

changes of innovation, clear thinking, and human creativity. As Max Weber argues with such insight, the rise of the spirit of capitalism came about in Calvinist Germany following the Protestant Reformation, which restored the direct link between individual man and God. (Through faith and work, individuals could obtain salvation through God's efficacious grace. This ethic was in opposition to the previous ethic of traditionalism - the acceptance of the institutions fixed through the link between man and God. Protestantism was a secular (self-denying), non-rationalistic individualism, through their own efforts, obtain salvation; and rationalism (the meaning of the universe was understandable; purposive action could be taken, as opposed to the previous belief in the magical, the mysterious, and the traditional institution of the collectivity.)

Weber asserts that it was precisely this Protestant ethic which set off as the underlying spirit of capitalism and industrial development. In more simple language, it meant that individuals did the work that was before them; they did their job. Such was the highest form of human endeavor. If man worked at the task before them and lived a self-denying, conscientious life, they maximized their chances of going to heaven at the same time as they worked for the good of their culture. Thus the ethic was essentially this-worldly - involving a contradiction between the religious and the secular - as opposed to almost every other major religion which involves a separation between the world and the next - between actions taken for personal material benefit and actions taken for spiritual benefit.

Combine this new Protestant ethic with the Smithian view of the ultimate collective benefits of individual economic action and one can begin to see both the power and the comfort of the new view of economic-technological behavior. Life was so simple. All we had to do was look out for our own interests and everything which we wanted in both this world and the next would result. All we had to do everyday was our job, and play ahead doing our duty to God, skill, and country, and we would advance science, art, and wealth simultaneously. Such was the dominant ethic of progress - individualistic and self-enclosed, based on the efficacy of technological advances.

Of course conditions have changed radically since the beginning of the industrial revolution. But what changes affect this underlying faith in individualism and scientism? The first is scientism - the religious belief in the efficacy of science and technology to solve problems, advance mankind, and bring "progress." There is of course much evidence to support this view, but for most of us it has a very large affective or emotional component as well. Scientism is the belief that technological development is efficacious and beneficial.

The second fundamental tenet of the spirit of Western individualism is individualism, the belief that cultural and technological advancement takes place most rapidly and beneficially when members of the culture work individually and independently. This type of activity maximizes the

MORE BASIC CONSIDERATIONS

The unarticulated power given mankind by a science-based technology places him in a race between (1) progress and (2) stagnation.

Carl M. Madsen, Chief, Research and Development, U.S. Chamber of Commerce

[System simulations] give indications that suggest corrective action will often be ineffective or even adverse in results. . . . Choosing an ineffective or detrimental policy for coping with a complex system is not a mere matter of random choice. The intuitive process will select the wrong solution more often than not.

John Forrester, Massachusetts Institute of Technology, Cambridge, Mass. What is needed, but lacking, is a set of procedures to enable consideration of social utility and of scientific merit to be factored into both the design of institutions and the process of public policy.

Carl Madsen

Underlying the concern with pollution, ghetto slums, unsafe automobiles, and robot assembly-line workmen is a much more general loss of faith. Somehow what was good and holy - the work ethic, the efficacy of technology to solve social problems - is no longer to be unquestionably revered. It is a rude awakening to many that the form of technology has not worked its magic. This is in its deepest sense not a crisis of economic values at all - it is a religious crisis. Beliefs which have been deeply held and cherished are being smashed by our nation's technological youth. Our condition is not only one of confusion and malaise, it is one of anguish.

What is the nature of this religious questioning? What are the old values? What are the new ones being recommended to take their place? What changes in belief are called for, and why? Are there conditions which mandate change at this deeply personal level? We should begin to approach this confusing and emotionally charged area of concern (1) with a language with which we can name intellectual concepts and communicate with one another with less chance of misinterpretation; and (2) from an historical perspective in order to view the present situation in its appropriate chronological context.

We think the current scepticism of our industrial system felt by much of the youth of the country and by many of the more thoughtful members of the "establishment," finds its focus in two basic tenets of the industrial-technological spirit. The first is scientism - the religious belief in the efficacy of science and technology to solve problems, advance mankind, and bring "progress." There is of course much evidence to support this view, but for most of us it has a very large affective or emotional component as well. Scientism is the belief that technological development is efficacious and beneficial.

