

## CHALLENGES TO OUR VALUE SYSTEMS IN THE SCIENTIFIC AGE

*by Sanborn C. Brown*

I would like to discuss the challenges to our value systems which are brought about by modern science and technology. In lower animals value systems are automatically structured-in, genetically determined, evolution-derived behavioral instincts which are geared to species survival. Man has developed further than this, and besides behavioral instincts his values are also socially and culturally derived through a heritage transmitted from one generation to another across the ages of his history. Social evolution is just as much geared to survival as is biological evolution, so that man's entire value systems are geared to the survival of man as an animal. Furthermore, all value systems must necessarily be evaluated in terms of their contributions to human survival in the working of the biological as well as the social evolution.

This is not the place to discuss the workings of either biological or social evolution. The details are well known. But I would like to emphasize that the remarkable progress in science and technology in giving us control of man's evolution has presented us with almost overwhelming problems, and we need to develop techniques for handling them. To put what I want to say into a useful operational framework, let me outline what some of these problems are.

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NEW GOALS SUGGESTED BY THE PHYSICAL SCIENCES

First let us look at the near future and use the physical sciences as they affect that future. One of the most significant directions in which the practical application of physical sciences is taking us is toward more and more environmental control. It started with man's early attempt at individual temperature and humidity controls with the invention of clothing. Then he studied the basic principles of mechanics and applied this knowledge to the construction of houses so that he would not be restricted to naturally occurring caves and caverns. He gained knowledge in the field we now call chemistry and applied it to heating his house with fire and controlling his local agricultural environment with fertilizers so that he did not have to move every few generations when he had exhausted the nutrients of the soil. Today we have our local temperature and humidity environment completely under control with our heated and air-conditioned houses and automobiles.

However, we are just beginning to realize that we can greatly enlarge the control of our environment throughout the globe. The painstaking, highly theoretical, and at times abstruse sciences of thermo- and fluid dynamics are finding undreamed technological applications as the geophysics of the atmosphere becomes understood. One of the real excitements of the present age is our first look at the earth from the outside. For all our grumblings about the cost, space research is here to stay, not because satellites can hover nuclear warheads over our heads, or because they can provide convenient communications links, but for a much bigger and long-range reason. Man is after controlling the weather. Our most modern ability, which at the moment is only a glimpse of our earth from the external coordinate system, will develop in the future to a full-scale ability to gather the facts about the weather, and with this fundamental knowledge will come the technological development of weather control. Hand in hand with our control of the weather will come control of the water, so that it will be perfectly possible, and in my opinion probable, that complete climate control will be achieved, certainly in areas of the globe in which man has chosen to flourish. Man will no longer have to work at keeping warm or cool or dry.

Another future development of the physical sciences I like to call the "elimination of onerous activities," by which I mean physically working, moving from place to place, and thinking. Up until now the principal occupation of men has been to use his muscles in the construction of things useful to other men, or to move other men or

materials from place to place. We are fast approaching the perfection of technology where man's muscles can be completely replaced by machines which do these things better than man. From a theoretical point of view, man can accomplish all his physical work and move anywhere on the earth with no more effort than pushing a button or speaking into a microphone. Very soon man will no longer be a necessity on earth as a source of mechanical power.

There is a very interesting problem when one looks into what lies ahead in artificial intelligence. Can we as men devise computers which will do our thinking for us? It is certainly logically and physically possible for a digital computer to do any sort of information processing that men can do. By that technical term "information processing" I mean most of the thinking that we do. A machine learns by being fed information in the form of a code; it can operate on this information to draw conclusions and arrive at solutions which are both novel and inventive. It is not clear at the moment whether machines with artificial intelligence will be able to generalize and philosophize, but from a practical point of view man spends almost none of his thinking time doing either of those things; so it appears as if most of the things man uses his brain for can better be done by machine. Again man will not be needed.

Cybernation is the name given to man's devising of electronic and other artifacts which have certain properties of living systems. Such electronic systems are built to fulfill duties prescribed by the operation of the machine. We are already engaged in devising cybernetic mechanisms that are capable of learning and advancing their own systems in part by their own effort. They can learn to play chess and checkers, at which they can subsequently beat their makers, man. They can reproduce themselves, they can explore for man, and they are already on the probes that are wandering into the far reaches of outer space doing man's exploration for him often better than man can do. It is quite clear that we already have the technological capacity to develop cybernetic systems to carry on most of the work of supporting human life as well as the life of the cybernetic systems themselves.

