GENESIS REVISITED: CAN WE DO BETTER THAN GOD?

by Michael Ruse

Abstract. We are faced with growing powers of manipulation of our human genetic makeup. While not denying that these powers can be used for great good, it behooves us to think now of possible upper limits to the change that we might want to effect. I argue that thoughts of changing the human species into a race of supermen and superwomen are based on weak premises. Genetic fine-tuning may indeed be in order; wholesale genetic change is not.

The self-styled creation scientists argue that God created man physically perfect. It was only after the Fall and the departure from Eden that things started to go wrong (Morris 1974). Today we find ourselves with all sorts of physical problems due to the degeneration which has gone on since the Creation. Also, some of these physical problems come from deleterious genes which have mutated from a formerly perfect state.

Creationism is not a world view to which I subscribe. I have in fact spent much time and effort countering it (Ruse 1982a; 1982b). However, I do agree with the Creationists that today we find ourselves with a human population carrying a large number of genes capable of causing—and often indeed causing—dreadful, life-sapping problems, both physical and mental. Tay-Sachs disease, hemophilia, and sickle-cell anaemia are but three that spring at once to mind.

Predictably enough, these genetic ailments have attracted much attention, within and without the medical community. As is well known now, for the first time in human history we are capable of doing something about some of them. Some diseases, like Tay-Sachs, can be detected in the womb and thus avoided through abortion of defective

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[*Zygon*, vol. 19, no. 3 (September 1984).]
 ISSN 0044-5614

fetuses. Some diseases, like diabetes melitus, can be treated through more conventional techniques, such as medication of the afflicted. And there are other approaches combining old and new techniques (Hilton et al. 1973; Ruse 1980).

Treatment of genetic ailments raises all sorts of thorny ethical problems. For example, should one abort afflicted fetuses? Should one force a racial or ethnic minority—a minority peculiarly affected by some diseases—to take preventative measures? Should one try to force physically healthy carriers of a disease to avoid conception? No doubt, as the years go by and as medical technology gets more and more sophisticated, ethical conundrums will intensify.

However, these more conventional issues are not the central focus of my paper. I do not bypass them because I think them unimportant; nothing could be further from the truth. Rather, in part I leave them because they have already been much discussed by myself and by others. Whatever the quality of my own work, that of others strikes me as high. Also, I leave these issues because for all the problems, essentially the overall answer strikes me as obvious: genetic ailments are bad things; it would be a morally good act to eliminate them; therefore, one should strive so to eliminate them. That is the framework within which discussion must take place. Hammering out details is incredibly difficult. But they are detail, nevertheless.[1]

In this paper, therefore, I want to look at far more hypothetical issues, where the right direction is not at all so obvious. I want to suppose that medical technology is very much more powerful than it is now and that we have virtually unlimited ability to recreate Homo sapiens in any genetic form or shape we desire. The question I want to ask is What can we—what should we—desire for our descendents, or (assuming that technology prefers to start anew rather than to tinker with the old) our replacements?

I realize that it is all very theoretical talking about nonexistent human successors, but advances in technology have a nasty habit of catching us unawares. I do not expect we will ever get quite the power to play God that I am hypothesizing, but we could suddenly find ourselves with undreamed-of abilities which do open up some of the areas I will look at. Thus, a little forethought is not entirely unwarranted. In any case, if a philosopher cannot talk about the nonexistent, who can?

On Being Human: Basic Information

If we are going to talk about changing or improving humans, then it is important to know what we are starting with. In this and the next two sections I will sketch what I take to be some of the major features of being human. I realize that my divisions may be considered crude:

philosophically, psychologically, and biologically. But I do not think they are so distorting as to negate the kinds of points I want to make (see Ruse 1984).

I will also make some comments about causes, particularly about the extent to which being human can be said to be a function of biological causes. Let me reassure those readers for whom any hint of the biological foundations of humanity is anathema, that I shall speak to their concerns later. (For more on the science, see Wilson 1975; 1978.)

I assume, of course, that my readers are with me in accepting that humans, like the rest of the organic world, are the result of a long, slow evolutionary process. I assume also, although this is slightly more contentious, that Charles Darwin's mechanism of the natural selection of small random variations was the major causal factor in evolution, including our own evolution (Darwin 1859; Ruse 1979a).

I want to start my analysis by proposing a threefold division of human features one way, and a twofold division of human features another way, giving us a matrix with six blanks to be filled. The threefold division separates the bare data that we humans process and the organs by which we get the data, the principles and organs by which we organize the data, and the abilities which we have to apply the principles to the data, mentally and physically. The twofold division separates the external and the internal: the things which concern the physical world and the things which concern ourselves and our fellow humans. Let me expand a little on the categories which these divisions yield (see figure 1). The matrix is my own: but the divisions have long histories in philosophy and psychology. They fit very much into recent pictures of humankind presupposed by sociobiologists (Lumsden and Wilson 1981; 1983).

