10-1-1961

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THE NEW TECHNOLOGY AND NATIONAL GOALS
SOME IMPLICATIONS FOR LEGAL-POLICY DECISION MAKING

By Louis H. Mayo*

There appear to be a multiplicity of approaches to the task of enlarging the scope of operations of the "rule of law," if this standard may be construed as implemented by any action taken to promote general world community goals through orderly, non-coercive processes.\(^1\) To explore certain of these possibilities, examination is made herein of some of the basic societal trends, principally technological innovation, which may obstruct or support the attainment of the more fundamental human needs and aspirations.

A. General Orientation: The New Technology and National Goals

The impact of the major technological developments of the past two decades on social structure is a matter of common knowledge. Development of nuclear fission is a classic example of this movement from theoretical science to laboratory experimentation to a new technology which has been applied for both productive and destructive purposes. Most technological developments appear to be merely techniques, devices, or tools in the social process, to be used for productive or abusive purposes depending upon the designs of the effective controllers.\(^2\) Yet, there is some evidence of an "imperative" component in the exponential growth of technology, as exemplified in the relentless and rapidly increasing demands for electrical energy, which is basic to modern industrial society.\(^3\) The early development of low-cost atomic power has been advocated as a primary public policy objective.\(^4\)

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\(^1\) See POST-WAR THINKING ABOUT THE RULE OF LAW, University of Michigan Law School (1961).

\(^2\) See Introductory Remarks to Where is Science Taking Us? by George B. Kistiakowsky, Saturday Review, December 10, 1960, p. 61; Rabinowitch, Hail and Farewell, Bulletin of the Atomic Scientists, March, 1961, p. 86; von Neumann, Can We Survive Technology?, AMERICAN STRATEGY FOR THE NUCLEAR AGE (Hahn and Neff, ed.) 32, 38. Yet both Rabinowitch and von Neumann seem to suggest that technology is not "neutral" or "indifferent." The latter states: "Technological evolution is still accelerating. Technologies are always constructive and beneficial, directly or indirectly. Yet their consequences tend to increase instability ..." von Neumann, op. cit. supra at 35.

\(^3\) Others have intimated that technology has some compulsive or determined characteristic which extends beyond human and social control:

Friends of humanity, impressed with the destructive potential of the new atomic weapons and the brainwashing possibilities of mass communications media in the television age, will thoroughly agree with the following observation of Dewey: "Man, a child in understanding of himself, has placed in his hands physical tools of incalculable power. He plays with them like a child, and whether they work harm or good is largely a matter of accident. The instrumentality becomes a master and works fatally as if possessed of a will of its own—not because it has a will but because man has not." Fields, Dewey's "The Public and Its Problems," 9 J. PUB. L. 416, 417 (1960).

\(^4\) See Review of the International Atomic Policies and Programs of the United States, Report to the Joint Committee on Atomic Energy, (October, 1960) p. 39-45. With respect to Western Europe the Report states: "Electricity consumption alone rose 120 per cent during the 1948-58 period, despite the setbacks of the Suez incident and two mild recessions
The significance of modern technology to American society has been explicitly and forcefully expressed in the recent Report of the President's Commission on National Goals, wherein it is recommended that the following national goals be established in the technological area as a basis for building a stronger nation and a better world:

Technological change should be used to improve men's lives. We have seen that it brings both progress and problems. Our goal must be to apply new technology so that it will improve the way men live and work. Necessary adjustment of an accelerating technology must be planned and carried out with human considerations paramount.

Technological change should be encouraged to meet our own increasing industrial needs, to stimulate our social and economic progress, and to face successfully the long-term challenge of international Communism.

Technological knowledge should be shared so that people throughout the world, particularly in the underdeveloped countries, may improve their lives and benefit from up-to-date technology.

The importance of technological progress has not been lost on our major international adversaries. A recent observer states that "technological advance has been a crucial element in the process by which the Soviets hope to enter the promised land. If anything, technological advance has been given even greater weight by Khrushchev than by his predecessors." Some observers see technological competition, especially with respect to weapons, as being the primary element in the cold war struggle. On the other hand, more hopeful commentators look to the application of new technologies, especially those relating to a better understanding of human behavior, human needs, and
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aspirations, as a means for achieving a stable and lasting peace.\(^9\)

It is fashionable today to speak of "revolutionary change." And however one might characterize the major social developments of our time, they all seem related in some significant way to rapid technological change. It has been truly said that "humanity faces no problem more important than how to bring about peaceful change, but the importance of the task must not obscure its complexity."\(^{10}\)

Professor Hurst informs us that the law has always been acted upon by or has responded to technological change, rather than controlled it.\(^{11}\) He has further observed that if invention itself was the key invention of the Nineteenth Century, a basic invention of the Twentieth Century ought to be a satisfactory effort by the law to make technical change mesh more smoothly with other societal trends.\(^{12}\)

Professor Julius Stone, in his admirable study, *The Province and Function of Law*, restates this problem in these terms:

> The point has been repeatedly made, without losing any of its force, that the contemporary social order must collapse if man's understanding and control of his human relations do not keep pace with technological development, that is, with his control of external nature.\(^{13}\)

If we are today experimenting with new ways of thinking, reflecting our awareness of a new urgency to create social institutions which are responsive to change, then it is probably safe to surmise that such modified thinking has been imposed on us by the phenomenal technological advances of the last two decades.\(^{14}\) We may agree that our best hope of world peace is through law,\(^{15}\) yet the "rule of law" is subject to a variety of interpretations even by thoughtful

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12 Ibid.