This means it is theoretically possible that within a relatively few decades we will be able to put almost every man out of his present job, replacing him with a system of cybernetic mechanisms which could leave man so free from productive work for society as to raise the very real question of the value of man's existence. This is somewhat futuristic, but we are already well on our way to replacing man in one area which used to be a human function, namely, memory, a

function that is fulfilled much better by a computer. Also, cybernetic systems in routine functions can now correlate facts much better than man himself. One simple example is this: go to Grand Central Station in New York at nine o'clock in the morning and see millions of people rushing to their offices to send other millions of people pieces of paper to send back. This is what we use men for, and it is much better done even by present machines. All these physical changes raise very real questions about the value of man as an individual in our society.

The decrease of the necessity for man to work in highly technological societies is dramatically illustrated by the history of the decrease in working hours per day. From twelve to fourteen hours a day as little as 100-150 years ago, we have already gotten to four hours a day in some occupations, and some may well go much lower. Man is just no longer useful in these "onerous activities."

Incidentally, the increase in leisure time is such an obvious extrapolation of present trends that those of us worried about the long-range future of science education are already starting to change the emphasis of our teaching away from a career orientation toward man's fulfillment of his much more extensive leisure time. If a man is to spend most of the hours of the day not at work, it seems most unrealistic to educate him for that work and much better to educate him for what he does most of the time — not working.

#### NEW GOALS SUGGESTED BY THE BIOLOGICAL SCIENCES

Hand in hand with the physical sciences and technologies have been developing the biological sciences and their technology, medicine. The ancient religious doctrine of "Be fruitful and multiply" comes into great question under the new environmental circumstances produced by the sciences. Science has altered the restraints that have operated in confining population size by disease and starvation, and has opened the door to possibly better ways of genetic selection than those that have prevailed in the past. Man has been made conscious of his own genetic process and is, so to speak, asked to enter into the conscious devising of better ways of developing the genotype. This is one of the great and radically new conditions which have emerged in the history of evolving life on earth in our time. The great concern of many people arises from our inability to predict the results of our tampering with the evolutionary process that has produced us. The whole reason that the evolutionary process was successful in the past was that the unfit did not survive. We are becoming more and more successful at changing this pattern, and, as we do so, more and more

geneticists are raising the question of whether the human race may not have serious problems due to stopping the process of purifying the genes which evolutionary control has taken millions and millions of years to perfect.

This actually lends urgency to the realization that the intellectual process which has removed one control must now face the vital problem of discovering or inventing some other kind of heredity control.

The deep freeze of human sperm has been demonstrated as a practical working scheme for keeping sperm, as far as our experimental evidence is concerned, forever. One can imagine a sperm bank collecting sperm from particularly desirable men who would make their genes available to particularly desirable females for guiding the evolutionary process of future mankind, breeding attributes which society recognizes as being good. This is a practical scheme. It has been tried in a limited way; we know it works. Man is now made aware that he is responsible for the genetic health and condition of his descendants, and this presents an ethical problem of great magnitude. It is clear that few parents would want to procreate if they knew in advance that there was a high probability that their children would be either sadly distorted or deficient in body or mind. But the solution to this problem is not as simple and obvious as many people have suggested. Many genes which give rise to regrettable deficiencies may at the same time be responsible for other combinations of highly desirable advantages.

Perhaps more pressing at the present time than the problem of quality is the problem of quantity. For example: what is the optimal population size for man? The human cultures of Greece and Rome came into flower with the world population much smaller than that of the United States at the present time. One must raise the question of how many people we need. With the decreasing usefulness of man, a smaller population may be all that is necessary to produce the variations needed for an optimum society. Besides the problem of food and other energy supplies per capita, we must really consider the problem of how much living space on the surface of the earth per capita is optimal for man. With the advances in cybernetics making the need for large numbers of men less important, the central question is what is the optimal size for the fulfillment of human life? Conceivably, and I think I feel this way myself, it should be much lower than our present world population.

