WHAT NATURALISTIC FALLACY?

Goal Statements and Behaviour in Society

> An artificial personality, the 'man within', as Adam Smith calls conscience, is built up besides the natural personality. He is the watchman of society, charged to restrain the anti-social tendencies of the natural man within the limits required by social welfare.
>
> (Huxley 1893a, 57)

The relevance of evolutionary theory to the study of moral philosophy has received much attention since the original publication of Darwin's *The Origin of Species* in 1859. The publication of *The Selfish Gene* introduced a novel approach to the study of evolution from the perspective of the ultimate unit of replication. The so-called gene's-eye view has allowed the resolution of problematic empirical evidence of altruistic behaviour. *H. sapiens'* complex communicative and memory powers open the door to the ability of memes to strongly affect social conditions. But there remains a major obstacle in the form of the *naturalistic fallacy*. Hume's assertion that a moral 'ought' cannot obtain from purely factual 'is' statements divorces the realm of science from that of moral philosophy. This schism is surmountable by a system that integrates a specific goal statement with the factual premises. This system provides a framework within which moral truths are deducible, albeit that moral 'ought' statements can no longer command a status of rational and existential independence; instead, moral rules are shown to be (possibly computationally difficult) heuristics for surviving and reproducing in a social context.

SOCIOBIOLOGY

'Sociobiology' was originally coined by E.O. Wilson in his landmark work to describe the scientific, genetic study of social animals, including humans, in context. Over the following years, the term has incited attacks of religious proportion. The overwhelming majority of this criticism stems from a set of basic (nurtured?) misunderstandings about the realm (nature?) of genetic studies. One error has been repeated with such frequency that it is called by name, the *genetic fallacy*: the belief that "current function or meaning can be inferred from ancestral function or meaning" (Hoy 1986 in Dennett, 1995, 465). Those wishing to discredit sociobiology, and human genetics, accuse modern scientists of the crimes of the Social Darwinists of the early twentieth century. The politically motivated eugenic policies of those people are an example of an idea warped, not a warped idea.

Genes provide the raw materials to be sculpted by the environment into living, replicating organisms. It must be that the highest peaks of Dawkin's Mount Improbable are most weathered by the environment. Dawkins (1976) talks specifically about this special potential in *H. sapiens*:

> [Humans] are built as gene machines and cultured as meme machines, but we have the power to turn against our creators. We, alone on earth, can rebel against the tyranny of selfish replicators.
>
> (201)

The assertion of an inherited trait must be carefully examined before being enlisted as support for any hypothesis. While a simple qualitative trait can have a simple Mendelian relationship with the underlying genetic code, any complex trait will almost invariably be affected by many factors, including the environment[1]. The implication being that even if a trait is shown to have a genetic component, that trait can be diluted, strengthened, reversed, or mimicked by the environment. Another important consideration in the study of the heritability of complex traits is a result of the Darwinian thesis. A trait that shows minimal *variation* (low heritability estimates) can be viewed as being (having at some point been) subject to selection pressure, whereas a trait exhibiting high *variation* (high heritability estimates) can be understood to be much more selectively neutral (Rickards 1997).

The validity and applicability of studies of inheritance in humans have been questioned because of the existence of culture. It would seem that the most important aspect of culture in relation to genetics is that of, initially, oral tradition. Once humans began to communicate, Good Tricks (Dennett 1996), which might have previously propagated on a geological (evolutionary) time-scale, were now tools to be passed around the fire. What used to be the domain of gene and nature had to accommodate the meme. The meme was introduced by Dawkins (1976) as "a unit of cultural transmission, or a unit of *imitation*" (192 - Dawkins' emphasis). These memes are evident as "tunes, ideas, catch-phrases, clothes fashions, ways of making pots or of building arches" (192). When the Ancient Romans built their aqueducts, the arch was not reinvented for each span, poor designs were not built then torn down to make way for modifications for each bridge, an evolutionary design process guided the builders. The numerous improvements which a human civil engineer saw in one lifetime would

