intelligence will not be altered by its attempts to make sense of its neighbours.

5.3. Promoting research

5.4. Creating a trans-disciplinary journal

5.5. Supporting a growing community

There is no community of scholars interested on the topic of intelligence in this sense. The area is fragmented, with no underlying

- Discipline.
 - Shared problems.
 - Agreed methods, tools or techniques.

- Organisation.
 - Departments.
 - Conferences.
 - Authorities.
- Training & curricula.
- Journals.
- Etc.

So any journal must also actively support the creation of that community, including:

- Providing a shared focus & outlet for research.
- Communication between widely scattered members.
- Training students.
- Involving outsiders.
- Supporting career development in an unrecognised discipline.

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6. Notes

Information processing theory is no more capable of explaining human nature than any other mechanistic system. One consequence of a mechanistic approach is that concepts such as knowledge, meaning or value are effectively barred, at least insofar as either is supposed to unite the two sides of any given action or experience. It is perfectly possible for an information processing theory to 'explain', say, cognition by assuming that 'data' emitted from the object is processed by given programs and the result of this processing is that the object in question is flagged as 'known'. However, the knower and the known would still be completely divorced from one another. Likewise for value – there is no mechanistic process whereby the valuer and the valued could come to be one, in the sense that a valued item is regarded as 'mine'. Ultimately, there is no way in which the distance between a pre-determined system and the information it feeds only can ever be reduced to the point of intimacy with the world that is the norm of human experience.

6.1.1. Static views of human nature

What both concrete and mechanistic views share is a belief in the ultimate fixity of human nature. They are essentially static. Notwithstanding the ability to perform local adaptations, learn to make minor adjustments or tune pre-existing structures, both concrete and mechanistic models ultimately assume that, however its appearances may be distorted by a rind of culture and ideology, human nature has always been, and will always be, essentially as it is now, with the result that contemporary forms of organisation, feeling and activity are assumed to be universal. That such a view of human nature is false to human nature is reflected not only in the qualitative changes an economic systems alluded to above but in every sphere, including the most basic methods, goals and values. As a result, the projection of the present onto the past invariably falsifies the latter, and simple projections of the present onto the future are scarcely credible. And if this static version of human nature cannot be true to the past or the future, then evidently its conception of the present is equally invalid.

The corollary of concrete and mechanical conceptions of human nature is that, if there are no difference between the past, the present and the future, then there can be no true development – if, that is, by development one means something like progressive and endogenous change that results not only in the improvement (in whatever sense) of human capacities in some localised sense but also a systematic transformation that creates qualitatively new forms and unleashes qualitatively new capabilities. In fact, notwithstanding the very limited capacity for adjustment that concrete and mechanical concepts allow, such interpretations are actively anti-developmental, for they allow for qualitative change only through exogenous processes and mechanisms – typically evolution but, as under previous models of this kind, through externally determined contingencies of reinforcement or mechanical shifts in class relationships.

That development is integral to the explanation of human nature has already been argued: if it is not, then human diversity is either illusory, nothing more than a mass of noise, or inexplicable.

If human nature cannot be reduced to any specific concrete or mechanical model, or indeed reduced at all, then development becomes the *most* fundamental aspect of human existence.

They may, in certain respects, be assumed to be more clearly expressed or more perfectly developed under modern circumstances, but the fundamentals were always and everywhere the same.

It should be emphasised that the rejection of a static view of human nature is not to deny that all human beings share certain characteristics. But to be universal is no more to be static than it is to be mechanical or concrete. Rather, it is relatively easy and uncontentious to identify certain constant

functions that are shared by all humanity. Thus, human nature has always been and very probably will always be characterised by economic and political systems, moral judgment, imagination, and so on.¹¹ But at the same time, it requires very little knowledge of human history to recognise that these functions are constant only in the abstract, and take radically different forms in different historical contexts.

Perhaps the best examples of illusions produced by a static point of view are to be found in the kind of economic theory that approaches non-capitalist societies and pre-modern eras as though they were just like modern capitalism but the resemblances were obscured by extraneous factors that created the appearance of 'economically irrational' choice, or indeed fundamentally difference methods for organising social and economic activity. A similar assumption pervades much of experimental psychology, which makes analogous assumptions about the bases of psychic experience, feeling, motivation and activity.

Of course, there must be a sense in which human nature is static – otherwise there would be more consistent notion of human nature in the first place. The problem comes when it is assumed that it 'static' implies either concrete (because it is must be ready for practical existence) or mechanical (because it is unvarying). It is perfectly possible (and highly likely) that human nature is static only in the sense that it is abstract (and is therefore appropriate to every concrete eventuality) and universal (and so not required to vary).

The problems to which a static, non-developmental view of human nature gives rise are easily summarised: it falsifies the past, it falsifies the present, and it falsifies the future. It does this both positively, in the sense that its specific interpretations of past, present and future are profoundly false, and negatively, by assuming that there is no fundamental difference between the past, present and future. But this is only to be expected of any narrow conception: for the sake of internal consistency and external completeness it must actively exclude anything it cannot assimilate.

A quasi-static alternative is to assume that human beings are essentially empty vessels, whose contents enter the individual from outside, slosh in and out without altering the container, and then depart or are displaced by other, equally exogenous replacements. Meme theory adopts this approach, as did, to some extent, behaviourism.

¹¹ Robinson (2004).