13 Stone, *The Province and Function of Law* 479 (1950):

> No doubt uneven development has taken its toll of human opportunities in past ages. The problems which it poses today, however, seem more critical by reason of three major transformations affecting modern democratic societies. The first is the extension of the democratic principle involving active participation by the mass of people in social affairs. The second is the great and increasing technological progress with increasing specialization of functions, which renders activities increasingly interdependent. The third is that, owing to this greater interdependence and the extraordinary progress in means of mass communication like the press and the radio, it has become impossible to keep crises, whether political, economic, intellectual, or moral, within the insulated chamber of a particular group, class, or human faculty.

14 Einstein once remarked: "The unleashed power of the atom has changed everything except our ways of thinking. Thus, we are drifting toward catastrophe beyond hope. We shall require a substantially new manner of thinking if mankind is to survive." Quoted by C. L. Sulzberger, *New York Times*, February 6, 1961, p. 22, col. 4.

15 See Rhyne, *An Effective World Court is Essential*, 46 A. B. A. J. 749 (1960), and the paper of the same author in this Symposium. Mr. Rhyne is a former president of the ABA who continues to do outstanding work toward the objective of broadening the "rule of law" throughout the world. See *New York Times*, June 18, 1961, p. 6, col. 1, re joint statement of Mr. Rhyne and the general chairman of the San Jose "World Peace through
and there are surely many routes of inquiry to pursue in seeking
a structure of orderly and equitable social practices. Some would go so far
as to contend that the only means of avoiding the dangers of uncontrolled
nuclear, chemical, and biological warfare is to adopt some form of world
government. It would appear, however, that we are at this time far from
finding satisfactory solutions to these perils. The following comments will be
directed not so much to the extension of systems of rules of existing law as
to an examination of certain types of current legal-policy problems and a few
suggestions as to possible modifications of advanced law school training which
will better help us understand such problems.

It might be suggested that the best long-range prospect for the develop-
ment of the “rule of law” is to encourage and train competent young people
in the analysis of and creative disposition of legal-policy questions. It would,
in fact, seem that this obligation has been inescapably thrust upon us by the
new technology.

B. Major Forces, Movements, and Trends in the Contemporary World

Whatever contribution the legal profession may make to the analysis and
solution of major contemporary socio-political problems will depend upon the
grasp lawyers in legal-policy roles have of the more influential non-legal forces,
movements, and trends which shape the present world context. It will require
an understanding of the nature and implications of such significant factors as
the following: the spread of industrialism, the rising demands of the pre-
industrial nations, the growing interdependence of nations, the increasing
role of the state in social and business affairs, the drift toward “bigness” in

the Rule of Law” conference: “The consensus of San Jose is a first statement of universal
principles on which a structure of world law can be built. This meeting has been a most
significant milestone in the evolution of civilization.”

17 See, e.g., CLARK AND SOHN, WORLD PEACE THROUGH WORLD LAW (1958); COUSINS,
In Place of Policy (1960). See also, Prescription for Peace, by Senator Joseph Clark,
Saturday Review, January 21, 1961, p. 63; Emery Reves, Why Wast Time Discussing
Disarmament?, Look, March 28, 1961, insisting that world law is essential for peace;
Actually, Mr. Warburg’s ideas differ quite sharply from those of Khrushchew,
because Mr. Warburg sees the necessity for a high degree of inspec-
tion and control, and would create puissant supra-national agencies to
exercise it. Indeed he cites the Grenville Clark-Louis Sohn plan as his
model, and this would provide for such powerful and such thoroughgoing
control organs that they might more properly be described as world
Government.

Jerome H. Spingarn, Director of the National Planning Association’s Arms Control Research
WARBURG, DISARMAMENT: THE CHOICE OF THE NINETEEN SIXTIES.
18 See KERR, ET AL., INDUSTRIALISM AND INDUSTRIAL MAN (1960), herinafter cited
as INDUSTRIALISM.
19 See New York Times, January 10, 1961, p. C 49, col. 4, re the “Revolution of
Rising Expectations.”
20 See STONE, op. cit. supra note 13; the theme that the Industrial Revolution and the
economic and commercial dependence resulting therefrom provided the primary motive force
for the high degree of interdependence in the industrialized world community of today is
expressed in EAGLETON, INTERNATIONAL GOVERNMENT 8 (1948 ed.). “International indu-
trial organization has proceeded with its division of labor until nations as well as individuals
are dependent upon each other.”
21 See INDUSTRIALISM 40. See also HEILBRONER, THE FUTURE AS HISTORY 112, 186
(1960).
industrial and labor organizations, the growing importance of the administrative function in governmental operations, the movement toward urbanization and the breakdown of traditional political boundaries, the growing acceptance of the scientific orientation and the expanding research function, the accelerating rate of information accumulation, the drive toward automation, and the increasing alarm registered over our seeming inability to create social and political institutions capable of harnessing, for human benefit, the afore-


24 See Symposium. The Future Metropolis, Daedalus, Winter 1961; Industrialism 39. Traditional boundaries and "states' rights" concepts are being strained by the new reach of a rapidly expanding suburbs and the necessity for a network of public service facilities to span interstate metropolitan areas. The recent dispute between the New York Port Authority and the Congress points up some of the emerging problems. See Comment, Congress and the Port of New York Authority, Federal Supervision of Interstate Compacts, 70 Yale L. J. 812 (1961). The enormous difficulties involved in simply transporting people within growing urban centers provides a good measure of the range and quality of economic, social, and legal problems which will challenge the very best professional minds for decades ahead. See The Research Frontier, Saturday Review, January 7, 1961, p. 86.


