Taming Technology

A plea for national regulation in a social context.

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The value of research leading to useful inventions and new technology has been an article of faith in this country since Benjamin Franklin. As we look ahead to the remainder of this new decade, we must admit that for the first time in recent memory this charitable assumption about the value of research is under broad challenge. Public policy must understand these doubts and react to their root causes.

Many people feel that humanity is threatened by the vanity of those who believe that only good can come from so thoroughly satisfying a process as scientific creativity. Science is, perhaps, some kind of cosmic apple juice from the Garden of Eden—those who drink of it are doomed to carry the burden of original sin. It is perhaps only a small step further to the notion that rationality—a procedure for minimizing personal prejudice in the evaluation of observations—is a dangerous guide to human choices, for it encourages intellectual complacency.

Science is important, and technology is both valuable and dangerous because science and technology are sources of power and power is a source of vanity. Demagoguery is also a source of power—and of vanity. Huey Long, Hitler, and Napoleon were not dangerous because they were vain, but were vain because they were dangerous and powerful. Perhaps science has been a form of vanity—not unlike mountain climbing or soothsaying or violin playing. The cult of personality does afflict us, as was documented in *The Double Helix* (*1*). But neither the biblical nor the Promethean theory of man's damnation for trying to overreach his limitations is an adequate theory for today's world. The vanity of the scientist hurts science more than it hurts society. The vanity of the human race to the extent that it has motivated the intellectual search for self-realization—the hallmark of civilization—has given us science, and the application of science, technology.

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A Force for Social Change

Technology has brought us changes, most of which we should welcome rather than reject. Wealth is the least important of these changes. Of greater importance is change itself.

Those young humanists who think themselves social revolutionaries are nothing compared to technology. The impact of technology on social institutions is the most significant event of this century.

This year marked the 100th anniversary of Lenin, who made the name of Marx a household word. His was an original, if misguided, technology assessment. The first industrial revolution—a little bump in the history of technology compared to events in the last 40 years—stimulated Marx's social invention. What will be the impact on our social institutions of the extraordinary advances in technology of the last three decades?

We all realize that the prevailing mood of the public toward technology is one of curiosity, frustration, confusion, admiration, dismay, disbelief, and—sometimes—disinterest. Astrology is booming; there are three professional astrologers in this country for every astronomer (*2*). I don't know what the phrase "Age of Aquarius" means, but we are apparently in it, and I don't think I'm going to like it.

In the first two decades since the war, we physicists were the ones with the bad consciences about the social impact of science. We did a great deal of breast beating while enjoying the extraordinary generosity of the American public in the form of rapidly increasing federal funds for research. Now we are all in it together: physicists and engineers, corporate and federal bureaucrats, judges, deans, labor leaders, entertainers, and politicians. We are the "establishment" in the sense that we are part of a set of social institutions which are adapting themselves too slowly to the needs of our society and whose nature few people understand. I must confess that when I listen to some of those who would disestablish the establishment and take our place, I think I would like us to continue to be the establishment. Nonetheless, we "established" scientists may be a dwindling group, at least in relative terms. The fraction of college students studying hard science and engineering is falling (*3*).

Before discussing the public's frustrations with technology, let's put technology's role in society in perspective. We cannot maintain a high living standard and share it more evenly both at home and abroad without continuing to increase our productivity. As a nation, we wish to allocate a larger and larger fraction of our national economic effort to services. But the service sector has proved itself highly resistant to pressure for productivity increases, and technology has only begun to tackle this problem. Until it does, manufacturing must increase its productivity at a doubly increasing rate. With our natural resources increasingly inadequate, and conservation a necessity, this increase in productivity will have to come, not from additional exploitation of resources, but from technology and education. If our products are to provide for recycling or more acceptable waste disposal and environmental protection in the course of manufacture, we need a lot of technology not now available to figure out how to do it efficiently. These higher-cost products will have to compete with the products of nations less concerned about environmental consequences. Clearly this is not the time to cut back on the wellsprings of human ingenuity that will be needed.

The humanist will argue that even more urgent than proper use of scientific capabilities by the society is the development of a set of social values, acceptable to the majority, and ade-

quate to the world as it is. I do not deny this. It is essential to man's survival that excessive devotion to materialistic values give way to more respect for nature and the fragility of the planet as abode for man. World attitudes toward population growth, acceptance of a natural limit on the "right" of individuals to use energy and produce progeny without limit must change. Science illuminates the discussion of values. Experience with technology affects man's confidence in his future, and therefore indirectly his values. But scientists have no monopoly on ethical wisdom. This value system by which our society lives evolves empirically and determines the conditions under which technological decisions will be made.