Another example is highlighted by an interesting article in *Science* by the biologist Robert Morison, at Cornell, on the value of the

family unit in modern society. He believes it should and will decrease:

The principal reasons for expecting a decline in the prestige of the family may be briefly listed as follows: (1) the family, which is a fine mechanism for transmitting conventional wisdom in a relatively static society, is relatively poor at assimilating and transmitting new knowledge essential to survival in a rapidly moving world. (2) Growing awareness of the population problem and of human genetics weakens the prestige of the family as a basic unit of human reproduction. (3) Increasing knowledge of the plasticity of the human nervous system in early life will encourage further invasion of the home in the name of ensuring equality of opportunity.

Particular interest attaches to the status of what might be called moral wisdom in this rapidly changing world. In earlier times the repositories of knowledge, wisdom, and morals were inextricably intertwined. The high priests of the early riverine societies were the astronomers, the biologists, the philosophers, the lawyers, and the religious leaders, all wrapped into one. To a large extent, scientific and theological knowledge coincided. The rapid growth of scientific knowledge in our own time has resulted in a greater and greater gulf between natural and theoretical knowledge and a considerable decline in interest in the latter. Ethics and morality occupy an uneasy position somewhere in between.

Although it is customary in all ages to throw up one's hands in horror over declines in standards of behavior, the astonishing thing is that the decline in respect for fathers, mothers, and priests as repositories of expert scientific knowledge has not been accompanied by more of a decline in respect for their moral influences. As compared to our views on the nature of matter, the origin of the seasons, the control of the weather, and even on the creation and nature of man himself, our views on private property, murder, rape, and adultery have changed very little since the time of Moses.

Let us turn then to our second point, the impact of biological knowledge on the concept of the family as the unit of human reproduction. No longer can a mother and father take satisfaction in unrestricted reproduction as the straightforward fulfilling of God's injunction to go forth and multiply. The evidence is convincing that, beyond a certain point, reproduction is not a social good but an overwhelming social evil.

Even if a government decides that the average family should consist of 2.5 children, the ultimate social decisions must emerge as the sum of a very large number of individual decisions. The presumption is that families with "good genes," a mother and father skilled in raising children, and sufficient money to sustain a good standard of living but not so much as to spoil or corrupt their children should have more children than families that don't enjoy these advantages. But who is to say what are the good genes or the most suitable child-rearing practices, and who will weigh just the right amount of money?

It is considerations like this that have led some very eminent geneticists to suggest abandoning the concept of the family as the unit of human reproduction in order to follow theoretically more suitable models derived from animal husbandry. Even more dramatic are the possibilities now being conjured up of eliminating defects and producing unimaginable virtues by

*tinkering with the genetic code itself. Even though it seems unlikely that a substantial number of people will shortly abandon classical methods of reproduction for the models derived from animal husbandry or bacterial transformation, it is undeniable that the progress of science is bringing about a growing separation between the phenomena associated with sexual attraction and those involving reproduction per se. Much of the conventional moral apparatus of almost all societies has, however, been based on the assumption of an extremely close tie between these two.*<sup>1</sup>

#### NEW GOALS SUGGESTED FOR SOCIAL EVOLUTION

Let me turn now to some thoughts on how to proceed to devise value systems which will in fact guide our evolution toward greater survival of man. First let me emphasize that I am talking about evolution, not revolution. Evolution uses existing conditions and organisms and changes them. Revolution throws out existing structures and replaces them with others. The whole history of the development of man has demonstrated that the evolutionary process is the stable one, and therefore I believe it is the mechanism that we should be discussing.

I think it is obvious, also, that our problems are sufficiently overwhelming right now that rapidity of the feedback response of social evolution, in contrast with the much lower response of biological evolution, makes it the only practical avenue for accomplishing the required changes at the present time.

The specific organization which centralizes the direction of social evolution is the acceptance of something which could be called the Establishment. The Establishment represents and acts for the will of society, and thereby guides social evolution. The Establishment is plural. In our world right here, it is bifurcated in its simple form into the church and state. Those organized efforts by members of society to construct a more satisfying culture are polarized about and administered by the Establishment. The church has been the unit which provided the focus and catalyst for the religious enterprise. Seen in this perspective, the church is in a much more central position than the general public image supports. It is not just an organization for worship where rituals, myths, and dogmas are enacted and expounded to inspire revitalization and provide meaning and purpose for the life of the individual. Rather, it is the central establishment that provides leadership in a form for mankind to guide its evolutionary direction both socially and biologically.