26 See Heilbroner, op. cit. supra note 21, at 157. See also Toynbee, Education, The Long View, Saturday Review, November 19, 1960, p. 60:

How is a limited human mind to cope with a cultural heritage that is perpetually increasing in bulk? The problem is aggravated when people begin deliberately to extend the range of human knowledge by systematic research (p. 61). . . . Research of whatever kind is good for teaching, because it sets a standard of precision and thoroughness which the researcher will exact from himself and demand from his pupils. But here, as so often before, we are brought back to the problems set by the limits of the capacity of human minds. Even if formal education is to become lifelong, how can a single mind in a single lifetime acquire an education that will be exact and at the same time comprehensive? We can not do without either of these conditions in a world that has become "one world" and that has also become scientific in its intellectual standards. (p. 79.)

See also, on the problem of accelerated pace of change in the world and the appalling mass of human knowledge about scientific matters and the interactions of technology and society; report on M. I. T. Parley on Scientific and Engineering education, New York Times, April 8, 1961, p. C-7, col. 1.

Dr. Chin Ning Yang of the Institute for Advanced Study has cautioned that the growing accumulation of knowledge and the growing complexity of that body of knowledge would
mentioned trends, almost all of which spring largely from technological advance. 28

Industrialism, perhaps, possesses the characteristic of a universal force to a greater degree than any other trend or movement of the time. Modern industrial civilization has been described as "the most aggressive form of civilization mankind has ever known." 29 The combination of intellectual drive, make it harder to forge ahead to higher levels of understanding. He compares this dilemma with the increasing difficulty a chess player experiences when his growing mastery of the game prompts him to calculate his moves farther and farther ahead than he has done in the past. Dr. Richard Feynman, of Cal. Tech., has suggested that it is still not obvious that such a pace of discovery can continue indefinitely—through such a time span of 1000 years. New York Times, April 9, 1961, p. 70, col. 2.

27 See Heilbroner, op. cit. supra note 21, at 159; see also A. H. Raskin, New York Times, Jan. 15, 1961, p. 47, col. 1, concerning the "revolutionary changes" taking place in industrial employment which have been created by technological advances in automation procedures.

28 See Stone, op. cit. supra note 13. See also Salter, Modern Mechanization and its Effect on the Structure of Society, SCIENCE AND SOCIAL CHANGE 317, 319-20 (1939); Chase, The Proper Study of Mankind (1948) Ch. 11, 112-122, Some Laws of Social Change, including the concept of "exponential growth" or advance on the basis of the "compound interest curve" and the mechanics of "cultural lag." The series of papers included by Jesse E. Thornton in SCIENCE AND SOCIAL CHANGE (1939), (The Brookings Institution) are very useful on the thinking of the interrelationships of science, technology and social change. The "revolutionary changes" taking place in industrial employment which have been created by technological advances in automation procedures.

Suggestions as to the more important scientific and technological developments of the next few decades and the type of societal and governmental response that will be required to meet the challenge are considered in Meier, SCIENCE AND ECONOMIC DEVELOPMENT, Ch. IV, New Patterns of Living (1956). See in particular The Developmental Society at 197 and Social Organization for New Technology at 207.

A recent book which covers a wide range of scientific-social relationships is ALLEN, ET AL., TECHNOLOGY AND SOCIAL CHANGE (1957). Basic parts treat: Processes and Theories of Social Change; The Social Effects of Selected Major Inventions; The Influence of Technology on Social Institutions; Rapid Social Change and Social Problems; and Social Change, Planning, and Social Control. The Preface states:

Finally, this text maintains a definite point of view toward the subject of social change: it holds that technology and applied science constitute a dominant and crucial force in causing change in modern Western society.

This may be regarded as the basic underlying theme of the work.

See also Auerbach, Law and Social Change in the United States, 6 U. C. L. A. L. REV. 516 (1959), for a discussion of law as a factor in the social process. The author states: "Since the advent of the Industrial Revolution we have been struggling . . . with the problem of determining what combination of public and private ordering of human activities is necessary to safeguard and enlarge individual freedoms and at the same time enable individuals to enjoy the potential benefits of modern science and technology." Id. at 529; On law and social change see Dror, Prolegomenon to a Social Study of Law, 13 J. LEGAL ED. 131 (1960):

The power to shape the future course of events so as to extend the benefits of advancing scientific knowledge for the satisfaction of common human need may now be ours insofar, and only insofar as our conduct is guided by an understanding of the impact of science on human society. During the latter half of the nineteenth century a powerful school of political thought was led to advance three main conclusions from a study of the influence which changing technology was then exerting on the social superstructures of the time. One was that nations were becoming economically more interdependent. A second was that skilled and privileged workmanship and the standard of life of the employed classes as a whole would continue to decline. The third was that the militant opposition of the employed classes to the existing economic system would continue to increase. On these conclusions they based a social policy which has outlived the impulse to searching examination of current events from the same standpoint.

Hogben, SCIENCE FOR THE CITIZEN 1127-1128 (3rd ed.).

29 See INDUSTRIALISM supra note 18, at 266, quoted from Ward, FIVE IDEAS THAT CHANGED THE WORLD 87 (1959).
scientific inquiry, technical evolution and industrial development is said to have worked a total transformation of all aspects of life — "not only of organization and technique, but of fundamental habits of thought and social behavior."

As the authors of a recent treatise on the subject have stated:

Industrialization creates vast urban areas; makes possible a great explosion of population; yields a new standard of living and of leisure; draws on new skills both social and technical; requires a vast network of rules to guide and coerce men in the complex and interrelated tasks essential to its successful growth; spawns new centers of organized power and furthers the concentration of authority in old centers, particularly the state; forges new methods of attaining and retaining this power; links men together in new chains of subordination and invites new frictions at each of the links in these chains; and provides a new culture based on mass tastes and mass consumption which gradually overwhelms the many and varied pre-existing cultures. It is the great transformation — successful, all-embracing, irreversible.