"Up Tight" over Technology

Why are so many people "up tight" about technology?

1) Technology seems to have too much momentum. Change is hard to absorb; technology is producing change too fast and without effective opportunities to debate its effects and trade-offs.

2) We are accustomed to calling on technology to solve wartime problems, whether it be real war or war on poverty, population explosion, or disease. Until Vietnam, our national experience with technology to win wars seemed to be very successful. Now we realize that massive applications of technology are ineffective, even counterproductive, in the absence of effective social institutions and popular commitment to well-defined goals. The public is not prepared for technology's failures or prices.

3) Each member of the public at large is a secondary party to every decision on exploitation of technology. Each is an unwilling and unknowing partner in every commercial transaction. Man exerts a nonlinear influence on his world.

4) Market forces are not satisfactory to allocate these secondary costs. We can't sell air, we don't sell frequencies, and we shouldn't sell the citizen's right to peace and quiet. Only recently have we begun to face this problem of the allocation and regulation of the environment through public stewardship. The individual wants good transportation and a clean environment. But when the benefit (clean air) only follows from everyone assuming the cost (a more expensive car), a collective market decision or a social decision is required. The individual's market behavior will not justify any manufacturer's effort to make a more expensive nonpolluting car. The chemical manufacturer is in the same boat. If he makes a unilateral effort to take care of the problem of wastes in the public interest, he has no protection from his less civic-minded competition. Thus, uniform standards are required.

5) Our traditional legal mechanisms for redressing civil wrongs are no longer as effective as they were when only two parties were involved. It is increasingly common to blame injury on "society," but society is hard to sue. In any case, technology is creating new situations at a rate faster than the courts can work out precedents, so the value of civil suits as a means of allocating responsibility for future acts is greatly diminished. The courts have courageously struggled with the task of applying established principles to modern conditions. They have extended the concept of a "drug," as controlled by Food and Drug laws, to include equipment used in medical treatment—x-rays, ultrasonics, electrocardiograms, and the like—which can indeed be dangerous to the patient (*4*). By implication, bedpans and tongue depressors are now drugs. But this courageous effort by judges to make up for the inability of the legislative process to keep pace with technological change is leading us into a morass of overloaded dockets, of semantic travesties, and of outdated doctrines. The alternatives to the courts are new social policies based on objective science and open politics. Politics assigns responsibility and performance levels through new regulations; these regulations can be based on engineering standards that build protection for all parties (including the public interest) into the technology.

6) The individual is frustrated by a world where the things he buys are too complicated for him to fix, where he doesn't know what performance he has a right to expect from his purchase, and it costs too much to have a repairman fix it. He has seen only once the man he bought it from and has never seen the man who made it. Moreover, the man who is supposed to service and repair the article has rarely met the men who designed and made it.

These sources of frustration are familiar, and they do stem, many of them, from technology. But running through every one of them is the frustration of rising expectations, outstripping our ability to satisfy them. Thus science, father of technology, stands accused of failing the human society, while much of the frustration results from the failure of our social institutions to use wisely and distribute fairly the benefits of technology. Yet these social institutions have not been static; they too have been changed by technology in ways not generally understood. Have these changes been for good or ill? Have the technology-induced changes in society better equipped us to adapt to change itself? For example, has technology tended to concentrate power in the hands of a few, retarding the evolution of nationalism into a more global society appropriate to the passengers on spaceship earth?

Technology Disperses Power

Sir Anthony Wedgewood Benn, until recently Minister of Technology in Britain, makes the case (*5*) that technology is decentralizing the locus of power. Traditional functions of the nation-state are being usurped by new social institutions created by contemporary technology. Consider four of the traditional functions of government: military security, economic strength, fostering national identity, and moral standards.

World security. Only "limited war" is now politically acceptable; world peace is strongly affected by world opinion. Technology has given Goliath a club so heavy he cannot lift it. And it has given every David a sling: mass communications.

Economic strength. National economics are now determined by aggregated markets on a scale of hundreds of millions of people. Only the United States, the European Free Trade Association, the Soviet Union, China, and India have a market of sufficient size to make efficient use of the industrial technology of today as realized in this country.