I am not here using the term "church" in a Christian connotation but simply as a name for the establishment that guides the religious enterprise. One must also realize that since religions are intimately

interwoven with the fabric of the culture in which they arise and grow, there are very many churches performing their necessary guiding functions; these churches can be utterly different in their dogmas and mythologies and still provide the necessary inspiration and goals for the social evolution of the species. Actually, of course, within any culture such as our own, since there is a tremendous variation in intellectual, emotional, and educational aptitudes and susceptibilities, if the church is to provide its guiding function, it must have real and basic meaning to the tremendously wide statistical spread inherent in man as he has evolved. With this in mind, one is led to the unavoidable conclusion that the religious establishment must take many forms to be relevant to such a variety of human temperaments as have resulted from our evolution.

Religion is the place where policy for society is formed. The state, the political organization which is the basis for civil government, is the administrative structure that sets the behavior of mankind in an orderly array. However, religions do not develop without a theology upon which they are based, and it is the theology which must be firmly based on our modern scientific knowledge if it is to be able to cope with the problems of mankind, both at present and in the future.

Three steps are necessary:

1. A theology has to be developed. My own feeling is that the scientific theology is being developed by such groups as make up the Institute on Religion in an Age of Science and that such progress has been made that one can say that at least theoretically we understand what we need to do to develop a scientific theology for modern man.

2. A religious activity needs to be developed that is based on that theology and made viable in modern cultural times. This has not yet been started.

3. The third step is to initiate a state administering religious policy in tune with the modern theology.

To make any progress, two great scientific principles have to be accepted and really acted upon. One is the validity of the principle of cause and effect, and the other is the credibility of evidence. Let me take a single example from the many problems that I have suggested and expand a little upon it: the problem of over-population.

The theoretical part of the Establishment, the church, has persuaded intellectual man of the so-called sanctity of the individual. Every life is worth preserving, and every life should be preserved as long as possible. Having persuaded society that this is good for the



evolution of mankind, the administrative section of the Establishment, the state, enacted laws against sterilization, against birth control, against abortion, against euthanasia, and reserved for itself the right of murder. The effect was not only overpopulation but a degradation of our gene pool and the protection of a large fraction of useless people. The evidence is clear that all men are not created equal, that in terms of good evolutionary planning the concept that every life should be inviolate is false. Furthermore, the cause and effect of overpopulation can be clearly understood in terms of the manipulation of the Establishment.

The data have certainly been collected, and yet we recoil from acting by questioning the principle of cause and effect, and try to discount the credibility of the evidence. As a matter of fact, I chose the particular problem of overpopulation as an example because it demonstrates another facet of the social-evolutionary process. The social-evolutionary process evolves itself. It is not static; it changes as a result of its own operation. "Be fruitful and multiply" was an important positive value when the number of humans was small and man's control over the environment was almost negligible. Man's constant danger of being annihilated decreased as his numbers on earth increased, and the validity of that social value became less positive. Now its social value is negative.

What makes it so terribly painful for us right now is that our deeply ingrained moral values have been inculcated into our thinking for thousands of years by social evolution based on the evidence of too few human beings. Now to accept the evidence of too many, to develop a new value system so different from the old, faces us with an almost overwhelming hurdle. But these are the hurdles we must get over if we are to develop a modern system of values based on modern, not ancient, value systems. There is a danger that the political structure may dictate a policy based on modern technology that will take into its own hands these kinds of value judgments. The state may take on selective breeding, it may do the various other kinds of things I have been suggesting, in a way which we as individuals would not think advantageous to the human race. There is the danger that a religion based on theology in tune with scientific knowledge will not develop soon enough to guide man's future development in the direction we as individuals would define as good.

I do believe that eventually it will come. The evolutionary process seems to be statistically valid even for this kind of development. But I hope that people can see the problems clearly enough to start quickly the development of religion toward an understanding of the

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operation of society based on knowledge of the world about us. A religion based on this new theology can truly help man find his place in the universe, can truly help find valid goals for man within the framework of the natural forces that control his destiny.

### NOTE

1. Robert S. Morison, "Where Is Biology Taking Us?" *Science* 155 (1967): 429 - 33.