The second fundamental tenet of the spirit of Western individualism is individualism, the belief that cultural and technological advancement takes place most rapidly and beneficially when members of the culture work individually and independently. This type of activity maximizes the

enough simply to understand that the Smithian Unseen Hand can no longer be trusted. The interdependence of each component of the system is extremely difficult to isolate and comprehend. It is not at all clear what actions will in fact have beneficial consequences to the collectivity.

Some of these feedback processes are, of course, obvious. If Con Edison pours pollutants into the Hudson River, the citizens along the river suffer. They suffer in a way which is not considered by the industry in the individual calculus of profit and loss figures. This is an important point and one which must be considered seriously by all of us interested in public policy, guarding the public welfare, and enhancing the quality of life. However, the situation in our complex and interdependent world is far more subtle, and the assumptions of scientism and individualism must be questioned for different reasons than simply to avoid negative externalities. Consider the following example of purposive action - that is, action which appears to be rational (remember the rationalism of the Protestant ethic), appears to be taken to achieve a desired result. A town seeks to have the congestion of a road relieved. Accordingly, they widen the road to allow the freer passage of automobiles. However, since the road is now more attractive, more drivers choose to travel the road, and it becomes more congested than before.

This example of counterintuitive negative feedback describes many aspects of our current technological situation. As Jay Forrester is struggling to point out to policy-makers who still believe in their myopic intuition, building low-cost housing in the cities makes the situation worse, not better, since it makes the inner city relatively more attractive for precisely those people who suffer most from being in the city.

The same process of negative feedback can be seen in many other areas of public policy. The Medicaid and Medicare programs increased the ability of the poor to pay for health care. The response of the health industries (doctors, drug manufacturing industries, drug stores, etc.) was to raise the price of health care according to what the market would bear (as any student of the market system would tell you they would). Our foreign aid program sought to raise the health standards of underdeveloped countries by providing medicine to lower the infant mortality rate. Lowering the infant mortality rate increases the population, placing more demands on the health service facilities and thus lowers the standards of health care.

What Forrester says about interaction within a system is vitally important and compels us to rethink some of our most basic (and seemingly most obvious) philosophic assumptions about the efficacy of thought, purposive action, and the application of technology to problems. His statement quoted in the preceding section is revolutionary in the history of knowledge.

Let us try to tie together some of the strands of our argument which may appear somewhat bedraggled by now. Our society is in a situation of deep religious and philosophic significance. We are not convinced of this significance by listening to hippies or to Charles Reich or to R. D. Laing, although each sees something of the transitional nature of

our times. Rather, the peculiarity of our predicament can be seen in its historical perspective from the understanding of its religious-philosophic significance - in other words, from an understanding of the relationship between the economic system and the ethical and epistemological tenets which serve as its grounding in the broader-meaning system of man. From the time of the Reformation through the Industrial Revolution to our present time there was a fit between the personality structure and the cultural institutions of economic actors. By this we mean that the personal-meaning system and motivations of individuals matched the incentives of the economic-technical system. Personal needs for meaning (religious as well as secular) were satisfied by the interaction of the economic and religious systems. Such was the relation of the Protestant ethic and the spirit of capitalism in Weber's sense. Individuals took efficacious action by doing their job, by being innovative, and by being self-aggrandizing, both in terms of personal meaning and in terms of the economic system. Concepts such as "achievement" and "progress" had definite and personally salient meaning. Problems were intrinsically solvable; to solve them simply took time, effort, and ingenuity. Life could grow better from day to day through work. And the evidence through feedback was that these people were right - technological advancement was fantastic in its pace and consequence. The standard of living rose more rapidly than at any other time in history. Transportation systems were built, and the system of interchangeable parts was developed, providing the technique for mass production. Wars were fought and won, and a depression was overcome through suffering and hard work.

These values which fit so neatly into the economic system are not called into question today simply because we have reached a technological plateau. The post-industrial society is not defined in terms of its relative affluence and the need for finding meaningful nonwork. Students today are not sceptical and iconoclastic simply because they are spoiled and mobile and do not feel the compulsion to work to support themselves. The economic system is not to be criticized simply because it results in negative diseconomies. Rather, these values are called into negative question because they are in fact no longer appropriate. What has been called into question is the fundamental belief that you can work at something (in the small) and accomplish what you set out to accomplish (in the large).