On the broader international scene, multinational companies are now major factors in global economic strength. Many of them have gross sales that exceed the total budgets of the governments of the nations in which they do business (*6*). The world economy and the need for economies of scale in manufacturing are forcing the political

merging of nations and the softening of communist isolation. Ten centuries of wars failed to unify Europe politically. Technology may well do the job in the next decade.

National identity and loyalty. If you live in New York City, it is cheaper to ski for a week in Switzerland than in Colorado. The world is increasingly economically dependent on the tourist and intellectually dependent on individuals to whom many nations are home. Of what nation was Paul Henri Spaak a citizen? Most remember him as European rather than Belgian. Many young people see themselves qualifying as world citizens.

The greatest legacy of our much underappreciated space program is the growing realization of the precious fragility of the life-sustaining surface environment of our small planet. After viewing the pale, cloud-wrapped earth through the eyes of a moonbound astronaut, man's perception of the nation-state can never again be quite so chauvinistic as it was when he saw each nation painted its own distinctive color on the cloudless expanse of a Mercator projection.

Setting moral standards. This is a traditional role for political leadership. Now communications make moral choices more nearly a matter of individual choice. Technology has given us leisure, mobility, and access to all the life-styles in the world. Individual privacy, far from being threatened by technology, is increased by the cloak of anonymity provided in the urban community that is, itself, a product of technology. The isolated agricultural community was a much greater threat to the individualistic life-style than the computer is today.

Government is left the jobs of social welfare, knowledge generation and education, public health and safety, and the difficult task of dealing with these worlds of global moral and political attitudes, of global economic and environmental interdependence, and of people who view themselves as citizens of the world and who choose their values from the cultures of all the societies to which they are exposed. These are surely good trends for the evolution of world society. The independence of the individual is enhanced by his freedom of motion, his access to information, and the global interdependence of world societies that exercise a stabilizing influence on every nation.

The Individual's Influence

There are, however, two serious difficulties with the social changes brought on by technology, in addition to the frustrations of the individual trying to cope with it. The growth of human knowledge has placed increasing burdens on the educational process. Either the entire society finds a way to participate in the educational process continuously, or we fall back on an elitist notion that a minority of priviledged citizens will be trained as experts on whom the rest must depend. The deprivation of the right to learn and know is as great a handicap to the individual in contemporary society as lack of freedom to hunt and till the soil would have been in an earlier time.

A second difficulty with the new world is the problem of the influence of the citizen over it. Of course he can vote, but he votes for a government that has increasingly less influence in the world. And he has communications too, but most of this capability is listening and looking. You can't talk back to the television. Stokely Carmichael and George Wallace come into your living room, but you can't get in theirs. So about all that is left seems to be to chase the TV trucks with your sign, hoping to get your message through. Through to whom? To all the other individuals who are also looking and listening. Thus, as the individual acquires from technology increasing independence, because of the diffusion of power throughout the world he loses his ability to influence that world except through collective action. However, once again, technology—through cheap transportation and good communications—makes that collective action possible and powerful.

The Ionized Society

I like to draw an analogy between the impact of technology on the modern world and the ionization of a gas. In a simple, "perfect-gas" society, collisions are usually between only two parties: Our mechanism for resolving such binary conflicts through a system of courts and English law has worked quite well. We knew our neighbors and the merchants we dealt with. Strangers and other disturbances were rare enough to be first-order perturbations. We could deal with them by independent strategies. Mobility was relatively low. Statistical disturbances relaxed quickly into local equilibrium. The walls could not be perceived from the village. The time constants of politics averaged out the delta functions of crisis in a day when Andrew Jackson spent a month in his carriage driving from Nashville to Washington to take office.

Technology has introduced a long-range force, and with it, the many-body interaction. You must now contend with all the people in your Debye sphere, and all of you are subject to the varying conditions on the walls of your environment. With this long-range force, the speed of propagation of information is that characteristic of electromagnetic waves—not the movement of individual bodies. But long-range forces permit many-body interactions, and they lead to collective motions. A large group of people can create waves and instabilities in the society just as the ions and electrons suffer unstable motions in a plasma. Are all these instabilities damped? Or do they continue to grow to eventual destruction as in present-model controlled fusion machines?

This is an age of specialization and of mass production. Both are indispensable to our high productivity and we cannot give them up.