[1] The 'environment' is taken in a broad sense. The phenotypic effects of genes in another organism, while genetic in nature, when exerting pressure on the subject are viewed as environmental effects. Thus, for example, a gene effect *I* in a parent could modify a gene effect *R* in their offspring. Perhaps (genetically) more intelligent parents do a better job of teaching offspring to read. The gene in the parent would have a phentypic (gene) effect *I* in the parent, and a phenocopy (environment) effect *R* in the child. See Dawkins (1976 and 198?).

take generations for others of nature's engineers, such as the bees, which lack complex symbolic communication. Although the ability of bee colonies to construct combs of perfect hexagons speaks volumes for the problem-solving ability of a genetic evolutionary process. The collective body of knowledge since cultural genesis has multiplied at such a rate that its effect on the strategies of humans cannot be ignored. Is it the case that memic inheritance has overtaken traditional genic inheritance in complex social animals? Are there basic genetic tendencies in humans that cannot be completely modified? Can the study of human evolution tell a meaningful story about moral imperatives? Do evolutionarily meaningful stories about moral imperatives provide a firm base for ethics now and in the future?

Many view the unit of selection as the individual, selection pressures differentiating between organisms, not between genes, or groups, or species. While the choice of unit of selection will not affect most discussion, this assumption must be maintained as a possible target when circumstances require. There are cases that will appear contradictory if viewed solely through the organismal lens. The individual as unit of selection has historically been the correct, and only, level at which to study evolution. Selective forces are exerted upon individuals to determine whether that particular individual survives, and more importantly, reproduces. The individuals in existence now are descended from successful individuals. Thus, any traits which, historically, affected Darwinian fitness, will be present at the expense of those which did not perform as well, for the individual.

A paradigm introduced in the latter twentieth century has done much to change the above view of evolution, that of the replicator-eye view expounded by Dawkins. The selfish gene / extended phenotype theory (Dawkins 1976, 1982) holds that, while most gene effects will act to increase fitness of their particular vehicle at the organismal level, this is somewhat of a side-effect, and that in some cases the Darwinian fitness of a particular individual is not the optimisation target of gene activity. This view has provided a means of explaining phenomena that had previously been difficult to resolve.

The theory of particulate inheritance dictates certain properties regarding the relatedness of individuals. The result being that any two siblings with the same parents will have ½ of their genes in common, as will any offspring of a parent. Grandparents can expect their grandchildren to carry ¼ of their genes. These proportions can be expressed in another manner. For any given gene *p* the likelihood of it being shared by two siblings with the same parents is ½, the probability of a grandparent being the ancestral origin of that particular gene in

a grandchild is ¼. These coefficients can be calculated for any related individuals as described in *The Selfish Gene* (Dawkins 1976 ppp).

The genetic study of individuals compares intra-species *differences* at certain loci. What does this say about the species as a whole, when the species shares such a large proportion of fixed alleles. Does the broad commonality of genotype within a species allow for fruitful analysis of inter-species conflict? This question may sound similar to a group selectionist view, but it differs in one important aspect. The group selectionist tells stories about acts which are committed *for the good of the species*, whereas this inter-species examination revolves around the notion of shared ancestral origin of alleles. A selfish gene can improve its chances of immortality by preferentially assisting the vehicles that have a higher likelihood of carrying a copy of itself.

At what point does this line of analysis fail? The parameters bounding this space are those of evolutionary time and benefit to allelic fitness compared with the costs of recognition and action. The overall possible genic effects (benefits) must decay as distance from shared ancestral origin increases, eventually being engulfed by the noise of environmental and genetic competition. It would be difficult to imagine widespread discovery of such computationally complex (intractable?) acts.

Of course, alleles are not selfish, describing them as such is merely a tool, a meme, by which to understand the processes involved. Quite simply, any allele, by virtue of its phenotypic effects on both the vehicle and its surrounds, which improves reproductive success at the expense of competing alleles (and modifier genes) will be more populous in successive generations. In effect, a restatement of the theory of natural selection (Dawkins). The concept of the extended phenotype attempts to describe effects outside the genetic vehicle. Are human effects on the environment a special kind of result of genetic action? Can the state of our environment be described in terms of *H. sapiens* genes in a manner meaningful to ethical study? Again, has memic inheritance subsumed genetic influence in complex social animals?