This doubt, which can lead to anguish at a very deep personal level, comes about because of two phenomena which are taking place simultaneously - the first in terms of cultural values, the second in terms of knowledge and action. The first phenomenon is the questioning of the personal rewards from the capitalist system. The result of achievement and material acquisition was supposed to be happiness and satisfaction. Well, here we are. Are we really happier because we are richer, or are meaning and satisfaction to be found in some other facet of human endeavor? This is one kind of questioning brought about by our technological progress. It involves the relation of action to value and meaning.

another and if they constantly sought their own advancement and not that of the country. It is a system in many ways based on mistrust, jealousy, and self-interest. Such is the vision of social engineers. And not because man is, in fact, untrustworthy and self-interested and unpersuaded by moral arguments, but because he must be treated as such in order to guarantee that the system will work. It must be assumed, to return to the example used by Rousseau, that each member of the hunting party will, in fact, chase after the hare even if he has promised not to do so. Because if there is no punishment, it will, in fact, be in his interest to do so and this will be recognized by the one or two self-interested men in the group. Thus, the argument about the real moral nature of man is irrelevant since, in order to guarantee that the system will work, man must be treated in any system as if he is self-interested.

Those of you whose role is social engineering in terms of policy formulation are advised to look to the manipulation of incentives rather than exhortation in order to encourage social responsibility. As members of the profession of engineering, however, it seems to me that your responsibility is quite different. The question here to be considered is: what role does engineering play in our transitional condition of action-value and action-knowledge? It appears that the current anxious situation finds its primary focus on this profession more than on any other. It is precisely because of the two aspects of the questioning of the Western industrial ethic that engineering must redefine itself. It is no longer enough for you to say that you are what you do, that, because you do technology, you are engineers. But to what end? If technology is really to be seen as a means to an end, should not the inventors of that technology understand the relation between means and ends? Is that not what engineering is about—the application of technology as a means to achieve some desired end? Therefore, the vision of the engineer cannot simply be confined to that problem which appears before him or which is thrust before him. Consider the example of the highway congestion. The responsibility of the engineer, it seems, is to explain to the policy-makers that widening the highway will bring about more congestion, not less. That is his job, since he understands the relationship between means and ends, and understands how to make the consequences of his action be in the direction of the ends he wishes to realize.

That is to say, engineers cannot simply be problem-solvers in the small (i.e., widening the highway). They must be problem-solvers in the large (relieving congestion). They must set themselves the task of understanding the nature of the interdependencies and feedback loops within the system with which they are dealing and be able to take intelligent responsible action. No one else can perform this role. All the other actors in the system—politicians, businessmen, consumers, etc.—are interested in solutions to problems in the small. There is no incentive for them to be concerned with problems in the large. As Russel Ackoff of the University of Pennsylvania states:

In a real sense, problems do not exist. They are abstractions from real problems. The real situations from which

they are abstracted are messes. A mess is a system of interacting problems. Planning should be concerned with messes. Not problems.

The solution to a mess is not equal to the sum of the solutions to its parts. The solution to its parts should be derived from a solution to the whole: not vice versa. Science has provided powerful methods, techniques, and tools for solving problems, but it has provided little help in solving messes. . . . The question of priorities is misleading. All messes should be dealt with simultaneously and interactively.

Engineers, then, are not gadgeteers; they are consequence experts; they study and practice the control of consequences in a complex, interactive system. This task may be very simple in a simple system such as the design of an electric circuit, or very complex and subtle such as relieving some of the problems of the inner city. But the essential role is the same: the understanding and manipulation of the consequences of a certain set of actions in order to achieve a desired end. An engineer is a designer and a means expert.

There are many other issues which are vital in understanding the nature of the relationship between technology and human values. This paper is intended to provide an intellectual basis upon which to pursue such a discussion and to provide a conceptual framework within which the issues may be productively considered. It is clear that something is going on in our culture; we are in an important period of transition. Old values no longer seem appropriate. The efficacy of the capitalist system, the political system, and even of thought itself has been called into question. With a haranguing irreverent son around it is easy to feel guilty and without direction. We hope that we have been able to clear away some of the brambles which tear at your skin on this ethical journey, and to point out some of the trails along the way.

SOME THOUGHTS FROM SUBSEQUENT REREADING AND DISCUSSION

1) The use of the term "scientism" may be confusing, since it sometimes refers only to the application of the scientific method rather than to some quasi-religious belief in its ultimate efficacy. The two concepts should be kept distinct, since it is certainly possible to apply the scientific method to problems without having that method determine one's world view. That may very well be a likely tendency, however.