Appreciation of the enormous material benefits which accrue to highly industrialized societies is no longer lacking in the pre-industrial nations of the world. The spread of popular aspirations for the better life, the so-called "revolution of rising expectations," is gripping large segments of the underdeveloped peoples who are beginning to demand a minimum share of the world's desirable goods. An African editor has commented on this development in these terms:

30 Ibid.
31 INDUSTRIALISM, supra note 18, at 266. Industrialization is basically a unifying, standardizing process which, however, varies with a number of factors including the type of "elite group" controlling the process: "dynastic elites with their paternal community, the middle classes with the market system, the revolutionary intellectual with their centralized state, the colonial administrators with their service to the home market or the compatriot settlers or the home ideology, and the nationalist leaders with their state-guided development..." The exercise of this dominant authority depends further upon the "nature of the pre-existing society, the role of geography, the stage of history, and the accidents of history." In such industrializing process these elite groups are called upon to resolve certain issues of fundamental importance, if not pre-determined by established custom or by the imposition of a drastically new ideology, as for example: the degree to which power is centralized or shared; the role of the state in political and economic decision-making; whether to shape a "managed" or "market" economy; the emphasis to be placed on group or individual values; the relative significance of status and contract; the extent of class stratification; the area of uninhibited inquiry and research; and the role of the educational process with reference to its potential impact on the distribution of political power. Id. at Ch. 10, Pluralistic Industrialism.

An interesting observation re the bi-polar world of nuclear weapons made in letter to editor of N.Y. Times, Sunday, April 30, 1961, p. E-10, col. 5, by G. Rajagopalachari, (former Governor General of India from 1940 to 1950), April 22, 1961, saying re the nuclear powers, U.S. and USSR as of now:

They are not prepared to go out to relieve or help victims against oppressors, if such action carries with it the possibility of a clash with another power which can start a nuclear war. The biggest powers now are more anxious to preserve peace and look after their own security than to yield to the call to do noble deeds. The weaker nations have been completely orphaned by the atom.
But casting off the bonds of colonial tutelage does not in itself solve the problems. Most of the people concerned are in a very real sense economically and technically less developed. What we mean by this is that poverty, misery, illiteracy, chronic ill health, are an integral part of their daily life. Until recently they have endured these evils in passive despair because they had no vision of anything better. But today they know that hunger, disease, fruitless toil, and early death are not inevitable, that it is possible to create conditions in which they and their children can have a better life. What has been aptly termed “the revolution of rising expectations” is underway.33

An integral part of this matrix of industrialism and of rising demands by the relatively underprivileged nations is the growing factor of interdependence among the nations of the world. As James Reston has recently remarked:

The more the Kennedy Administration studies its new responsibilities, the more conscious it becomes of the complexity and interconnection of its domestic and foreign problems. It cannot even think about balancing the budget without the cooperation of the industrial nations of Western Europe, whose defense policies and programs for the underdeveloped nations affect the level of expenditure in Washington. . . . In the international field . . . cooperation through OECD and NATO . . . will affect our decisions on the budget, on interest rates, and on foreign trade and may well in the end lead to limitations on our sovereignty. . . . The facts of economics and finance, politics and philosophy, are integrating the nations as well as the races.34

One of the more conspicuous contradictions of the era arises out of the fact that the obvious trend toward mutual dependence is accompanied by intensely emotional, even violent, outbursts of nationalism. But as Henry A. Kissinger has said:

The great revolution of our time is the breakdown of the self-sufficient nation-state. Not even the most powerful country is capable by itself of maintaining security or of realizing the aspirations of its people. One of the ironies of our day is that more and more nations are coming into being at the precise moment when the nation-state is becoming incapable of dealing with many of its problems and the interdependence of states is even more obvious.35

Professor Friedmann has warned of attempting to oversimplify or ignore the considerable diversity in the internal social organizations of the different nations, which will continue to complicate the problems of achieving international order and “world peace through world law.”36

Whatever the source and quality of objections to the scientific orientation, the spread of technology, and expanding industrialism, whether arising from reactionary dynastic elites or from democratic liberals resisting the forces of standardization, this trend will probably persist, at least, for the foreseeable

36 See FRIEDMANN, op. cit. supra note 23, at 455.
future. Furthermore, Alfred North Whitehead has pointed out, history has disclosed only three ways to escape the Malthusian dilemma of overpopulation—expanding commerce, improved technology, and utilization of empty spaces. Obviously, of these three, expanding technology must be given the prominent role. Many contemporary scholars also view industrialism and advancing technology as irreversible trends. Even Professor Heilbroner, who takes an exceedingly pessimistic view of the future, both with respect to the prospects for a "better" world and for an improvement in the quality of individual liberty and dignity, nevertheless says: "Whatever its capacity for the destruction or the diminution of man, the perfection and application of industrial technology is withal the only possible escape from the historic indenture of man."

Professor Harrison Brown, in a recent article, examines the implications of the elimination of war, and finds that a multiplicity of problems would still confront us since certain problems have traditionally depended upon warfare, or at least military power, for their solution. Hence, substitute measures for solving these problems must be found. Noting that we are living in the midst of an enormous revolution, characterized primarily by rapid technological change, he sees the process of urbanization creating an increasingly complex society, not only nationally but internationally, since there is a growing dependence of most nations on resources of other nations. Projecting into the future, he suggests that as industrialism spreads, competition for essential and scarce resources may drastically increase. He feels that industrialization of the underdeveloped areas of the world is the most pressing problem facing mankind today, next to the abolition of war, and that the latter is tied in closely with the improvement of conditions in pre-industrial nations and a hoped-for reduction of international tensions. He warns that if impressive measures are not taken by the Western world to alleviate intolerable conditions that the rapid spread of totalitarianism is most probable, and adds, "With modern techniques of control and persuasion, this process may become irreversible."