ALTRUISM

One set of behaviours, in particular, has leapt to eminence in the attempted arsenal of counter-evolutionary critique. These behaviours have been grouped as varieties of altruism. Altruism, the antithesis of selfishness, is the act of increasing another's store of some value at

the expense of one's own. What, particularly, is used to quantify the costs and benefits to the donor and recipient leads to various apparent paradoxes.

Modern game-playing theory has been one of the most useful tools in this modern approach. A modified prisoner's dilemma game can be used as a framework to study various strategies in competition with both other strategies and themselves. This iterated prisoner's dilemma allows the evaluation of various algorithms and reveals certain strategies, or combinations thereof which are ESS (evolutionarily stable strategies). An ESS is a strategy, or combination of strategies, which can do no better in competition with itself.

The paradigm of the prisoner's dilemma can be applied to evaluate the likelihood of certain behaviours existing, and in what proportions these behaviours might exist. For example, Dawkins successfully predicted opposing behaviours in solitary digger wasps (Dawkins, 1976) by calculating an ESS between two competing behaviours. For two given competing strategies, there may be more than one ESS, and the particular observed strategy might be a result of pure historical chance. What is more, it is possible, through external forces, for the particular ESS in existence to be ousted by another.

The need for a rationalisation of psychological phenomena with evolutionary behaviour lies at the heart of the debate. Altruism was defined above in terms of an abstract store of value, it is when this abstract idea is more precisely defined and coupled with ancillary concepts such as Darwinian fitness that apparent contradictions occur. Psychological altruism (PA) defines acts in terms of some form of sacrifice by the individual to benefit another. However, evolutionary altruism (EA) is some act that improves the Darwinian fitness of another, while reducing the Darwinian fitness of the performer. Altruism in nature has been shown to (possibly) coincide with PA but not with the concept of EA (Sesardic).

Kin selection is the observed phenomenon of apparently altruistic acts between related individuals. By examining coefficients of relatedness, however, it can be seen that in these circumstances, the overall (inclusive) fitness of an allele can be increased at the expense of one particular vehicle (Dawkins). Here, there is PA, but no paradoxic EA.

Of the various forms of altruism, reciprocal altruism seems the most problematic. Behaviours such as warning calls in small prairie mammals seem to put the caller in grave danger, while improving the likelihood of survival of intended receivers of that warning. Game theory can be used to examine this situation and make a meaningful assessment of the

altruistic nature of the warning call. The analysis indicates that in fact the (inclusive) fitness of an individual in a population with members who warn is greater than that of an individual in a population of non-warners. (Dawkins)

Communal crèches in natural populations are found as a means of raising young in some social animals. This appears to be an example of altruistic behaviour on the part of some females towards (unrelated) young of another female. On closer examination, however, it becomes apparent that the activity actually increases the fitness of the female, as a function of shared genes, or is the result of an implicit cost/benefit analysis of competing strategies, and in fact, altruism deserves no mention. It is easy to imagine that the energy involved in preventing non-offspring from suckling outweighs the benefit of ensuring that only offspring are suckled, especially if the milk being usurped is surplus (Dawkins).

A naive observer could have used the language of altruism (and/or group selection) in describing the crèche system; the females are performing an altruistic act (giving milk to young) so that the burden of providing milk to the offspring is shared among the females of that population. The altruistic description can indeed serve a purpose, just as various levels of abstraction are used to describe complex systems. However, there is an especial danger when using altruism as an abstracted device in a genetic context, because the detail being glossed over tells a very different story, one that replaces altruism with selfishness (Dawkins).