2) Related to the dual difficulties of looking at a problem only in the small and adopting a technique (means) as a religious world view (end), is the phenomenon of role identification. That is, many people in our society identify themselves emotionally and philosophically with their job or their role in the culture. Often, the first question asked of you when someone is first introduced to you is "What do you do?", as if what you do were related in some deep and determining sense to what you are as a person. Note how closely this cultural phenomenon is related to the ethical myopia of "I just do my job" (knowledge-value) and working at problems only in the small (knowledge-action).

The second phenomenon involves the relation between faith and knowledge. The system interacts through feedback of our society, the new so important and complex that they must be dealt with in an entirely new way. We cannot simply apply ourselves to a problem, based upon the faith that our working in it will somehow alleviate the difficulty. Our former policy and our urban policy, to name only two of the more obvious areas of public policy, have suffered because of precisely this type of myopic vision. Supporting a country militarily with the hope of making it more likely to become democratic is perhaps more often than not counterproductive, since the country becomes increasingly dependent upon the support, hence less capable of providing for itself, hence less capable of governing itself. To use a previous example, building low-cost housing can only serve to increase the congestion of the center city by making it more attractive to investors.

What is needed in response to the dual problems of action-value and action-knowledge is a different vision of the role of technology in our society. In the past, technological development was seen as an end in itself, a value to be pursued per se. It seemed obvious on the fact of it that that progress meant progress—i.e., technical advancement in the small meant progress in the large in terms of an increase in the quality of human life. We have tried to show that both view of that belief—the religious-personal and the scientific—are being subjected to the most basic skepticism because our condition in this complex, interdependent, affluent, and baffling society warrants it. Working at it, applying our technological know-how, does not necessarily get us closer to what we want to do.

Technology should be seen as a means which can be utilized to achieve the values independent of technology that we decide we wish to realize. To take an action-knowledge example, if we wish to relieve the congestion on the town highway, the problem must be re-explained as exactly that—the abatement of congestion on the highway. The task is not as so many engineers would intuitively assert, to build a better highway. The answer to the congestion problem might be found in a quite different component of the interactive system (i.e., alternate work hours, building a rapid transit system, or digging out holes in the road). Or to take an action-value perspective, it must be recognized that the enterprise of technology is only a means to personal happiness and satisfaction which may or may not come as a result. The endeavor itself should not be confused with those human values which it seeks to realize. Expanding your division of General Motors is not good in itself, it is good only if it provides some good as a consequence (wives have more time to spend with their husbands because they have a second car, your expanded plant hires several currently-unemployed laborers, etc.).

If technology is seen simply as a means, not as an end in itself, and not good or bad in itself, what is the responsibility of engineers whose job it is to develop and apply technology? What are your responsibilities as a citizen, as a member of a profession, as a member of a firm, and as a human being to see that your technology has beneficial

consequences? Do your actions make a difference? These questions are both serious and difficult, and should be discussed in such a short paper. We would counsel you to consider several perspectives on the problem, especially studying some new light on some of them. The first view we would like to consider is that proposed by David Rockefeller and many others both in your and in our country: the social responsibility of business. Rockefeller argues that businessmen are a part of the community; they take actions which have profound effects upon that community, and therefore have a responsibility to contribute to the solution of the social problems of that community. Although we applaud the sentiment, we think this view involves a fundamental confusion concerning the role of business in our society. Businessmen and businessmen have no such social responsibility. That is, there is nothing in the role of business which gives them that responsibility for the alleviation of social problems. It may be that as citizens of our society the members of business sectors may see some of the detrimental consequences of their behavior and some of the possibilities for beneficial action, and may take constructive action as a result of this vision, but they are acting as citizens, not as businessmen.

More important, however, we should look at the motivational base of this approach. Businessmen should respond, argues Rockefeller, because they have the argument morally persuasive. It is possible that they will respond to this exhortation and be convinced, but there is no guarantee that they will. Here we return to the world distinction made at the beginning of this paper. We first distinguished between two strategies for reform: propaganda and active manipulation. Second, we showed that these two strategies were based upon differing views of the nature of man: the first assuming that man is changeable in that motivation, that they can be convinced of the wisdom of their action and will take steps to change their behavior for moral reasons; the second assuming that man does not to further their self-interest and accordingly, it is those interests which they must be convinced to change.