In accordance with the basic theme herein examined he concludes: We know this to be a fact: it is not the lack of technical knowledge or of knowledge of the earth's resources that are the major barriers to the evolution of a world in which all individuals have the opportunity of leading free and abundant lives. The primary hindrance is man's apparent inability to devise those social and political institutions which can enable us to apply our technical knowledge at the rapid pace the situation demands. Here, no doubt, lies the greatest challenge of a future without war.

Technological changes ordinarily have economic and social effects which

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37 See Whitehead, ADVENTURE OF IDEAS (1933) p. 84 (Mentor. ed. 1955).
38 See INDUSTRIALISM, op. cit. supra note 18, at 266. See also generally, SEIDENBERG, POSTHISTORIC MAN (1957).
39 HEILBRONER, op. cit. supra note 21, at 206.
40 Brown, Tasks for a World Without War, in Daedalus, Fall 1960, p. 1029.
41 Id. at 1032.
42 Ibid.
43 Id. at 1037.
44 Id. at 1038.
45 Ibid.
frequently require some direction or regulation by law. The American experience has generally been to bring the abuses of adverse effects of new technological practices under control in response to increasing public demand. This is a sequence which might ordinarily be expected. We have had a striking exception to this sequence of events, however, in the atomic energy field, wherein stringent governmental control was placed over the development of this new energy source prior to the time it was made available for civilian utilization. A number of factors, but principally its wartime development for military purposes, seemed to require such governmental action. The subsequent treatment of nuclear energy has resulted in some significant deviations from traditional legal patterns in order to carry out the basic purposes of atomic energy law. These purposes are numerous, important, and—as might be expected—to a certain extent, conflicting. A new and highly restrictive concept of information control was imposed in the atomic energy field which has had extremely crucial international ramifications. Title of special nuclear material was kept in the government, and the development of nuclear weapons was strictly controlled. The government had to undertake the extraordinary step of providing insurance protection for the new civilian atomic energy industry, against liability for nuclear reactor accidents. It was also felt necessary to establish a unique and powerful new congressional unit, the Joint Committee on Atomic Energy, in order to provide a link between the highly classified activities of the Chief Executive, the Atomic Energy Commission, and the military on the one hand, and the need for accountability to the Congress and the American people on the other.


47 "It is . . . declared to be the policy of the United States that . . . the development, use and control of atomic energy shall be directed so as to promote world peace, improve the general welfare, increase the standard of living, and strengthen free competition in private enterprise." Atomic Energy Act of 1954 § 1, 60 Stat. 755 (1944), as amended, 68 Stat. 921 (1954), 42 U.S.C. § 2011 (Supp. V, 1958).


50 Section 52 of the Atomic Energy Act of 1954.

51 Id. at §§ 91, 92.

52 Id. at § 170, Indemnification and Limitation of Liability. Dangers incident to the operation of an atomic power reactor have proved a serious source of resistance to the development of a private nuclear power industry. "Basically, the problem is to find a reactor site that will be remote enough to protect the public safety in event of accident and yet close enough to consumers to permit economical transmission of electricity." New York Times, March 4, 1961, p. 7, col. 2. It is of interest to note in this connection that the fear of injury from radioactivity by Soviet workers is hindering the application in Soviet industry of various new techniques based upon nuclear physics. See New York Times, March 4, 1961, p. 33, col. 6.


Another recent technological development, namely television, that occupies our time if not our thoughts to the same extent as nuclear power, raises problems of a somewhat different order but nevertheless useful for illustrative purposes as to impact on legal-policy decisional processes. Here a scarcity of channels, at least in the commercially feasible VHF band, is
The impact of today's rapidly developing technology raises a host of implications for legal-policy inquiry. Is this technology contributing to a core of unity within the diverse cultural backgrounds of the international community? Is it leading to greater rationality in the allocation and utilization of resources? Is it tending toward standardization of conditions and practices with the inevitable development of mass tastes and mass values? Does the influence of standardization and large organization in certain segments of societal activities increase or decrease the total opportunity for individual choice? Is the over-all impact of contemporary technological developments to render the individual a less effective political and governing unit within the community?

Several questions are further suggested by the new technology in terms of the mechanics of the legal-policy decisional function in addition to the foregoing inquiries, which relate primarily to the substantive effects of the technological component. With the increasing complexity of legal-policy decisions, including the introduction of more complicated technical considerations, how can we assure that scientific knowledge will be used to fullest advantage in legal-policy decisions? Is the technical component and its ramifications beyond the reach of understanding of many of our governmental policy-makers? Are there some factors, whether technological or otherwise, over which our responsible policy officials can, in fact, exercise no control, or only minimal control? Are there increasing numbers of decisional contexts in which the human capacity for decision is simply too slow, cumbersome, and uncertain, to conform to tolerable limits? To what extent does the rigid security classification of much significant information hinder the legal-policy decisional process? And how is a balance or organization to be created which will distinguish "expert" from "layman" decisions, or perhaps more realistically, bring whatever specialized talents are useful and available to bear upon the resolution of major policy questions?