The anonymity that accompanies technological specialization, the dispersion of responsibility that accompanies the system of mass production and mass marketing, are all necessary consequences of high productivity. And high productivity is the source of personal leisure and independence. But this makes us terribly interdependent as a society. Failure modes in any part of the social system will soon affect everyone one way or another. Indeed, this is a special problem deserving serious study in the next decade: the failure modes of the complex modern society and the degree to which our very survival becomes dependent on the absence of failure in the major subsystems on which society depends. Among them are power, communication, transport, health services, food, and peace-keeping.

But how do we resolve conflicts in an "ionized" society? The courts cannot do the job when the parties cannot be uniquely identified and responsibilities cannot be assigned. There remains the arena of politics. But our democratic political system can carry

only a limited burden of conflict resolution. Thus, we must ask, can the need for consumer protection, for pollution reduction, for environmental control, for responsible use of the products of science, for all the other social improvements that involve the action of the society in concert be resolved by lawyers alone? Or will it not call for better management of technology at the source?

There are those who believe that the legal-political framework is the proper one and that technology is a secondary matter. Ralph Nader has called for an army of volunteer lawyers to oppose in court the army of lawyers representing manufacturers. The class-action suit is much discussed as a means to aggregate the interests of many individuals in juxtaposition to that of industry. But, if one follows that path to its final conclusion, we reach the cataclysm of the ultimate class-action suit in which 80 million American consumers are suing 80 million voters. By that time, the Supreme Court will have nine vacancies.

The resolution of these conflicts in the society must come from a combination of research, of responsible private action and astute public policy —all carried on within a rational framework. Indeed, it is my thesis today that research, once primarily a task to generate new technology, will in the 1970's increasingly be needed to support the formulation of policy and techniques for dealing with technology intelligently.

Rational Regulation

A great deal is written and said about wise social choices, but the fact is that, as a society, we do not yet appreciate the tremendous importance of valid information. Each day policies are formed and government decisions are made without adequate information. That surprises no one, for it was always so. But in some situations, it has become popular to attempt to legislate technological solutions to problems without regard to cost or practicality. This practice is born of the historic tendency of government to intervene in technology where matters of public health and safety are involved, safety being considered as an absolute, regardless of cost. Difficult as it may be politically, we must help people to understand that safety is never absolute, nor worth any price.

Indeed, like many other technologies, the hard science solutions to safety problems have failed to account for the behavior of the humans whose safety is in jeopardy. After four decades of experience in improving the safety features of farm machinery, manufacturers are frustrated to find that owners of the safer equipment simply push it to higher performance, accepting a roughly constant level of hazard. Thus the tractor, redesigned to lessen the likelihood of tipping over, is driven on a steeper hillside (*7*).

A primary responsibility for regulating technology rests with government regulatory authorities. Here one sees two philosophies at work in government. One approach relies on understanding the factors, both technological and behavioral, that influence public protection (for example, safety), product performance, and cost. The standards mandated by government are then established on the basis of a rational evaluation of the consequences of technical alternatives. A data base adequate to measure these consequences then provides feedback for later modification of the technological requirements if necessary. This procedure requires a great deal of research and analysis, assumes a high level of professional competence in government, and may produce a solution that is politically hard to sustain. But it is the rational procedure.

The alternative is more to the lawyer's liking. You view the major parties in conflict—perhaps a group of manufacturers and a set of consumer protection advocates—and incorporate in the regulations that degree of severity of technological constraint that represents the equilibrium of the political forces in opposition. Not too much regard may be given to the specific technological solution that is mandated, because one is prepared to negotiate on the basis of the dynamics of the political forces. Government relies on industry's self-interest to propose a more acceptable solution. Government accepts the solution that most easily survives politically.

The difficulty with this rather traditional pragmatic approach is that once government has assumed the responsibility for determining the technological restraints under which all manufacturers must operate, government must also be responsible for the performance of the resulting product. And if it turns out that the public purpose—be it safety or environmental protection—that was the basis for regulation is not in fact served, public confidence in the possibility of taming technology through democratic processes is dealt another blow.

All of the sources of public frustration resulting from dealing with technological change call for a similar effort at rational understanding aimed at restoration of a basis for public confidence in man's ability to guide his own destiny. The temptation to lash out irrationally at technology (and at science on the principle of guilt by ancestry) may be satisfying. But it is a far more dangerous threat to our survival than technology itself. More science, not less, is needed in order that we learn to live with technology so that we can retain its enormous potential for human benefit while mitigating the secondary problems it generates.