The first category treats of what the empiricist philosophers called sensation and of the organs of sense. Being human involves having eyes, ears, noses, and so forth and getting information about the external world through these organs. I am not claiming that we get raw sense data and that only when it is received does any processing occur—in fact, I would be inclined to deny this—but I do suggest that, like other animals, we soak up information about our physical surroundings. Through our eyes we see the blue sky and the green trees; through our noses we detect the putrid odor of a decaying dog.

In line with the position taken above, I assume that eyes and ears and the like were produced by evolution through natural selection, which in turn is a consequence of an ongoing struggle for existence and reproduction. I assume also that, even today, such organs are tightly under the control of the genes. A human that can see is better equipped in the struggle for existence than one who is blind, and the ability to see

is one possessed innately. It is part of nature rather than nurture, to use a dangerously crude, but still-useful dichotomy (Ruse 1979b; Wilson 1978).

	EXTERNAL	INTERNAL
	(Our relations with the physical world)	(Our relations with the human world)
Basic Information	Sensations, given through the external organs (e.g., the eye)	Emotions and feelings given to us "internally," (e.g., through reflection)
Regulative Principles	Epigenetic rules of sense, such as mathematical claims and causal principles	Epigenetic rules of feelings, particularly the basic premises of morality, like the Categorical Imperative and the Greatest Happiness Principle
Culture	Science and technology	Morality, religion, and law

FIG. 1.—The human matrix. This does not pretend to be complete, and the divisions are not absolute. Perhaps some human actions/achievements lie across borders; for example, religion possibly belongs to both external and internal cultural categories. As explained in the text, the notion of an epigenetic rule is taken from the sociobiological writings of Charles Lumsden and Edward O. Wilson.

The second category, paired with the first, treats of what the empiricist philosophers called emotions and of the internal organs of sense or reflection. I do not claim that the two categories are psychologically or anatomically exactly analogous, but the old philosophical division seems to have continued value. What I have in mind for the contents of this second category are emotions like happiness, sadness, hatred, love, and so forth, together with direct feelings like pain and hunger. Also included are the various items of physical apparatus which give rise to these emotions and feelings.

I take it that, as with the organs in the first category, the "organs" in the second category are fairly direct products of evolution through natural selection and are controlled by the genes. The ability to feel pain has obvious survival value; so also does depression at the loss of a child. If you do not pass on your genes, then you come to an evolutionary full stop. And if you do not care about the loss of a child, you do not pass on your genes.

Emotions like hatred and love—directed towards fellow humans—also have selective value. If you do not love those close to you, you will be less likely to aid them—and they you. If you do not hate enemies, then you will not try to beat them before they beat you. (This all sounds very Darwinian and not very Christian—"nature red in tooth and claw." In fact, as we shall see, biology and morality are not quite at such odds.)

I should add that I include under the emotions sexual feelings. I feel lust toward many female members of my species and somewhat more refined feelings of love towards one in particular. The same holds for other humans. The selective value of sexual urges is as close to a tautology as it is possible for an empirical claim to be (Symons 1979; Hrdy 1981).

On Being Human: Regulative Principles

Let us move to the third category (first column, second row of figure 1). Humans do not have disembodied sensations rattling around in their minds: "Here is a patch of blue, here is a smell of skunk." Rather, things are organized and interpreted. For example, even saying, "Here is a smell of skunk," requires some sort of categorization. We see objects as certain things. We relate things of one kind to things of other kinds. Thus, when we see fire, we associate with it the ability to burn; and, when it does burn something, we say that the fire "caused" the subsequent ashes or pain or whatever. Also, we organize things mathematically. Given five apples and seven apples, we expect twelve apples; and, if there are not, then we doubt our senses or our counting ability rather than the expected total.

Philosophers and others have long identified and discussed the organizing principles of our thinking about the external world. Most, including myself, would agree with David Hume that we do not read the organization directly from nature; we do not see the cause in "fire causes pain." Rather, the organization must in some sense be mind-imposed.

Avoiding argument and speaking dogmatically, like many others, I feel drawn towards a Kantian answer to the source and nature of the thoughts that we have about causation, mathematics, and the like (Kant 1929; 1949; Lorenz 1962). It will be remembered that Kant argued that there are certain "synthetic *a priori*" principles, which we must use when we think about the external world. These "regulative principles," as neo-Kantians call them, give a structure and meaning to that which we observe. What I would argue also, speaking now even more dogmatically, is that evolution through selection gives us the reason for the

very existence of the organizing principles. Those beings who think causally are better able to handle the world than those who do not. The burnt child fears the fire—or the child dies, without reproducing! In other words, I suggest that thinking causally, mathematically, and so forth is part of the genetic wiring of the brain.