Sesardic (1995) reviews various attempts to reconcile the evolution of human (rational?) altruistic behaviour and finds several competing theories, the underlying message, however, is overwhelmingly that the apparent paradox of altruism provides no real problem for the evolutionary philosopher. Sesardic warns against making the same mistake as some sociobiologists of relying on psychological egoism when a situation appears difficult to reconcile with evolutionary descriptions. These sociobiologists are actually themselves falling prey to the genetic fallacy. A simple illustration can be envisaged.

A population of nut-collecting rodents lives in small groups, each member of the group is related to some degree, and the entire group lives in a single hollowed-out tree. During especially long winters, it happens that some of the animals' nut stores run out, since all in the group are related, as long as it does not starve itself, an individual's inclusive fitness will be increased by providing access to its food store. What happens when, for example, there is a population explosion because of some historical incident, and groups of unrelated rodents

begin sharing tree trunks, it just so happens that once this has happened, sharing nuts may not always improve inclusive fitness. However, it is incorrect to describe the new situation as proof against evolutionary theories. It may be that the costs involved in discovering a method to measure relatedness outweigh the benefits accrued by saving nut supplies. While current behaviour cannot be satisfactorily explained, a perfectly plausible explanation obtains when the prior situation is understood.

THE NATURALISTIC FALLACY

Much has been said about whether evolutionary theory can enliven the party that is ethical theorising. The most prominent stumbling block is that of the *naturalistic fallacy*; it has been repeatedly argued by philosophers that a moral-ought consequent cannot be reached purely from factual-is premises. Hume (Agar 1997) maintains that the same set of factual statements can lead to opposing normative moral statements. While evolutionary study may *describe* what *is*, stating what *should be* involves a value judgement which is, and cannot be, contained in merely factual statements. Thus, the outcome of the deductive moral process which begins with the factual premises must at some point incorporate an objective statement about innate value before reaching a moral imperative.

A moral philosopher would find no difficulty in separating the following statements into moral and non-moral:

(1) Fans ought to get to the game on time.
(2) Humans ought to tell the truth.
(3) Lions ought to attack *wounded* ungulates.

Statement (2) says something moral, while statements (1) and (3) say something about the best way to achieve a particular goal. These goals are probably the fans wanting to see their team play and the lions wanting to get the easiest kill. The difference, some would say, is purely in the semantic interpretation of the word 'ought', (1) and (3) are instrumental-ought ($ought_I$) whereas (2) is moral-ought ($ought_M$). *Prima facie* it would appear that the major distinction between the $ought_I$ and $ought_M$ statements are indeed that (1) and (3) describe a route to a goal, whereas (2) is just so. Ethical theory requires that there is a moral premise in the deductive reasoning that arrives at (2), in other words, (2) cannot reduce purely to facts about the world. This is the reason that the naturalistic fallacy came about. If it is assumed that there is indeed a substantive difference between the semantic interpretations of ought, can (1)

and (3) reduce to facts about the world?

A number of assumptions must be made in order to arrive at (1). If it is assumed that sports fans achieve less enjoyment from seeing part of a game than from seeing an entire game; that there are no other projects which the fan would rather achieve during the time taken in transit and watching the game; and there are no downstream consequences of going to the game; then (1) can be accepted. There is at least one alternative available to any given fan, which is to not go to the game, therefore there is a choice. The sceptical philosopher will readily point out that there is no moral worth attributable to either of these options *ceteris paribus*, but these assumptions are not all purely factual, there is an implicit value statement, in that the fan enjoys an entire game over a partial game. There is a definite goal, and that is to pursue a project that gives greater enjoyment.

Wounded ungulates are generally easier prey for lions, thus less energy is expended in the chase and the chance of a kill is increased. Energy, in the form of food, is a scarce resource, therefore if a lion can conserve energy it will be advantageous to the lion. Also, if attacking *wounded* ungulates reduces chance of injury to the lion, then lions that preferentially attack such ungulates will, *ceteris paribus*, be more highly represented in future generations of lions than those which do not. In other words, following (3) will improve survival and reproductive success in lions. Thus the goal in this case would be to maximise survival and reproductive fitness.