Let me give you just two examples to illustrate the care with which we must evaluate our tactics for taming technology. A primary ingredient in photochemical smog is the molecule PAN (peroxyacetyl nitrate), formed in the presence of nitric oxide and hydrocarbons from auto exhaust and other sources. Where high levels of PAN are found, eye irritation and other discomforts may be severe. If steps are taken to reduce the hydrocarbon emissions, the PAN levels will drop. But when NO levels are reduced—and NO is highly toxic itself—PAN levels may actually increase again, going back to dangerous levels (*8*). Sometimes solving part of a problem on the basis of inadequate understanding is worse than taking a little extra time to be sure you know what you are doing.

The Flammable Fabrics Act provides for elimination from the market of unreasonably flammable children's sleepwear. Tens of millions of dollars of annual production are affected. The National Bureau of Standards evaluated a test for measuring flammability and discovered a fabric which could pass a 12-second direct exposure to an open flame, but with a 3-second exposure burst into sustained burning. This mystery yielded to careful research, but had we not discovered it, the public's expectation that modern technology could provide them with safe fabrics for the children's pajamas might again have been frustrated (*9*).

Accurate, credible, objective mea-

surements will prove essential to the regulation of technology in the future. As environmental problems get more severe, and as we pay a higher and higher economic price to preserve a livable planet, the importance of quantitative understanding will skyrocket. Unless dramatic progress is made, we may find that, even though technological fixes exist, we cannot administer a policy of public regulation under democratic principles and legal procedures.

Corporate Responsibility

Does the solution lie in fostering the social conscience of the industrial executive? Much progress toward a better life for all Americans can certainly be made by the voluntary efforts of an enlightened business community.

But I personally think there is a limit as to how far a manufacturer ought to go in assuming responsibilities for the price to be paid for social improvement. It seems to me that the private sector has a very important role and that is to operate within a framework of demand and of social rules, and to meet that demand within those social rules as efficiently as possible. The company should not decide what additional social costs should be borne by their customers, except within the framework of free competition and public regulation. Once the company attempts to do that, then not only does competition lose its present keen edge, but, in addition, the society at large loses the opportunity to make the social decision as to whether it wishes to bear the cost. Industry does, however, have a very great responsibility to know the consequences of its operations and future plans and to share this information with the public so that the social decision can indeed be made. Industrial management should not only invest in sufficient research to insure the availability of this knowledge, but it should directly encourage its engineering staffs to share this information with their academic and government colleagues.

One forum within which this exchange takes place is the process of voluntary engineering standards making. Little known to the public, or even to most research scientists, organizations like the American Society for Testing and Materials, the American National Standards Institute, and the Society for Automotive Engineers bring together over 100,000 scientists and engineers to negotiate the technical specifications for materials, products, and test methods that are the sinew of our industrial operations. When adopted by a state or local authority, these standards may become codes. Building codes, for example, are motivated by desire to provide health and safety protection for people in their dwellings. But today's fragmented system of building regulations is stifling the opportunity of technology to meet a vital social need: more and better housing. A new system for evaluation of industrialized construction technology against performance-based standards is essential for effective progress in the construction industry and for production of enough housing to meet our needs.

If we are to incorporate a future-oriented technology assessment into technology at its industrial source, one of the means of doing so is through this system of industrial standards. For example, it is, in principle, possible to incorporate in standards for plastics a specification for biodegradability. We must also learn how to adapt our engineering standards, insofar as possible, to put them on a performance basis rather than on a design basis. Most of the present building standards, for example, specify the design options and thus fail to provide for new materials and construction methods that might be superior. Wherever specification of performance rather than design is possible, it permits industry to use its full innovative capability to solve the problem which is expressly described in the standard. The social objective—therefore, the commercial objective—of the standard is expressed in performance terms, and the question of how to meet that performance is left as open as possible. Performance-based standards, however, put a tremendous burden on the ability to measure because measuring performance is very much tougher than measuring design, which can often be done by inspection. Thus some tough scientific and engineering problems must be solved before it is possible to cast the rules for taming technology in performance terms. In the building example, one must first specify the attributes of the structure which are required for safe, healthy living. Then one must establish the criteria by which the structure is to be judged. Through what angle may a building bend in a high wind before occupant discomfort is unacceptable? Finally, one must know how to evaluate an entire building (one that may be designed from new composite materials assembled on new structural design principles) against such performance goals.