My position here, although perhaps controversial, is not particularly novel. In recent years, both philosophers and biologists have subscribed to some version of it. For instance, W. V. O. Quine writes about our thinking on natural regularities:

> One part of the problem of induction, the part that asks why there should be regularities in nature at all, can, I think, be dismissed. *That* there are or have been regularities, for whatever reason, is an established fact of science; and we cannot ask better than that. *Why* there have been regularities is an obscure question, for it is hard to see what would count as an answer. What does make clear sense is this other part of the problem of induction: why does our innate subjective spacing of qualities accord so well with the functionally relevant groupings in nature as to make our inductions tend to come out right? Why should our subjective spacing of qualities have a special purchase on nature and a lien on the future?
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> There is some encouragement in Darwin. If people's innate spacing of qualities is a gene-linked trait, then the spacing that has made for the most successful inductions will have tended to predominate through natural selection. Creatures inveterately wrong in their inductions have a pathetic but praiseworthy tendency to die before reproducing their kind (1969, 126).

And in a similar vein, the sociobiologists Charles Lumsden and E. O. Wilson suggest that our thinking is governed by "epigenetic rules," which channel "the development of an anatomical, physiological, cognitive, or behavioral trait in a particular direction" (Lumsden and Wilson 1981, 370). Both Wilson and Quine argue that we think and organize in the way we do because there is a selective advantage in so doing.

Corresponding to this third category, in the other column we have in figure 1 the fourth category dealing with the organization of our feelings and emotions. Here, obviously, I locate the determinants of our moral thought. We organize the feelings from within, just as we organize the sensations from without. We think of emotions in terms of right and wrong, good and bad. When I feel tenderness towards a child in need, this is judged a good emotion. When I feel an urge to treat someone unkindly, for instance in a sexual situation, this is judged a bad emotion.

I suspect there is rather more controversy about the exact nature of the organizing principles of feelings than there is about the exact nature of the organizing principles of sensations. Some thinkers have wanted to put the emphasis on the individual, arguing that this is the crux of

moral thought. Immanuel Kant's name arises once again, for his well-known, supreme ethical principle, the Categorical Imperative, had several versions, but they all made the rights and status of the individual supreme (Kant 1949). Thus, Kant argued that one should always treat other human beings as ends in themselves and never as means to some different ends. You must not, for instance, make an example of someone for the sake of others.

Other ethical theorists have argued that the organizing principles of morality must put the emphasis on group benefits. Most notably, the Utilitarians argue that one should maximize happiness for all. Under this philosophy, one can disregard the individual, if the group benefits warrant it. Thus, if severe punishment of one drunken driver would save many subsequent lives, then so be it (Mill [1859] 1910).

I am not going to try to judge here between these and other philosophies. To be honest, I think there is merit in each. Moreover, for all of the difficult cases, there is much more overlap between rival ethical views than many would allow. What I do want to claim here is that—contrary to what is often claimed—it is not completely ridiculous to seek a biological basis to our moral way of thought. (See Singer 1981 against my views, and Murphy 1982 supporting my views.)

Students of the evolution of animal behavior, so-called sociobiologists, give good reasons to suggest that all-out conflict between organisms is far from a good thing, judged from an evolutionary perspective (Wilson 1975; 1978; Ruse 1979b; Trivers 1971). Quite the reverse! Cooperation can advance one's reproductive chances far more effectively than can unremitting hostility. It is true that, genetically, this may be a case of enlightened self-interest—you further my reproductive chances and I will further yours. Nevertheless, at the emotional and conscious level, such cooperation could have all the marks we associate with truly disinterested goodness.

Of course, suggesting that biology and ethics are not necessarily in conflict is not to say that one will therefore get an exact mesh. But without going into details, I think one can see fairly obvious ways in which both Kantianism and Utilitarianism can be given genetic backing. Indeed, I would go so far as to say that perhaps biology throws some light on the above-mentioned clashes between basic principles. Possibly, there is no right answer! Unlike the God of Genesis, evolution is a pragmatic mechanism. It does not guarantee excellence, only that things will work, more or less (Lewontin 1978). I surmise that perhaps both Kantianism and Utilitarianism are products of evolution, and, since their clashes are not that horrendous, evolution tolerates them. It is better to have both Kantian and Utilitarian urges, despite the clashes, than urges only in one or the other direction.

On Being Human: Developing Culture

Let us move quickly to the fifth and sixth categories, dealing with what it is to be a human being. It is no use having sensations, emotions, and ways of organizing them, if you cannot then go on to take action. We humans have abilities to use and develop our knowledge of the world; we humans have abilities to use and develop our moral sensibilities. These are the things I include in the final two categories. I am sure that the things in the final categories evolved along with the things in the earlier categories, and not after them (see Johanson and Edey 1981).

Thus, on the one hand, we have the mental abilities to work with the various regulative principles governing the products of sense. These abilities lead most notably to mathematics and to pure science. Then, we have the physical abilities to put this knowledge to use. Through our power of speech, through our hands, and so forth, we work together, developing technology and mastering nature. In short, we build one major part of what is often called the human cultural sphere.