The multifarious effects of the new technology have been etched or speculated upon in the foregoing discussion. The implications are so vast, complex, and probably so decisive that this inquiry will persist until our time of crisis has passed and settled on a relatively stable course of development. Professor Heilbroner hits at certain fundamental social assumptions affected by the new technology. He finds that it has done much to shatter whatever lingering attitude of optimism we have retained and to make us question our power to control nature and to achieve constantly improving conditions of human betterment. The idea of inevitable progress, he maintains, has suffered a serious loss of support, despite the fact that Americans tend to be stubborn
optimists in spite of emerging adverse forces which are substantially beyond our control. The superior war technology has, however, modified our notions of progress by impressing upon us the possibility of annihilation, and the remarkable Soviet success in science and technology has badly shaken our confidence. Noting that the two great currents flowing in the world today are industrialism and the rise of popular aspirations, he finds—like others—that the basic question is how we can harness science and technology for legitimate social ends. To him technology is one of those great “universal trends” which may very well carry with it egalitarian political ideas and greater public control instead of being left to the “free market mechanism” and “profit-ability” standards. Emphasizing that “there has been no successful revolution against technology,” he nevertheless feels that the social implications of technical change can be guided if there is sufficiently early intervention by intelligent public control. Like others, he expresses the hope that we keep faith in the integrity of progress by facing the present realistically and looking forward to the future in its full perspective of dangers and opportunities.

Another school of thought not only analyzes the adverse effects of technological change but appears to carry out its pessimistic implications to a further degree than Heilbroner. For example, we have this statement: The conflict between human beings and the technical tendencies of society is obvious enough. Yves Simon has said, “The new rationalism born of the rationality of our technical environment may be the least reconcilable enemy of democracy and more generally of liberty... The rationalism born of technological pride hates human liberty both on account of its excellence and on account of its wretchedness.”

C. Legal-Policy Decisional Procedures and the Scientific-Technological Component

Serious questioning of our national policy-making machinery has arisen in recent years, not all of which can be attributed to political motivations. The lack of confidence manifested in the quality of much legal-policy decision-making springs from a variety of sources. The criticality of certain current

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55 Id. at 55.
56 Id. at 61.
57 Id. at 146.
58 Id. at 161.
59 Id. at 159, 169.
60 Id. at 185.
61 Id. at 187.
62 Id. at 208-209.
63 HUTCHINS, Two Faces of Federalism 22 (1961); Here the two faces of federalism appear as one. Whether we aim at individual freedom or at liberty under law, we cannot accept the rationalism of technology. Individual freedom is associated with doubt, hesitancy, perplexity, trial and error. These technology cannot countenance. Liberty under law presupposes the supremacy of politics. It presupposes the possibility, for example, that political deliberation might lead to the decision to postpone the introduction of a new machine. Technology, on the other hand, asserts that what we can do is worth doing; the things most worth doing are those we can do most efficiently; or, in de Jouvenel’s phrase, “we should not do what is good for us, but what we are good at.” Ibid.
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problems and the unstable world power balance are highly disturbing factors, as is the protracted psychological distress of the "cold war." It is commonplace to allude to the appalling complexity of many current problems. Some appear so overwhelmingly unmanageable that it is easier to ignore the difficulties, or panic, than to attempt a dispassionate analysis and solution. Human decisional capacities may not be equal to the task of maintaining a traditionally power-structured world while simultaneously undertaking to satisfy the fresh demands and needs of millions of people attempting to bridge the chasm from pre-industrialism to modern society. Goals for Americans speaks of a "time of trial" for the democratic process. At home, it is noted that our successful experiments in democracy and technology have led to the complexities of urbanized living, the standardization of tastes and attitudes, centralization of communications, a hypertrophy of organization, the cumulative tendencies of which are to isolate the individual from the centers of control, and to flood him with over-simplified and trivialized knowledge, thereby discouraging his responsible participation. On the international scene, we are found even less adequately prepared to cope with the sequence of events. Consequently, the question arises as to the capacity of American democracy to maintain its forward motion in the new decades. For one thing, it is stressed that the margin for error has been greatly reduced:

The democratic process is grounded on common agreement to proceed slowly through techniques of compromise and to avoid steps which cannot be retraced. In order to work at its best, it needs time and space—time in which to consider all points of view, to consult all interests, to build up a clear majority, and to reassure the reluctant minority; space to make mistakes and yet not do irreparable damage to the public weal nor to private liberties.

The nature of many contemporary problems, however, requires immediate decision; the number of important problems is increasing; and the character of the problems makes them more difficult to decide. Still, such decisions must be made. Democracy must count less heavily on spontaneity and place greater reliance upon firm techniques of planning. "The quiet times are gone forever; forethought, decision, and energy are the order of the day." It is hopefully concluded, however, that despite the onerous new burdens being placed on our democratic machinery, it has shown toughness, resiliency and adaptability in the past, and can probably bear up under the strain of the future.

But a steady faith in our own institutions does not remove the obstinate probability that some problems are simply not susceptible of permanent solution or even of happy temporary adjustment and that certain social forces are

64 Goals for Americans 64 (1960).
65 Ibid.
66 Ibid.
67 Id. at 65.
68 Id. at 64.
69 Ibid.
70 Id. at 65.
71 Ibid.
72 Ibid.
more or less beyond our control. It is recognized that we must make some decisions of critical importance on insufficient information, and further, that every alternative course before us may have serious adverse consequences.

But if we are to try to preserve an orderly, rational, governmental process, free of alarm and despondency, we must attempt to raise our decision-making and prediction reliability to the highest possible degree.

The current concern with the quality of national decision-making procedures arises in large part from the complexity and critical nature of the new technology and its impact on the international community. Such matters


74 That the lack of adequate information undermines the basis for intelligent decision, both in Government and industry, in certain functional contexts, see THE RESEARCH FRONTIER, Saturday Review, January 7, 1961, p. 86.

