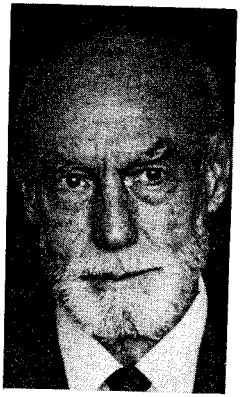
SCIENCE, VALUES, AND SURVIVAL



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Summary

In the context of today's mounting global problems, the relative demand for medical, educational, and related social benefits that derive from the neurosciences is diminished. At the same time the human value spin-offs of brain research and related sciences are thrust into a strategic position of top concern because of their key

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role as criteria for policy priorities and decision-making guidelines. Recent conceptual developments in the mind-brain sciences rejecting reductionism and mechanistic determinism on the one side and dualisms on the other clear the way for a rational, realistic approach to the theory and prescription of values and to a natural fusion of science with ethics and religion. Science can be upheld as the best route to an increased understanding and rapport with the forces that made and move the universe and created humanity. The outlines for a global ethic emerge that include reverent respect for nature and the evolving quality of the biosphere, which, if implemented, would set in motion the kind of social change needed to lead us out of the vicious spirals of increasing population, pollution, poverty, energy demands, and so on. The strategic importance of neuroscience and the central role of prevailing concepts of the mind-brain relation to all of the foregoing remain evident throughout, as does also the direct relevance of efforts to bring added insight and substantiation of these mind-brain concepts through further advances in brain research.

INTRODUCTION

We used to say that there are two kinds of scientists: those fired up by a problem and searching for methods to get the answers, and those highly trained in some method who are searching about for some amenable problems. While most of us line up somewhere between these extremes, there is much to be said, at least in principle, for giving preference where possible to problem priorities over methodology. What follows is, above all, problem-oriented and attuned throughout to the query, "What difference does it make?—especially ten, twenty, or more years from now?"

Reduced funding of science, even where a major application to current quality-of-life problems is obvious, reflects real changes in social priorities and in society's collective judgment of the importance of science and what it contributes. We read in *Science* (Sawhill, 1979) of the "public disillusionment" and "today's more jaundiced view" of science and that "faith in the beneficence of scientific endeavor and the promise of technology has been steadily eroding."

An underlying cause for these changes can be seen in the new and growing recognition of mounting global, so-called "crisis" problems that science is alleged to have helped to create and that

promptly raise a host of moral issues and value conflicts for which, again, science, it is held, does not provide answers.

Futurists and common logic concur that a substantial change, worldwide, in lifestyle and moral guidelines will soon become an absolute necessity. On a planet of finite resources, the laws and mores of a freely increasing population must eventually be replaced by those of a regulated population, and the sooner this inevitable shift occurs, the better for the residual quality of the biosphere. In brief, it becomes increasingly evident that the prime, urgent need of our times is not for more science and improved technology, medical or otherwise, but for some new ethical policies and moral guidelines to live and govern by.

Once this conclusion is perceived, the common tendency is to bypass science to look elsewhere for answers. Problems that resolve to basic issues in ethics and morality are traditionally supposed to be beyond science. It is argued that science which describes facts cannot be used to prescribe values. Prevailing doctrine in modern philosophy asserts that it is logically impossible to derive values from a set of scientific facts, or to infer what ought to be from what is. In view of the collective effect of various considerations of this kind, it is hardly surprising that public faith in the promise of science and technology "has been steadily eroding."

A DIFFERENT APPROACH

In what follows I try to defend a position directly counter to the above, which would, in effect, not only restore to science any loss in public favor, but would go further to give science, and the scientific endeavor generally, a new public image and a higher societal role of top priority. On the proposed terms, science becomes the prime hope for escape from the vicious spirals of advancing civilization, but for other reasons. A different approach to the public support and role of science is suggested in which science is upheld, not because it begets improved technology, but because of its unmatched potential for the shaping of ethical values. In the world view perspectives and truths of science we will find the best key to valid moral guidelines. The arguments are adapted to today's priorities and grow stronger, not weaker, as current

in addition are complicated by social value problems for which science is apparently unable to provide answers. When the quality and even survival of civilized society is threatened, what difference does it make to Congress or the public whether we find some new nerve connections in the brain, some new transmitters or receptors, and so on? Even the ever-strong humanitarian appeal of medical advancements that might eventually save hundreds of thousands of lives does not fully escape the new unspoken perspective of a world already afflicted with population imbalances in the hundreds of millions. The overwhelming priority of the growing demands of today's "global crisis" problems was already perceived in the late 1960s (Platt, 1969) to be of sufficient magnitude and urgency to warrant mustering the scientific community in an all-out crash attack with the implication that to continue the practice of "science as usual" is morally indefensible.