What is the answer? How can you encourage the use of technology to understand and be responsible for its consequences? The answer we think depends upon your role in the society. As a citizen you should join Rockefeller in his exhortation, seeking to be an engaged and persuasive as you can to convince members of the business community to become socially responsible. As a policy-maker, however, your role is entirely different. In this role you are a social engineer who must understand and adjust a complex social-economic system and make certain realistic assumptions about human behavior in order to be effective. That is, the policy-maker cannot rely on faith in the goodness of the human spirit to realize his objectives in terms of changes of behavior. Laws must be passed which make it in the self-interest of those to whom the law applies to adhere to what that vision is.

The founding fathers understood this principle. With founding vision and genius they constructed a system which would work even if the members did not first see

3) One example of a counterintuitive approach to a currently pressing problem is that of energy production. Most engineers are looking to alternate sources of energy to cope with the problem of increased energy consumption. Perhaps we should consider using better insulation or fewer cars. Perhaps the real problem is not energy consumption and supply at all, but rather energy efficiency.

4) It is very important to realize that both strategies of reform (propaganda and manipulation of institutional incentives) are being practiced now. Advertising, for example, is very definitely a form of propaganda in which a group of people is persuaded by one means or another to take action in accord with the wishes of another group. Tariffs are a means of incentive manipulation. The point is that we are not in a position to choose one or the other as alternate courses of action. Rather, we must question in what ways we wish the influence of these strategies to operate.

5) Perhaps a useful way of looking at our culture today is to consider that we are presently in a position to effect self-conscious evolution. Our capabilities for storing and relating knowledge are great enough that we can now understand many of the systems of interconnection with which we have only been able to struggle myopically before. Thus, our view of the city should be ecological in the sense that it recognizes that the city evolved in the way it did because of the logic of its symbiotic relationships. The only

way we can effect beneficial changes in such a system is to alter the fundamental ecological relationships in a beneficial way. That is a task for responsible engineers.

6) To understand the current economic system one must look not only at the way it changes and responds, but at the way it stays the way it is (its inertia). As Madden points out, "Mental telepathy is unlikely to be vigorously researched by corporations with heavy investments in communications equipment."¹ To pursue this argument, very large corporations and monopolies lack the stimulus of competition, and small companies lack the finances for extensive technical research and development. Perhaps, then, in terms of the strategy which looks to institutional incentives, we should alter the antitrust laws to allow for and to stimulate technical research and development.

7) It would appear that Mao Tse Tung has been able to use propaganda so effectively that he has been able to alter fundamentally the ethical outlook of the individuals of his country. The Communist Chinese people seem to act on the basis of a commitment to the value of collective good rather than of individual gain. Is such a change good? How will it affect the individual creativity and idiosyncrasy?

¹ H. A. Cairns, Ed., *Clash of Cultures*. New York: Praeger, 1965, p. 41.

On the Social Psychology of Organizational Resistances to Long-Range Social Planning

DONALD N. MICHAEL

Abstract—This paper is a brief report and reflection on a three-year study of the social-psychological problems involved in changing public organizations so that they are able to perform social, particularly urban, long-range planning. It reviews the philosophy of the study, the present state of long-range planning, planned-change literature and its implications, and some issues in organizational transformation.

THIS PAPER is a brief report and reflection on a three-year study of the social-psychological problems involved in changing over public organizations so that they

Manuscript received April 26, 1972. This paper was presented at the IEEE Workshop on National Goals, Science Policy, and Technology Assessment, Warrenton, Va., April 26-28, 1972. This work was derived from a study being supported by the Center for Studies of Metropolitan Problems, National Institute of Mental Health, under special Research Grant R12 MH 14629.

The author is with the Center for Research on the Utilization of Scientific Knowledge, Institute for Social Research, University of Michigan, Ann Arbor, Mich. 48106.

are able to perform social long-range planning.¹ Posing and seeking national goals, indeed constructive and positive social survival, appear to make long-range planning mandatory. Yet, our study of organizational resistances to long-range social planning suggests that if present organizational structures and the norms that sustain them are not radically changed these resistances cannot be overcome using available organizational theory or available planned change practice expertise. The conceptual and operational crisis implied in these findings present a major intellectual and professional challenge.

The criteria offered by M. Webber present an excellent conceptualization of the long-range planning technology.