On the other hand, we have the mental abilities to work with the principles governing the emotions and feelings. This leads to full-blown ethical systems and perhaps to related phenomena such as religious doctrines. Then, again, we have the abilities to put ethics into action, building systems of law, government, and so forth. Thus, we get a second major part of the human cultural dimension.

It is often argued that culture is a phenomenon on top of, and separate from, our biology (Sahlins and Service 1960). The second law of thermodynamics lies beyond the genes, as does the United States' First Amendment and the Roman Catholic doctrine of transubstantiation. There is obvious truth in this, for we do not have genes for being heliocentrists rather than geocentrists, Democrats rather than Republicans, Catholics rather than Protestants. Moreover, culture involves powerful new processes, specifically the ability to develop new ideas as needed and to pass information from one adult directly to another (i.e., all information does not have to come from random mutation and be passed through the zygote).

However, as you might guess by now, I think claims about the biology-free nature of culture are only half-truths. I would argue that culture has its roots firmly in biology. Being a Copernican rather than a follower of Ptolemy is not a direct function of the genes, but thinking in a scientific way at all is (Lumsden and Wilson 1981; Lorenz 1962) and so is preferring Copernicus to Ptolemy. Biology provides the skeleton and culture fleshes it out. If culture is not broadly adaptive, in a literal biological sense, then from an evolutionary perspective we would be better off as moronic herrings than as humans.

The same comments about the importance of the biological background for the development and nature of much technology holds for the development of morality, not to mention our legal and other systems. This is not to say that nothing can or will go wrong: that culture can never threaten biology. Perhaps, indeed, technology will overreach itself, and we shall all be blown to bits by nuclear weapons. Perhaps Catholic views on birth control will lead to such overcrowding that disease and famine will kill us all. There is nothing in evolution to deny that this could be so. In fact, depressingly, the contrary is the case. All experience points to extinction as the ultimate fate of organisms; we should not expect anything different for humans. But, for all this, I do stand by the claim that, as humans develop and put their ideas into effect, "biology holds them on a leash," to use an apt metaphor of Edward Wilson (1978).

Let me sum up the way I am looking at humans for the purpose of this discussion. I am suggesting that there are different levels to being human and that these occur on both the intellectual and the emotional side. I do not pretend that my divisions are the only ones or the best ones. Critics often accuse people like me of being reductionistic, whatever that might mean (Allen et al. 1977). Therefore, let me emphasize that I certainly do not pretend that the categories I have identified exist separately. How could one have mathematical abilities without an awareness of the principles? Nor do I claim that together the items covered make up the whole human. Apart from anything else, I am sure there are many aspects of humanity I have missed entirely: one thinks, for instance, of those aspects to do with our artistic nature. Nor even do I deny the existence of absolute values, although like many philosophers I myself have trouble relating them to human beings (Mackie 1977).

However, I do think the various items I have identified are important constituents to being human. Moreover, for reasons I have suggested, I believe biology is an important factor in these constituents being what they are, in the way they are. Hence, if we are thinking in terms of programs for creating genetic superpeople, then the above discussed features are the sorts of things which should come under our scrutiny. At least, in the next section, they will come under mine!

Bigger and Better Sensations?

Let us run through our six categories, one by one. The question we are asking ourselves in each case is: What, if anything, would be an improvement? Suppose a genetic fairy godmother did appear, prepared to wave her wand over any human feature and to grant any change

requested. What changes could we ask for? What changes would it be sensible to ask for?

You may think this is all a bit silly. After all, what you really want is that everything be bigger and better. If we could raise everybody's IQ by twenty points and could make everyone a little more caring about neighbors, not to mention enemies, then humans would be far improved beings. Add a couple of wings and the potential to live for 10,000 years, and who knows what marvellous things we might be and do!

I am not sure that matters are quite this simple, as I will try to show. But first, we must ask about the first category, namely, the organs of sensation and their products. *Prima facie*, the prospect of a little improvement here seems like a wonderful thing. We would all like the eyes of a hawk and the ears of a bat, not to mention the x-ray visual powers of Superman. Or would we?

Consider the options. Minimally, we might hope to perfect the organs we have already. Next, we might hope to add powers that other organisms have but that we do not have. At most, we would desire altogether new powers, like those of Superman, or even powers that we do not even know or think of. I suspect, however, that satisfaction of any of these options would not bring happiness. Indeed, such satisfaction might well make us very uncomfortable.

Take the question of the organs we have already. I am sure that all baseball fans would love to have the power of their eyesight increased significantly, and I suppose there is nothing too much wrong with this—although how easy the game itself would be to play, given that everyone had fantastic eyesight, could be queried. But, super-strong hearing would be quite another thing. Imagine how hard it would be to concentrate if every crackle of paper were to sound like a clap of thunder or the roll of a drum! And a super-strong sense of smell would be downright disgustingly burdensome. Every time you entered a room, you would be greeted with a wave of armpits and feet. Pity the poor nonsmoker forced to sit next to a man with a pipe! No doubt, we would learn to discriminate; but, if the noise were really loud or the smell really strong, a great deal of brain "rewiring" might be needed before we could tolerate it.