Although little has happened in the interim to reduce the specter of global breakdowns, it seems that considerable has happened to discourage public feeling that science and improved

global conditions worsen. Even basic "pure" research and the practice of "science as usual" emerge on the proposed terms with a heightened social and moral approval.

The usual appeal to medical, educational, technological, and other direct benefits is bypassed and our bets are placed instead on certain less obvious human value implications that stem from brain research. Particularly relevant are recent changes in concepts relating to the human mind, the nature of the conscious self, freedom of choice, causal determinacy, and to the fundamental relation of mind to matter and to brain mechanism. Some of humankind's most enduring concerns are involved; i.e., whether consciousness is mortal or immortal, cosmic or brain-bound, or reincarnate, and the like. It is in terms of the humanistic implications along these and related lines that neuroscience has always had its special interest and greatest meaning. Ideologies, philosophies, religious doctrines, world-models, value systems, and the like will stand or fall depending on the kinds of answers that brain research eventually reveals. It all comes together in

only, visible hope for future generations. The supporting arguments have already been expounded in some detail elsewhere and may be found in the original articles cited and their references (Sperry, 1965, 1969, 1972, 1977, 1980). Rather than assume prior knowledge or laboriously restate the reasoning in different words, it is more expedient for present purposes simply to list below some of the principal postulates, propositions, observations, and inferences as excerpted with minor changes from the previous accounts. Because the subject matter ranges somewhat afield from neuroscience, overlap and redundancy are risked rather than the reverse. Some attempt at logical ordering is maintained, but the cross logistics mount rapidly, and a quick grasp of the whole may be found preferable to a logical sequential approach.

COLLECTIVE POSTULATES AND PROPOSITIONS

Subjective Values in Objective Perspective

• In addition to their commonly recognized significance from a personal, religious, or philosophic standpoint, human values can also be viewed objectively in causal control terms as universal determinants in all human decision making. All decisions boil down to a choice among alternatives of what is most valued, and are determined by the particular value system that prevails.

• Human values, viewed in objective, scientific perspective, stand out as the most strategically powerful causal control force now shaping world events. More than any other causal system with which science now concerns itself, it is variables in human value systems that will determine the future.

• Any given brain will respond differently to the same input and will tend to process the same information into quite diverse behavioral channels depending on its particular system of value priorities. In short, what an individual or a society values determines largely what it does.

• As a social problem, human values can be rated above the more tangible global concerns such as those of poverty, pollution, energy, and overpopulation on the ground that these more concrete problems are all human-made and are largely products of human values. Further, they are not correctable on any long-term

in accordance with the conceived ultimate purpose of life as a whole. This latter will logically imply at the same time an associated world view or universe scheme that is consistent.

• Because of the hierarchic structure of values the search for improved ethical guidelines can be narrowed to the search for what ought to be most valued. This in turn leads to problems of the highest determinants of value priorities—the "life goal," "world model" concepts and beliefs that lie at the heart of the problem of moral judgment and logically condition the value structure at all levels.

• Societal values, especially of the kind people disagree on, are always dependent upon, and relative to, some general frame of reference containing the premises, beliefs, presuppositions, and such on which the reasoning about priorities rests. The question may be raised, "What makes one reference frame superior or supersedent to another?" and then, "Is there some ultimate frame of reference for values that could logically and rightly be accepted and respected by all countries, cultures, governments, and creeds, and by humanity in general, as the final supreme standard when it comes to judging ethical priorities, resolving value conflicts, and as a guideline for human judgment generally and international decision making in particular?" The practical need for some such unifying global standard becomes more and more evident for things such as world population control, conserving world resources, protecting the oceans and atmosphere, and for various other modern world problems that increasingly require united effort on a global scale.

• What is needed ideally to make decisions involving value judgments is a consensus on some supreme comprehension and interpretation of the universe and the place and role within it of humans and the life experience.