It is evident that lions are not rational agents, and that choosing wounded ungulates over fit ungulates carries no moral weight (for lions), but a lesson can be taken from this. If it happened that a certain gene effect, *U*, in lions causes the rule (3) to be followed, and this rule is adaptively beneficial, then the lion gene pool will eventually be dominated by *U*. A behaviour such as this is no more difficult to imagine than the ability of certain birds to recognise impostor eggs, or brood parasitism in cuckoos (see Dawkins 1976). How is this behaviour controlled within the lion? There is no conscience thought involved, it must be some form of innate (hard-wired) symptom-analysis *heuristic*, a first-order rule.

There is one population of orcas in Patagonia which has learnt to surf up a particular beach with the waves in order to catch seals, a scarce (food) resource. The origin of this behaviour is very interesting. Apparently, one orca ‘discovered’ this behaviour, and eventually her contemporaries mimicked her and benefited. This is an example of non-genetic behavi-

oural inheritance, and is of limited evolutionary aid, but it illustrates the origination of a novel and fancy behaviour that improved the survival and reproductive fitness of its adherents.

Female orang-utans in the jungle spend most of their time raising offspring. These mothers have an encyclopaedic 'knowledge' of their environment, where to find ripe fruits and seeds at a particular time of the year, even if they have not been there in years. These orang-utans are territorial, and it is within these large expanses that the gentle apes pursue their never-ending quest for (scarce) sustenance. Often fruits will only be ripe for a very short time, and in a particular place, yet these wonderful creatures know when and where to find them. The early years of an orang-utans life are spent clinging to their mothers, watching, learning, and improving their survival and reproductive fitness.

The orang-utan cannot solely be following some simple behavioural complex such as 'sit in a tree, look around for food, eat food,' these creatures exhibit an ability to learn specific geographic and temporal locations. It must be that the years spent with the mother are years spent learning. A major behavioural component must be 'remember what mother does.' This points to an adaptation very different from that of the lion; in effect , a second order adaptation that causes the bearer to acquire specific singular behaviours.

Of what relevance are these stories, and how does (2) enter the picture? It is to be hoped that a statement can now be made about humans, and morality. Drawing together the discourses on altruism and behaviour, a plausible story, whose exact details are inconsequential, about the evolution of human morality can be concocted. Proto-humans at a certain point in their evolution developed the ability to communicate and acquired the cognitive power to represent a model of themselves and other proto-humans. Certain altruistic (PA) behaviours conferred a Darwinian advantage, and reciprocation of (at least some of) these altruistic acts were contingent upon previous states of the world. Game theory tells us that the highest payoff is achieved by both parties acting 'altruistically', but if one party acts selfishly, then the other loses more than if both had acted selfishly. Thus, it would be advantageous to remember the previous acts of potential recipients of altruistic behaviour. An adaptation which conferred a sense of obligation, call this the proto-moral cognitive module, in the right circumstances, would reduce the likelihood of cheating. The ability to communicate results in the ability of offspring to inherit (in the Lamarckian sense) various *heuristics* from older members of the social group, thus the long, painful process of evolutionary discovery can be short-circuited. This proto-moral module needed to be a combination of an innate (first-order) de-

sire to uphold obligations, and an ability to learn (second-order) rules during upbringing. Thus repeated imperative commands from parents could be assimilated into the proto-moral module as Rules To Be Followed. The proto-moral module would function better if rules were viewed as objective and unquestionable. Perhaps those who viewed these rules as subjective did not feel any strong need to uphold these urges of obligation because the effectiveness of the module was so greatly reduced; thus, in a context of reciprocal altruism and punishment for non-compliance these subjectivists might well be under-represented in successive generations. This moral module can be made even more binding on the individual by connecting to pleasure/pain senses. If compliance with the moral module brings about a physiological state of comfort and non-compliance heightened levels of discomfort then moral behaviour is all but ensured except in exceptional circumstances.