Of course, the simple fact of the matter is that we do not need and cannot properly use a strong sense of smell. Contrast us with dogs, who can and do use such a sense. Their faces are close to the ground, and so they are positioned to use their noses efficiently. Furthermore, their territorial-cum-mating proclivities need this sense. Male dogs have to check out for intruders on their territory; hence, the urinating against lampposts, to mark home ground. Males also have to sniff around the

rears of other dogs, looking for rivals and for females in heat. Humans, however, just do not work that way. Males do not have to smell out receptive females. Indeed, it would be disastrous to human society, as we know it, if they did. Can you image if women came into heat?! (See Symons 1979, for related thoughts.)

In short, I am far from convinced that we need much-improved organs of sense, and analogous doubts spoil the prospect of developing new trends of organs of sense. Such nonhuman organs do exist. For instance, many insects (and other animals) communicate through chemicals, so-called pheromones. This is an incredibly efficient way of transmitting information, as Wilson explains.

> The amount of potential information that might be encoded in this manner is surprisingly high. Under two special circumstances, when transmission occurs in still air over a distance of the order of a centimeter or less, or when it is accomplished in a steady, moderate wind, modulation is not only practicable but highly efficient. Under extremely favorable conditions, a perfectly designed system could transmit on the order of 10,000 bits of information a second, an astonishingly high figure considering that only one substance is involved. Under more realistic circumstances, say for example in a steady 400-centimeters-per-second wind over a distance of 10 meters, the maximum potential rate of information transfer is still quite high—over 100 bits a second, or enough to transfer the equivalent of 20 words of English text per second at 5.5 bits per word. For every pheromone released independently, the same amount of capacity could be added to the channel capacity (1975, 233).

Do we humans really need such a method of chemical communication? Obviously, in the most radical way possible, we would get a new slant on things. But to what avail? Given extra senses over and above those we have now, would we be able to process a great deal more information in an efficient manner? Or would we be liable to collapse from brain overload? I love reading Charles Dickens. One of the joys is that, with any of his novels, I get a good long read and can really enter into the imaginary world of the author. Even if I could, I do not particularly want to read *Bleak House* in five minutes and the collected works in half an hour!

You might argue that it is the new slant that counts, not the added information-gathering power. A rose smells good, quite apart from its visual beauty. Perhaps, then, the rose as chemical entity will be even more stunning. But, rose-lover though I am, I remain unmoved. How can I deny the joys of chemical information about roses, until I have sensed them? However, the new slant will only go so far. It is not as if any new sense is going to unlock mysteries more profound than dreamed of in our philosophies. An insect using pheromones avoids the same objects as a human using sight or touch. Any new sense is a different way of getting at the same world, not a way of getting at a whole new world.

In short, however efficient, a new sense's value is limited. If you doubt this, consider the relationship between the sense of sight and the sense of touch. Seen-circles and touched-circles are not the same, but they do not contradict each other or suggest that the world as revealed by the one sense is not the world as revealed by the other sense (Berkeley 1963; Turbayne 1962).

Finally, what about pretend senses? Unless someone can spell out in some way what they are supposed to do, they can hardly be of much concern, and they are certainly not things to strongly desire. Further, those pretend senses which often are proposed seem of dubious value. X-ray eyes will certainly help you if you cannot remember whether you packed your toothbrush. But do you want everyone in the room to know what color underwear you have on today? Or if indeed you have underwear on at all? Is life to be one long nude-beach party? Even the oft-desired ability to read thoughts would be burdensome. Can you imagine any relationship—even the most loving (especially the most loving)—without some degree of mental privacy?

I conclude that drastic changes in the first category of items I associate with being human are not really all that desirable. At least, as best we ourselves can judge, the effects of drastic changes in our organs of sense would not at once lead to total happiness, and there are good reasons to think the reverse might be the case.

Analogous arguments apply fairly readily to items in the second category: the feelings, the emotions, and their associated organs. Those of us subject to strong depressions or to desperate pain from cancer will surely cry for relief, and who could deny such cries? But this is far from saying that—all other things being equal—we want some emotions blocked right off or that we want other emotions strongly intensified. Pain certainly serves a vital purpose. I for one am far from eager to replace it with a light bulb in the middle of my forehead—a bulb which flashes on whenever there is something wrong with my body.

Conversely, think how devastating the emotion of love can be when it gets out of hand. Do we really want to spend our days as aging Romeos and Juliets, able to think of nothing but the sweet objects of our affections? I am reminded in this context of Cephalus's reply to Socrates about the joys of old age. "For instance, I remember someone asking Sophocles, the poet, whether he was still capable of enjoying a woman. 'Don't talk in that way,' he answered: 'I am only too glad to be free of all that; it is like escaping from bondage to a raging madman.' I thought that a good answer at the time, and I still think so: for certainly a great peace comes when age sets us free from passions of that sort" (Plato 1941, 5).