¹ The time period implied in the phrase "long-range social planning" would vary, of course, with the activity being evolved but, generally speaking, it refers to a ten to twenty year perspective.

another and if they consistently sought their own advances and not that of the country. It is a system in many ways based on restraint, inhibition, and self-interest, such is the view of social engineers. And not because such is in fact necessarily and self-intervent and supported by moral arguments, but because he must be treated as such in order to guarantee that the system will work. It must be assumed to return to the example used by Rostow, that each member of the banking party will, in fact, cheat after the fact even if he has promised not to do so, because if there is no punishment, it will, in fact, be in his interest to do so and this will be recognized by the one or two self-interested men in the group. Thus, the argument about the real moral nature of man is irrelevant since, in order to guarantee that the system will work, man must be treated in any system as if he is self-interested.

Those of you whose role is social engineering in terms of policy formulation are advised to look to the manipulation of incentives rather than exhortation in order to encourage social responsibility. As a member of the profession of engineering, however, it seems to me that your responsibility is quite different. The question here to be considered is: what role does engineering play in our transitional condition of action-value and action-knowledge? It appears that the current anxious situation finds its primary focus on this profession more than on any other. It is precisely because of the two aspects of the questioning of the Western industrial ethic that engineering must redefine itself. It is no longer enough for you to say that you are what you do, that because you do technology, you are engineers. But to what end? If technology is really to be seen as a means to an end, should not the engineers of that technology understand the relation between means and ends? (Is that not what engineering is about—the application of technology as a means to achieve some desired end?) Therefore, the vision of the engineer cannot simply be confined to that problem which appears before him or which is thrust before him. Consider the example of the highway congestion. The responsibility of the engineer, it seems, is to explain to the policy-makers that widening the highway will bring about more congestion, not less. That is his job, since he understands the relationship between means and ends and understands how to make the consequences of his action be in the direction of the ends he wishes to realize.

That is to say, engineers cannot simply be problem-solvers in the small (i.e., widening the highway). They must be problem-solvers in the large (relieving congestion). They must act themselves the task of understanding the nature of the interdependencies and feedback-loops within the system with which they are dealing and be able to take intelligent responsible action. No one else can perform this role. All the other actors in the system—politicians, businessmen, consumers, etc.—are interested in solutions to problems in the small. There is no incentive for them to be concerned with problems in the large. As Russell Ackoff of the University of Pennsylvania states:

In a real sense, problems do not exist. They are artifacts born from real problems. The real situation from which

they are abstracted are messy. A messy is a situation in which interacting problems. Planning should be conducted with messy, not problems.

The solution to a messy is not equal to the sum of the solutions to its parts. The solution to its parts should be derived from a solution to the whole, not vice versa. Science has provided powerful methods, techniques, and tools for solving problems, but it has provided little help in solving messy. . . . The question of how to proceed is messy. All messy should be dealt with simultaneously and interactively.

Engineers, then, are not gadgeteers; they are conceptualizers; they study and practice the control of consequences in a complex, interactive system. This task may be very simple in a simple system such as the design of an electrical circuit, or very complex and subtle such as relating some of the problems of the inner city. But the essential role is the same: the understanding and manipulation of the consequences of a certain set of actions in order to achieve a desired end. An engineer is a designer and a means expert. There are many other issues which are still in understanding the nature of the relationship between technology and human values. This paper is intended to provide an intellectual base upon which to pursue such a discussion and to provide a conceptual framework within which the issues may be productively considered. It is clear that something is going on in our culture; we are in an important period of transition. Old values no longer seem appropriate. The efficacy of the capitalist system, the political system, and even of thought itself has been called into question. With a languishing interest soon around it is easy to feel easily and without direction. We hope that we have been able to clear away some of the tangles which cut at your skin on this ethical journey, and to point out some of the paths along the way.

SOME THOUGHTS FROM SUBSEQUENT READING AND DISCUSSION

1) The use of the term "scientism" may be confusing since it sometimes refers only to the application of the scientific method rather than to some quasi-religious belief in its ultimate efficacy. The two concepts should be kept distinct, since it is certainly possible to apply the scientific method to problems without having that method determine one's world view. That may very well be a likely tendency, however.

2) Related to the dual difficulties of looking at a problem only in the small and adopting a technique (method) as a technical word (end), is the phenomenon of role identification. That is many people in our society identify themselves emotionally and philosophically with their job or their role in the culture. Often the first question asked of you when someone is first introduced to you is "What do you do?" as if what you do were related in some deep and determining sense to what you are as a person. Note how closely this cultural phenomenon is related to the ethical myopia of "I just do my job" (knowledge-free and work-free) at problems only in the small (knowledge-action).