This story is empirically falsifiable, but of what consequence would the successful falsification of details of the story be? It would seem that something of this nature occurred and is now present in human biology. It might be advantageous to describe the result of this process as it is seen in society today. During a child's early years, most waking hours are spent discovering truths about the world, including 'moral' truths. Children learn these truths either through personal discovery or from an informed source. Intergenerational communication has allowed the testing of behavioural strategies orders of magnitude more rapidly than ever possible through genetic evolution. Thus it is possible to inform children of strategies to follow in circumstances in which those children may never have found themselves, such as the exhortation not to accept candy from strangers. These strategies are conveyed as rules-of-thumb, a set of heuristics, because at first children may not be able to comprehend the underlying reasons, and later because there is insufficient time to deduce all things from first principles. In fact, society could not function if all knowledge had to be completely proven from first principles to each individual before that individual could make use of that knowledge. The problem solved by using a heuristic approach then, is one of computational complexity.

The stories about lions, and orcas, and orang-utans also serve another purpose, they illustrate the fact that the sole (twin) *goals* of these creatures, and in fact almost all creatures, plants, bacteria, *et cetera* are to survive and to reproduce, or more correctly, to have been a successful vehicle for their replicators. These organisms are not given any moral status because of this fact. The only exceptions are the higher primates, and possibly even only one, *H. sapiens,* who *appear* to enjoy a multitude of personal projects not related to survival or re-

production. Humans have a faculty dedicated to the (apparent) objective appraisal of actions and motives which often suggests proper courses of action in relation to these projects. The heuristic rules which humans follow have evolved throughout the millennia of cultural existence.

If human morality has its evolutionary origins in a basic drive for survival and reproduction (SR) and cultural mores can be shown to uphold these twin pillars, then future moral imperatives must be at least formed with Flanagan's Principle of Minimum Psychological Realism in mind. Indeed, a stronger statement can be made. Moral statements are purely goal-based $ought_I$ statements in which the goal is survival and reproduction *in society.* Given any sufficiently rich set of descriptive is-statements about humans and their environment it may not be possible to arrive at an $ought_M$-statement, but given those same premises, and a goal-statement it is possible to arrive at an $ought_I$ statement, and if that goal-statement is of survival (and reproduction) then an $ought_M$ statement can be reached. The difference between $ought_I$ and $ought_M$ is that the SR goal-statement ($goal_G$ - gene's-eye goal) is never mentioned..

Modern philosophers have dealt with the is/ought gap in different ways. Ruse (1995) puts forward an argument based on a meta-ethical stance of subjectivism and non-cognitivism, or in Sober's terms 'ethical subjectivism'. Ruse avoids the is/ought problem altogether by appealing to his meta-ethical stance. He denies Sober's emotivist label by arguing that his view describes moral facts as sitting on top of non-moral facts, the human moral faculty is a sensory processor, just as the visual cortex is for vision. For Ruse, moral facts require justification of sorts. Clearly this stance is not based on an emotional-response view, although Ruse admits his position is still susceptible to problems inherent in a cultural-relativism, but on a cosmic scale.

It would be helpful to distinguish between different forms of objectivism and subjectivism. Carruthers (1992) discusses weak and strong versions of both. Strong subjectivism would include an emotivist attitude, while strong objectivism would take in an intuitionist approach. By accepting Carruthers dismissal of these strong forms, discussion can centre on weak subjectivism and weak objectivism. A weak subjectivist would maintain that while ethical feelings 'depend ultimately upon the basic attitudes of the person making the judgement,' there remains 'room for reason and argument.' (4) A weak objectivist does not view some 'non-natural property' (18) as the source of morality, rather, that states of the world may be perceived as morally right (or wrong) and that there is some objective truth to these percep-

tions. The essence of the difference between these two weak stances is in the resolution of moral disputes, for the subjectivist, there could be irreconcilable differences, whereas for the objectivist, in any situation there will be a 'correct' view.