I hasten to add that I am not arguing for the deletion of sexual passions *per se*. Apart from the disastrous effects this would have on society, life without sex and love would be very drab. Do you really want to do philosophy all of the time? Nor am I arguing for drastic alteration of the passions. Radical feminists and others sometimes argue for the desirability of such a transformation, where one would take heterosexual passions and turn them into something androgenous, making for indifference as to the sex of one's partner. Frankly, I enjoy being a man and feeling sexual attractions towards women. Others, male and female, likewise enjoy sexual feelings. So why change them? (I am not denying the joys of homosexual attractions for those inclined that way. Nor am I saying that male and female feelings are identical, or that one should accept complacently every last aspect of today's male-female distribution of goods or power.[2])

Changing Regulative Principles

Let us move on now to the third and fourth categories of items involved in being human. These are the categories dealing with the ways in which we humans process and interpret the data of our senses and our emotions. They speak of what neo-Kantians call "regulative principles" and what sociobiologists have dubbed "epigenetic rules." In dealing with the physical world, the third category treats such things as the way we think mathematically and causally. The fourth category treats especially principles of morality.

I am sure there have been times for all of us when we have wished that we could more clearly appreciate basic principles of thinking about the world and about ourselves and our relations to others, but this is far from wanting wholesale change. In fact, it is hard to see what case could be made for such change.

Take as an example the kind of principle which informs our thinking about causality. When something happens, we look for a cause. "Things do not just happen!" We look for a uniformity between cause and effect. If you strike a match and it ignites on one occasion, then you expect it to ignite on other occasions. If it does not, then you want to know why.

Now, as I have pointed out, there are obvious biological advantages to thinking this way. The child that does not learn to fear the fire—the child that does not think that fire causes burning—simply is not going to survive long enough to reproduce. Hence, to speak quite bluntly: if we start tampering with the way in which we think causally, we can predict wholesale disaster in fairly short order. Hume may be right about there being no objective causality, but this is not to deny the selective advantage of thinking that there is (Quine 1969; Lorenz 1962).

In other words, attempts to change the way we suppose causes to operate in the world seem downright foolish!

But, you might complain, we do not have to think causally—at least we are not forced to think in a conventional way. Quantum mechanics proves this (Nagel 1961). Perhaps this is so, but nothing I have said is affected. In everyday life we do have to think in a straightforward, causal fashion. Just suppose some student claimed that the isomorphism between his answer and that of a friend was due to random, unpredictable factors! In any case, even in such subjects as quantum mechanics one is hardly discarding regulative principle or governed thought. You modify some claims, like causality, in order to save more basic ones, like the principle of noncontradiction (Hanson 1958).

Finally, you may object that my whole line of argument is circular. Trapped as I am within my selectively produced thought patterns, I simply cannot say what a noncausal stream of thought would be like. Hence, I cannot pronounce on it. Perhaps, if I could only know, life without causal thinking would be bliss. There is, I admit, something in this objection. It is true that, literally, I cannot conceive of a noncausal world; hence I can hardly argue for its undesirability! But I would also point out that, because something is inconceivable, this does not mean that it is a possible option—certainly not a possible reasonable option, which I should allow for at this moment (Ruse 1984). So I reaffirm that without causality, my claims about natural selection and everything else simply collapse into a meaningless morass. Life without causality is inconceivable, and that is that. It is certainly not something for which we should strive.

Similar arguments apply to the principles of moral thought. Even if it is conceivable to have a life without any moral perceptions whatsoever, it is hardly desirable. A human who has absolutely no moral feelings for his or her fellow humans is no more going to be able to function than a human who has no sense of causation. My own feeling is that, in an important sense, you cannot really conceive of human life without any morality. I doubt we could have such life, if everyone hated everyone else from the moment of conception.

Although he is no evolutionist and although indeed he thinks morality belongs to a sphere above the animal passions—a sphere of reason—I believe my point is the one Kant was trying to make when he justified the first version of the Categorical Imperative: "Act only according to that maxim by which you can at the same time will that it should become a universal law."[3] Breaking with the imperative leads to what Kant calls "contradictions"—these are not logical contradictions, but they do point to the collapse of society and to personal ill-effects from the break.

Suppose a man refuses to repay a loan and says to himself that he will always refuse.

> He changes the pretension of self-love into a universal law and then puts the question: How would it be if my maxim became a universal law? He immediately sees that it could never hold as a universal law of nature and be consistent with itself; rather it must necessarily contradict itself. For the universality of a law which says that anyone who believes himself to be in need could promise what he pleased with the intention of not fulfilling it would make the promise itself and the end to be accomplished by it impossible; no one would believe what was promised to him but would only laugh at any such assertion as vain pretense (Kant 1959, 40).