Dependence on Mind-Brain Concepts

• Beliefs concerning the ultimate purpose and meaning of life and the accompanying world view perspectives that mold beliefs of right and wrong are critically dependent, directly or by implication, on concepts regarding the conscious self and the mind-brain relation and the kinds of life goals and cosmic views that these allow. Directly and indirectly social values depend, for example,

basis without effecting adaptive changes in the underlying human values involved.

• The human value factor in biospheric controls stands out as the primary underlying root cause of most of today's difficulties. The more strategic way to remedy mounting adverse global conditions is to go after the social value priorities directly in advance, rather than waiting for human values to change in response to changing external conditions. Otherwise, we are doomed to live always on the margins of intolerability, for it is not until things begin to get intolerable that the voting majority gets around to changing its established values.

• Recent developments in the mind-brain sciences eliminate the traditional dichotomy between science and values and support a revised philosophy in which modern science becomes the most effective and reliable means available for determining valid criteria for moral value and meaning.

on whether consciousness is believed to be mortal, immortal, reincarnate, or cosmic, and whether consciousness is conceived to be localized and brain-bound or essentially universal.

• Recent developments in mind-brain theory revise the ultimate criteria and our ultimate frame of reference for determining value priorities. Problems of values, ethics, and morality (questions, i.e., of what is good, right, and ethically true and of what ought to be) become, in these revised terms, something to which science, in the most profound sense, can contribute fundamentally and in which science should be actively and responsibly involved.

• Current concepts of the mind-brain relation involve a direct break with the long-established materialist and behaviorist doctrine that has dominated neuroscience for many decades. Instead of renouncing or ignoring consciousness, the new interpretation gives full recognition to the primacy of inner conscious awareness as a causal reality.

THE KEY TO QUALITY SURVIVAL

Implicit in the foregoing is the conclusion that our top social priority today is to effect a change worldwide in humanity's sense of value. This translates by hierarchic value theory into a change in what is held most sacred. What is needed, more specifically, is a new ethic, ideology, or theology that will make it sacrilegious to deplete natural resources, to pollute the environment, to overpopulate, to erase or degrade other species, or to otherwise destroy or defile the evolving quality of the biosphere. This is exactly what is found to emerge from our current approach to the theory and prescription of human values. Relying on the kind of truth supported by science we arrive at an ethic that promotes an ultimate respect for nature and its creative principles, including those of its peak thrust into the highest reaches of the human mind, along with corollary value criteria which, if applied worldwide, would promptly set in motion the kinds of corrective legislation and other trends and pressures that are needed to remedy looming global disaster conditions.

On the terms proposed the utility of science takes a different form. Society would look to science not only for new technology and objective knowledge but, more importantly, for the criteria of ultimate value and meaning. Each advance of science brings increased comprehension and appreciation of the nature, meaning, and wonder of the creative forces that move the cosmos and produced human beings. Even "science as usual" gains, in this context, a heightened social significance and moral support. The special, key role of neuroscience and brain research will be readily apparent.

It remains to further stress a point already implied, namely, that for science to qualify fully and function effectively in this changed role, it will be necessary that we abandon an entire mode of scientific thinking long referred to under the general rubric of "scientific materialism." Moves to abide by the truths of science, as opposed to unproven claims from other sources, have had sporadic support since Francis Bacon. What is new today is the shift in science from reductive physicalism to a holist-mentalist paradigm and the changed interpretations and perspectives that this brings. Among traditional views that consequently require correction is that predicating the impotence of science in regard

properties of all entities are conceived to be just as real and causally potent as those of their components. This preservation of the qualitative value and pluralistic richness of physical reality stands counter to the common tendency to correlate science with reductionism.