Ruse (1995), surely, must be counted as a weak subjectivist:

> [M]oral properties do not really exist 'out there' in the physical world, however real they may seem to us. They are rather, in some crucial sense, a part of our perceptual apparatus.
>
> (287)

> Am I not reduced to the misguided therapist's: 'If it feels good to you, then that's OK'. Such a conclusion would indeed be the very refutation of my philosophy.
>
> (253)

Sober's (1996) dislike of the subjectivist stance leads him to search for objective moral truth:

> Why should the fact that ethics cannot be deduced form purely *is*-propositions show that no ethical statements are true? Why can't ethical statements be true, though irreducible?
>
> (104)

To sidestep this problem, as Ruse has done, works for those who already share his subjective ideology *at some level*; but what of the objectivist, who knows that the truth is out there? An objectivist's first argument against an is/ought/goal view would be to cry *genetic fallacy.* The objectivist would (possibly) accept the historical origin of morality, but deny its applicability to future moral deduction. The second argument might be one suggested by Dennett (1996) in his refutation of utilitarian theory, that the moral value of the final outcomes of an action are computationally intractable.

It may be impossible in the end to reconcile an objectivist's view of the ideal world, just as it is impossible to convince some that the earth was created in more than seven days. Is the story of Genesis not a powerful meme? The (many-times) translated Old Testament provides a set of rules, the Ten Commandments, to be followed by its adherents. These rules served a purpose, just as the softer New Testament writings did. They were the best way to ensure survival and reproduction, given the state of the world at the time of their inception. The proffered goal was not the ubiquitous $goal_G$ but the more personal and palatable promise of divine salvation. Many of the biblical imperatives are still upheld in society today; some members of society say because of their inclusion in an allegorical storybook, others because they are the 'right' way to live.

Morality surely is a property of (some) life. The ability to attribute values to different

objects, actions, and motives is not present in most living organisms, let alone inanimate objects. Therefore the 'answer' of morality must lie within the scope of life. Life must be examined to determine the meaning of moral value. It has been examined. The moral faculty is an evolved tool to ensure optimal benefits from certain situations in a social context. As generations pass, solutions to specific situations are more fully explored, thus better strategies can be adopted. Whereas a specific set of circumstances, or any given situation for an individual, might be computationally intractable, over time, general rules of conduct can be refined. If $goal_G$ is accepted then moral imperatives can be derived from a sufficiently rich set of descriptive statements about the world.

The use of $goal_G$ with appropriate is-statements can produce moral rules for any situation. It must be remembered, that as in the study of genetics, observations about strategies in a given population in a certain environment cannot necessarily be transported to a different population in a different environment. Take, as an example, the question of whether to support famine-stricken children in a far-off land. Utilitarians would answer that the greatest store of happiness, or the least amount of preference-debt, can be achieved by always supporting these humanitarian needs. The $goal_G$ adherent, if posed this question, would calculate the payoffs of various strategies (give money, keep money, or a combination thereof) across a population and their effects on fitness of the individual performing the act. While these may stink of computational complexity, it must be remembered that much of the work has been done before, by nature and humans. Given that the closest level of association would be at the species level and would have no material pay-back but (possibly) some (misplaced? - remember the nut-eating rodents) feelings of increased comfort, the possible benefits to the individual, and its descendants, would be negligible, so without doing any new calculation the $goal_G$ morality would not require any famine aid. Only one correct conclusion can be reached for any set of factual data, thus, there is a source for moral truth, but it is not grounded in some physical property. A challenge to the moral objectivist would be to find a situation in which the prevailing ethical norms were not consistent with a $goal_G$ derivation, given the state of the world at that time.

The addition of a specific goal-statement, that of survival and reproduction, has allowed the derivation of moral imperatives from purely factual is-statements. These moral-ought imperatives are viewed as different from other instrumental-ought statements because of the need for an objectified moral truth. The moral condition was made possible by the

need for bounds on individuals' behaviour in a social context. Individuals in a social situation may very well follow (psychologically) altruistic behaviour to further their fitness. This analysis was made possible by viewing inheritance from the genic perspective. Thus the study of evolution has aided in the description of human ethics; what is more, evolutionary ethics provide a means of guiding actions by ensuring that projects do not contravene consequents of factual premises coupled with the specific goal-statement of survival and reproduction.

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