I endorse Kant's argument, but I would give it an evolutionary interpretation. If you do not cooperate with your fellows, then you will be less well off than if you do (Trivers 1971). For this reason, I cannot imagine why one would want to change our moral awareness in any significant way. (I have argued in an earlier section that perhaps our moral awareness is not perfect—as is so often the case with the products of evolution—and that sometimes it fails as in the case of individual/group conflicts. I am certainly not arguing against fine tuning of the products by evolution, here or elsewhere, although I am not quite sure what form the fine tuning would take in this case.)

Changing Abilities

Finally, let us turn to the fifth and sixth categories, those which cover humans as beings able to put their thoughts and principles into action, both mentally and physically. Even here, I am doubtful about the benefits of significant changes from the present state. Take the fifth category, dealing with the development of systems of pure thought like mathematics and science and then the applications of these systems as technology.

A priori, it is attractive to think of us all being mathematical superstars, but is it not all going to be a bit self-defeating? Consider, analogously, the genius of Wolfgang Mozart. Think of the sheer, undiluted pleasure that that man has brought to so many people. What if each and every one of us were busily churning out forty-one symphonies, an opera of the greatness of *Don Giovanni*, and four exquisite gems of horn concerti? Would the work of each and every one of us have equal value and give equal pleasure, as Mozart achieves? The mind boggles at the thought of the Canadian Opera Company trying to put on twenty-five million different operas—one for each man, woman, and child in the country. Then, if we each follow up our first success with our own equivalent of *The Magic Flute*. . . !!

The sad truth is that the worth of human accomplishments is comparative. It is far from obvious that, if we were all that much brighter

and more adept, we would be that much better off. This is not a neo-Luddite cry against science and technology. I am all in favor of both. It is to suggest that twice as much of a good thing is not necessarily twice as good a thing—whatever elementary economics texts may say.

Perhaps you accept my position about science and technology (category five) but are loath to accept it for the application of morality (category six). After all, if we were all a lot more moral, this would be a much better world. If we felt the same sentiments of love for the Russians (and they for us) as we do for our own family and if we were prepared to take the same amount of effort and to make the same sacrifices for strangers as for friends, then everyone would be better off—those in the West and those in the East.

Heretical though it may sound, I am inclined to think that a world peopled by Mother Teresas would be no better than a world peopled by Mozarts. Morally, the hunger of any one child sets up the same obligations as the hunger of any other child. But could any one of us function if we felt the same pangs and urge to action about every child in Africa as we do about our own children?

I do not want to appear deliberately callous. I am not saying we have no obligations to the starving poor. We do! I am not saying Mother Teresa is not a wonderful model. Of course she is—as was Mozart! I am simply pointing out that, if we all worried equally about every individual, we would have a collective nervous breakdown long before we did any good. It is far better to be able to work on helping a few than to pine after helping all.

In this context, I am reminded how, in the movie *Gandhi*, the Mahatma jokes that his friends say that they cannot afford the expense of keeping him in poverty! This is my point. You can have a saint or two, if the rest of us are "sinners"; but if everyone aspires to sainthood, giving up all to serve the poor, everything falls apart.[4]

So, having run through my six categories, here you have my conclusion—a conclusion which, I must confess, somewhat surprised me at first—that God did not do such a bad job after all! Before we plunge headlong into massive programs of genetic redesign, perhaps we should consider where we stand today. It may just be that it is not such a bad place to stand.

Three Qualifications

I will conclude this discussion by raising three points which may be troubling readers—three points which should be troubling readers!

First, please remember that the whole analysis of this essay has been predicated on science fiction assumptions. We are a very long way from being able to manipulate human genes at will. Moreover, as always in

life, one rarely gets benefits without costs. The human genetic structure—the genotype—is a tightly integrated whole. If you start altering one set of genes, then there will probably be a domino effect, altering other genes (Dobzhansky et al. 1977). Do you really want to be a mathematical genius if it eliminates your sex drive? Analogous comments apply at the physical level. Perhaps it would be nice to have wings and fly like angels, but think of the radical redesign that would be needed. Apart from anything else, we would probably have to learn to sleep on perches.

Second, I freely admit that I have taken a strong biological line on humankind in this essay. I am certainly not a genetic determinist, arguing that everything can be deduced from the units of inheritance. I do argue that we have our feet very much more firmly in biology than many would admit or accept.

What if you disagree with me and argue that humans have, in large part, escaped the realm of biology? What if you argue that, in some sense, humans stand above and apart from biology? The answer surely depends on how much weight you put on the notion of escape. You might argue that many human features (e.g., our notions of causality) are basically environmentally caused, probably through learning, but that the overall sphere of human culture is ultimately of value in the struggle to survive and reproduce. If this is the case, then I doubt that the conclusions of the previous section will be that much changed.