75 See LEWINSDON, PROPHETS AND PREDICTION 302-303 (1958).

76 See PRICE, GOVERNMENT AND SCIENCE 168-169 (1954), and subsequent discussion this section, infra. While of no particularly critical importance in itself, the U.S. Atomic Energy Commission's Projects, "Plowshare" and "Chariot," to investigate the feasibility of using nuclear explosives for peaceful purposes by conducting an excavation experiment in the Ogotoruk Creek, Alaska area, provides an example of the extremely complex nature of the possible effect of the non-military application of nuclear technology. The interrelated bioenvironmental factors involved and the possible derivative effects on plant and animal life had to be thoroughly explored by the Commission: "The Commission would approve conduct of this experiment only if there is assurance that it will not jeopardize the local inhabitants or the plant and animal species from which they derive their livelihood. Final authorization for use of nuclear explosives would be the decision of the President." See U.S. Atomic Energy Commission Release No. D-152 of June 8, 1961. See also New York Times, June 9, 1961, p. 15, col. 3, wherein it is stated that the A.E.C. denies that this particular explosion would result in radioactive "fallout." See also New York Times Editorial of June 12, 1961, p. 28, col. 1, re the complexity of such safety judgments by the A.E.C. and other responsible officials, stressing that the A.E.C. must be thorough and clear that no danger is involved if public opinion is to support such peaceful experiments with nuclear energy.


See also COMPROMISE VERSUS DECISION, J.D.C. BAR ASS'N., July, 1961, 367, 375. The new Pentagon emphasis on speed of decision and the use of the latest systems of automatic data processing and other electronic means of rapid, systematic decision-making required by the contemporary military-political situation is discussed by Hanson W. Baldwin, New York Times, April 10, 1961, p. 16, col. 2.

77 See, for example, Walter Lippmann, Washington Post, June 20, 1961, p. A-13, col. 1, with respect to the then-approaching decision as to whether to terminate negotiations with the USSR on the "test ban" and resume the testing of nuclear devices, who, after discussing various technical and political factors and implications of the matter states:

That the decision which the President will now have to make is not obvious, is not open-and-shut, is shown by the fact that, while warning the Soviet Union that without a treaty we shall be free to resume testing, he has not yet ordered testing to be resumed. For he has first to determine whether the net balance of advantages would be substantially on our side.

See also Chase, PRINCIPLES FOR THE NUCLEAR AGE, Saturday Review, May 20, 1961, p. 32-33, wherein the author sets forth certain "well-authenticated facts" springing largely from the new technology and then proceeds to formulate nineteen principles from these "technical facts" which have "impressive logical justification" for the nuclear age, including proposals for the construction of international governing machinery and demanding recognition that the "outstanding principle ... is the abandonment of national sovereignty."

It is of mildly amusing interest at first glance to note the "crisis" faced by our Government with respect to whether we should assist the Soviet Union to close its "ball-bearing gap," or more precisely, whether the Soviets should be permitted to buy from the United States $1,500,000 worth of newly developed, very complex machines capable of producing
as the resumption of nuclear bomb testing,\textsuperscript{78} the possibilities for an adequate disarmament inspection system,\textsuperscript{79} the "Nth Country" problem,\textsuperscript{80} and such extremely difficult judgments as determining the proportion of resources to apply to offensive military striking power as opposed to defensive bomb shelter strategy,\textsuperscript{81} are all closely tied in with technological developments. And, of course, the incidental problems arising from spreading industrialism\textsuperscript{82} and urbanization\textsuperscript{83} are of only a slightly lower order of importance and complexity.

The peculiar nature of certain problems can easily lead to exasperation, as for example, the risk of adverse mutations that future generations must assume as a result of our decision to permit nuclear weapons testing with its accompanying release of radioactivity.\textsuperscript{84} Another perplexing question concerns the multitude of derivative effects which may flow from rapid transition to automation processes, such as employee dislocation, the need for re-training, impact on wage and work-hour structure, and changes in work and leisure patterns.\textsuperscript{85} Appraisals of certain important components of the continuing national policy process are simply impossible to reduce to a confident conclusion. Hanson Baldwin has stated that President Kennedy's request for a survey of our military position within four weeks was, in fact, a request for a Herculean task which would well occupy a lifetime.\textsuperscript{86} The problem of trying to deal with fast breaking and potentially explosive events through a lumbering bureaucracy continues to elude our capabilities. But perhaps better means could be devised

high-precision ball bearings used predominantly in guidance systems of military missiles and space craft. It was pointed out that this machinery might enable the Soviets to save several years delay in closing the present gap in the "miniaturization" of their missile guidance systems. Such skill at miniaturization enables the U.S. to reduce the thrust level of its own missiles while securing the equivalent net results. See Washington Post, March 1, 1961, p. C-14, col. 4. See also the assertion by Vice Admiral Hyman G. Rickover that a $2.98 toy model of the Polaris submarine has given the Soviet Union millions of dollars worth of information about U.S. nuclear submarines. New York Times, June 18, 1961, p. 9, col. 1.


\textsuperscript{82} See generally, INDUSTRIALISM, supra note 18. The expanding range of industrialism and its impact on American society is considered by Samuel P. Hays in THE RESPONSE TO INDUSTRIALISM 1885-1914 (1957). "[T]here is no better method of enlarging our understanding of other nations than to know intimately how we responded to the very forces that millions now face elsewhere." Id. at 193.

\textsuperscript{83} See note 24 supra.

\textsuperscript{84} See Livinston and Wolfe, FAS Position on Arms Control, Bulletin of the Atomic Scientists, April 1961, p. 137. See also Chase, Principles for the Nuclear Age, Saturday Review, May 6, 1961, p. 32-33.