This same idea—regulating for performance with minimum specification of technology to be used—has wide applicability for taming technology without destroying it. It focuses our attention on social goals and provides incentive to examine as many alternative technological solutions as ingenuity can produce. It also calls for the natural scientists and engineers to work closely with their colleagues in design, behavioral sciences, and economic analysis. The problem of technology assessment is not an ivory tower task. Becoming the masters of our own fates is a here-and-now job, calling for a great deal of urgent hard work and work conducted in a new environment.

The Potential Pitfall

In emphasizing the role of research in policy-making, I should point out a potential pitfall for the scientist or engineer. Since social problems are so complex, it is easier to argue about them superficially—calling upon subjective judgments and insufficient knowledge—than to do the hard work necessary to produce the needed technical facts. This is especially true in such fields as economics, sociology, and systems analysis, where the many variables involved make controlled experiments difficult. This could undermine the traditional dedication of technical people to thorough work and solid achievement; this dedication is needed more than ever if the demands for sound data in an ever-expanding sphere of knowledge are to be met by a broad outlook and a wide range of general knowledge not incompatible with solid technical achievement; in fact the times call for a new breed of technical man who can combine these qualities if we are to come to grips with the social issues facing us.

How should the scientist or engineer participate? The era of the expert adviser—aloof from nontechnical considerations and immune to challenge—is over. There was a time for the expert, perhaps a time when scientific vanity showed most. But no one is free of social bias, and, indeed, one man's social bias is another man's ethical principles. The scientist's prin-

ciples must be involved, and his technical arguments must be made clear and pursuasive. The emergence of the scientist as an active, responsible, if biased, citizen was a relatively radical idea a few years ago; this role is now more widely accepted. But the important thing is not the politicization of science but the active involvement of scientists and engineers in those arenas where the decisions on uses of technology are really made: (i) in standards-writing organizations, where professional societies could organize teams of engineer volunteers to represent the public interest; (ii) in industrial design, where economic expediency should encounter high professional standards; (iii) in universities, where the role is not solving social problems, but illuminating them and developing new choices for solutions; (iv) in state and local government, where regulation of technology is done well or badly, depending on the talent available and the help received; and (v) in the federal government, where the ability of this nation to tame technology depends on a choice between policies based on rational consideration of the scientific facts in their social context and a reversion to know-nothingism and a destruction of confidence in our ability to master ourselves in harmony with nature.

Most of you who are scientists are discouraged about the prospects—for you see in the bright mirror of scientific truth a dark shadow of man's unwillingness or inability to use the gift of intelligence for beneficial purposes. You see the nonscientist, confident in his superior ability to manipulate the power that the scientists have indirectly given him, prepared to follow his intuition and his horoscope but unwilling to base his actions on the rich store of analysis and knowledge that science can give him. Where lies the greater vanity? Where lies the better hope for mankind?

Mankind must react rationally to the opportunities as well as the problems created by technology. On one side lies a harmonized world of interdependent societies, enjoying decentralized power and shared wealth, leisure, and learning. On the other is a despoiled planet of charred earth, dead lakes, and an acid atmosphere.

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Activist Youth of the 1960's: Summary and Prognosis

Understanding the modal personality of activists may help in making future decisions.

John L. Horn and Paul D. Knott

In looking back over the 1960's, it is apparent that activism among youth loomed large among the events and developments which must be regarded as important. Few issues were as hotly discussed by people in all walks of life, and few succeeded as well in drawing otherwise disinterested people into flushed and hostile advocate camps.

The interest in youth activism generated numerous theories intended to "explain" it—as an historical development, a sociological phenomenon, a psychological process, or a manifestation of personality. So numerous are these "explanations" that there is probably one to suit virtually anyone who has an opinion about youth activism.

But what do we know about youth activism (*1*), the people who foment it, or what to expect for the 1970's? Fortunately, there are some objective and systematic studies to provide information. In particular, there are a number of empirical studies of the attitudes, beliefs, family backgrounds, and abilities of young people who were prominent in some of the most notable youth demonstrations of the 1960's. As can be expected, when studies of emerging phenomena are based on observations gathered in a charged atmosphere and under changing conditions, the results are often inconsistent. Yet these studies contain much of the reliable information we now have about an important area of human behavior. The aim here is to put one band of this information—that pertaining to the personality of activists—in as clear a perspective as possible. Results from several major studies are summarized, and some explanatory concepts deriving from these findings are discussed in an effort to provide an accurate, composite description of the young people who emerged as activists in the 1960's. Our analysis may help to provide guidelines for dealing with activism in the coming decade.

In this article, the word "activist," unless otherwise indicated, will

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