I am quite happy with the view that, instead of causal thinking being "wired" into the brain, humans are susceptible to imprinting and causal notions are impressed upon us at any early age. Which of these claims is correct is an empirical question and not for me to say. The important thing is that such causal thinking has a selective value. If this is so, however caused, my arguments hold.

Alternatively, you might argue that biology is totally irrevelant. One can believe whatever one likes, and biology will have no effect at all. (See, for instance, White 1959.) In this case, my arguments and conclusions seem totally worthless. There are no biological restraints at all on change. I suppose, in this case, you could change humans around at will, given the required technology. I am not quite sure why you would want to, though. Presumably you will not necessarily rely on today's criteria for justification, since these are the very things open to change. At least, whether or not you believe mathematics and morality are objectively true, our belief in their truth is open to change. Since the whole position seems predicated on an obviously false assumption, I shall say no more about it here. If nothing else, in one generation, humans would be a phenomenon of the past. (A Platonist might argue that there is a world of absolute truth, containing mathematics and

morality. Our rational faculty has direct access to this world, and so long as we keep our reason, such access will always be there. But surely, the Platonist and I stand shoulder to shoulder! We both deny that there will be a world beyond mathematics and morality.)

However, in the context of discussion about the biological/non-biological foundations of human nature and culture, there is one comment which needs to be made. Even if you take the strong biological position that I do, this in no way implies that any and all changes you might want to make to the human condition should be genetic. Indeed, almost the opposite seems to be the case. Accept, as I do, that mathematical ability is in part genetic. Accept that some improvement in mathematical ability would not be amiss. It would be ridiculous to plunge straight into genetic redesign. Far better to improve the teaching of mathematics and to rely on more sophisticated machines, specifically computers.

The same considerations should be foremost throughout any discussions about the nature and improvability of humankind. Why bother with wings, when we have airplanes? Why bother with improved eyesight when we have binoculars? Why bother with pheromones when we have learned to do even better through radio, television, and the like? And, why bother with a biologically improved morality when, through the welfare state, we have been able so drastically to improve the lot of so many? In short, however strongly you may be in favor of change, biology should be a last resort.

There is a third and final point that I want to make to my basic conclusions. This centers on a philosopher's worry. I have argued that, all things considered, humans are in pretty good shape. The human plan does not call for drastic redesign. Am I not commiting that worst of all sins, deriving *ought* from *is*? Am I not endorsing a form of evolutionary ethics, arguing that that which has evolved is good because it has evolved? Am I not saying: "Humans evolved. Therefore, they are good. Therefore, they should not be changed"? (Flew 1967; Hudson 1970).

Not at all! At least, not in any vicious sense. For a start, I am certainly not saying the products of evolution are perfect. Who has a good word for smallpox? Not I! Nor am I saying that humans are perfect. I started this essay by pressing the value of eliminating genetic disease; and, within limits, I would allow that healthy humans could stand some genetic fine-tuning. If I could live, reasonably actively, for 150 years, I would jump at the chance.

Second, I certainly accept that I adopt a conservative position by saying: "Do not fiddle with the products of evolution unless there are good reasons." This is not to endorse the evolutionary process as such;

it is simply to say that our present situation works reasonably well. Healthy humans already have the potential for happy, fulfilling lives—mine is! Genetic change needs justification, and I have given reasons to suggest that such justification may not be obtained as readily as one might think. However, if someone could convince me that we would be better off using pheromones rather than eyesight, I would be the first to advocate the switch.

Third, I agree that, in some ultimate sense, our standards do come through evolution (see Murphy 1982). Our notions of true and false and of right and wrong have been caused by the natural selection of random variations. This is not to say that that which has evolved is that which is true or right. It is to say that the only sense of truth or right which we have comes from evolution. Hence, to ask that we think or feel otherwise than we do is to ask for that which cannot be conceived and that which cannot be desired. In the long run, our ideal of perfection has to be human, because human ideals are all we have. Stated theologically, the author of Genesis said we are made in God's image. I really do not see how else God could have made us.

NOTES

1. I say this despite the recent manifesto, designed by Jeremy Rifkin and signed by many clergymen, calling for a stop to all genetic interventions on humankind (Briggs 1983). Failure to avoid the agony of severe genetic disease—if one can—is a gross moral lapse.

2. Some of the strongest supporters of my position would be conventional sex researchers, who have neither philosophical nor biological axes to grind. They point out that those who are most unhappy sexually are those with no firm sense of sexual identity. See Green (1974).

3. Supposedly, this version is equivalent to a second version, making individual rights supreme: "Act so that you treat humanity, whether in your own person or in that of another, always as an end and never as a means only" (Kant 1959, 170).

4. I certainly do not want to defend priestly celibacy, but it is surely the case that Mother Teresa functions as effectively as she does in part because she has no family obligations. You cannot spend all day helping the poor in Calcutta if you have small children at home—nor should you.

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