Toward the Prescription of Values

- Instead of separating science from values, the current interpretation leads to a stand in which science becomes the best source, method, and authority for determining the ultimate criteria of moral value and those ultimate ethical axioms and guideline beliefs to live and govern by.
- The classic *fact-value* and *is-sought* dichotomies of philosophy logically dissolve in the context of cerebral processing. The operations of the brain are already by nature richly replete with established values and value determinants, both inherent and acquired, with the result that incoming facts regularly interact with and shape values. The resultant value system, along with conceptions of what ought to be, is determined in large part by the factual input.
- Changing to an ethic based in science would entail in large part a substitution of the natural cosmos of science for the different mythological, intuitive, mystical, or "other-worldly" frames of reference by which people have variously tried to live and find meaning. The aim is not to eliminate value controversy and differences of opinion but only to bring these into a domain set by an agreed-upon frame of reference supported by science—not with the idea that scientific truth is absolute or beyond question, but only with a conviction that it does represent the best and most reliable, credible, and dependable approach to truth available.
- Once science modifies its traditional materialist-behaviorist stance and begins to accept in theory and to encompass in principle within its causal domain the whole world of inner, conscious, subjective experience (the world of the humanities), then the very nature of science itself is changed. The change is not in the basic methodology or procedures, of course, but in the scope and content of science and in its limitations, in its relation to the humanities, and in its role as a cultural, intellectual, and moral

force. The kinds of interpretations that science supports, the world picture and attendant value perspectives and priorities, and the concepts of physical reality that derive from science all undergo substantial revisions on these new terms. The change is away from the mechanistic, deterministic, and reductionistic doctrines of pre-1965 science to the more humanistic interpretations of the 1970s. Our current views are more mentalistic, holistic, and subjectivist. They give more freedom in that they reduce the restrictions of mechanistic determinism, and they are more rich in value and meaning.

- Accepting as self-evident the ultimate value of what humanity generally has held most sacred—namely, the cosmic forces that made, move, and control the universe and created humanity—and interpreting these in accordance with science, one emerges with a value system that includes a strong reverence for nature promoting the values of the recycle philosophy, population, regulation, protecting and enhancing environmental quality, and the like.
- In the eyes of science, to put it simply, our creator becomes the vast interwoven fabric of all evolving nature, a tremendously

to value judgments along with much of the doctrine associated with reductive mechanistic determinism that for many decades has characterized science and our scientific outlook. This was the thinking of Karl Marx and is the reason that the more materialistic and animalistic aspects of human nature are put first in Soviet philosophy before humanity's more idealistic, more spiritual components. The issues at stake are not minor. They involve not only the public image of science, the relation of science to human values, and the kinds of values science upholds, but also some of our more basic concepts in science concerning physical reality, mind and matter, and the nature of causation.

CAUSAL DETERMINISM: THE CENTRAL ISSUE

The issues narrow to opposed views of causation that are basic and central to everything stated thus far. One view holds that the causal forces and laws operating in nature are fully explainable in purely physical terms and are, in principle, ultimately accountable on the basis of quantum theory, the elemental forces

subsidiary components. In this view the fundamental forces of physics are only building blocks used in creating bigger, more competent entities and forces. The patterning of the building components, (i.e., their arrangement in space and time) becomes a distinctive key factor in making things what they are, and is not determined solely by the properties of the parts themselves.

To attempt to explain an entity in terms of its parts and then the parts in terms of their parts and so on, results in an infinite regress in which one is left at the end trying to explain everything in terms of next-to-nothing. At each step of the way critical pattern components of causality are lost and the explanation becomes less and less complete at each lower level.

When a new entity is created the new properties of the entity, or system as a whole, thereafter overpower the causal forces of the component entities at all the successively lower levels in the multinested hierarchies of the new infrastructure. In other words, whenever an entity joins forces with others to form a new whole, the position that it is forced to take in the universe and its subsequent course through time and space and its eventual fate are thereafter determined more conspicuously by the new properties of the system as a whole than by its own original properties. A degree of self-determinacy is lost to the parts as soon as the higher powers of the new whole become superimposed. Although the causal forces at the lower quantal, atomic, molecular levels in the infrastructure continue to operate in full force as usual they are enveloped, encompassed, overwhelmed, superseded, supervened, and outclassed by the new causal properties that emerge in the whole. Evolution, in the course of compounding new compounds, continuously adds new entities and new phenomena that embody new qualities, new causal forces, and principles with new scientific laws and control properties.

The new emergent phenomena, not reducible, in principle, to their parts and deserving to be recognized as causal realities in their own right, are in many respects more powerful and dominant features of reality than are the lower properties of the components. Instead of a universe completely controlled by quantum mechanics and the basic forces of physics, science presents, by this interpretation, a universe controlled by a rich profusion of qualitatively diverse emergent powers that become increasingly complex and competent. Any randomness, chance, caprice, or chaos

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