\textsuperscript{86} See New York Times, February 1, 1961, p. 16 c, col. 1.
to deal with the unexpected crisis so as to avoid the grief of another U-2 incident.87

The alarm over our national policy structure has been sounded by many sources. One prominent military-political observer suggests that as a society matures, decision becomes more difficult, the area of choice more restrictive, and the price of delay higher.88 Since choice is the mechanism of evolution, we must have specific goals, a formulated plan, and the courage to make hard decisions.89 Henry A. Kissinger has written:

If we seem forever on the defensive, frantically striving to stave off disaster, and if we give the impression that we use world opinion as a substitute for developing our own purposes, our policy will seem to be the result of panic rather than of sober thought.90

A growing dissatisfaction and impatience is evident with the increasing number of setbacks to our national prestige, such impatience being directed primarily at "the pedestrian pace of our bureaucratic interagency coordinating procedures which seem to be always lagging behind the more flexible, aggressive Soviet initiatives."91 A serious question is raised as to whether our political machinery is equipped to deal with the type of quick-response decision to which our military striking power is geared.92

Certain observers, however, have directed their criticism to the process of tooling the military machine, in particular to the quality of high level policy planning and execution demonstrated in dealing with the tangled scientific, military, and organizational problems of our missile program.93 In this complex story, it is asserted that indecision, delay, waste of money and skilled

87 See New York Times, February 6, 1961, p. 7, col. 2, with respect to the "Santa Maria incident." See also New York Times, May 7, 1961, p. 1, col. 7 re the establishment of a new "cold war" operation center to keep a constant twenty-four-hour-a-day watch on world "crisis spots." "Mr. Achilles and his staff . . . are responsible for seeing that recommendations for dealing with crisis are made promptly to the Secretary (of State) and through him to the President!" The group is also charged with the duty of making certain that the decisions reached by Mr. Rusk and President Kennedy 'are promptly implemented.' "To the effect that one of the major "Pentagon" trends or concerns is with "greater speed of decision," see Hanson W. Baldwin, New York Times, April 10, 1961, p. 16, col. 2.
89 Ibid.
90 See Kissinger, The New Cult of Neutralism, The Reporter, November 24, 1960, p. 26, 29. On a more specific level, James Reston, New York Times, March 19, 1961, p. 10-E, col. 6, in discussing the Kennedy Administration's multitude of problems, has stated: The Atlantic nations . . . are now at a critical point. They are under constant pressure from the Communists. They are divided into two jealous trading blocs. Britain, France, Belgium and Portugal are all going through extremely difficult periods with their disintegrating empires. Coincidentally, new weapons are wrecking many of the assumptions on which the North Atlantic Treaty was based, automatic machinery is heightening the trade war among the Allies, and the new convertibility of European currencies is creating new opportunities and new problems in the increasingly interdependent free world.

And Walter Lippman has commented: "We have had a run of bad news and the time has come when we must make up our minds whether to face it and learn from it, or to shrink from it into a nervous breakdown with suicidal tendencies." Washington Post, June 13, 1961, p. A-13, col. 1.
92 Ibid.
93 See review by Walter Millis, Saturday Review, January 21, 1961, p. 64, of MEDARIS, COUNTDOWN FOR DECISION.
personnel, vicious infighting among governmental agencies and among large industrial defense contractors, characterize our ponderous efforts to deal with one of the most pressing technological problems of the present era. Such an analysis leaves a far from complimentary evaluation of our policy and decision-making function in the political-military-technological field.

With respect to the question whether a democratically structured society has the vigor and determination to respond to the demands of a world geared to a high level military and industrial technology, it has been strongly asserted that we are now inexorably drifting into an elite control structure without full recognition of this fact. Former President Eisenhower in his Farewell Address to the Nation warned of a war-defense oriented mentality reflected in "an immense military establishment and a large arms industry" which may be endangering our traditional pattern of civil control and accountability. "We must guard," he said, "against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex."

We have probably moved further toward a limited control structure than we care to admit. Surely, some of the more critical decisions of our era have been made by one or a relatively few men, and necessarily so. The controversial novelist-scientist-government administrator Sir Charles Percy Snow has written that:

One of the overwhelming facts of our time is that the cardinal choices which lie before nations must be made by a handful of men acting in secret. When I say cardinal choices, I mean those which determine in the crudest sense whether we live or die—as nations and individuals. For instance, the choice by the U.S. in 1945 to use that bomb, the choice in the Soviet Union in the late '40s to make the fusion bomb, the choices the same countries have made about intercontinental missiles. All these choices—and many other choices involving science and government—were made in secret. They had to be. All were made by a small handful of men at the highest levels of government. All were choices made even more difficult by the complexities of modern science. And, the most bizarre and disturbing feature of all, these choices had to be made or endorsed by men—presidents, prime ministers, cabinet members, military leaders—who were not able to comprehend in depth the scientific arguments for and against the decisions.

Sir Charles stresses the need for finding new means of assuring accountability

94 Ibid.
98 G. F. Snow, Whether We Live Or Die, Life, February 3, 1961, p. 90, adapted from Harvard Lectures on Science and Government. In this connection see John W. Finney, New York Times, June 25, 1961, p. 1, col. 1; "Amid considerable secrecy, a debate is being waged within the Administration, Congress and the scientific community over a possible new atomic warhead known as the neutron bomb." And see James Reston, New York Times, June 28, 1961, p. 32M, col. 3, Khrushchev Provokes an Agonizing Reappraisal: "Decisions of great importance are now in the making, but because they involve critical and complex questions they are being taken in private. . . ." See also Hanson W. Baldwin, New York
of official actions in light of the above conditions while at the same time undertaking to demolish a variety of what might be described as democratic myths, as for example: "Scientists used to assume, as an optimistic act of faith, that science could only flourish in the free air. I wish it were so, but nearly all the evidence is dead against it... It is a pity."

"He finds fundamental fault with what he feels is a disposition against change or, at least, an unwillingness to orient ourselves to the future:

[We are living in the same world with future-directed societies. We seem to be flexible, but we haven't any model of the future before us. In the significant sense we don't know how to change. And to change is what we have to do."

In accordance with this theme, he proposes a prominent role for scientists in the highest echelons of government since, he reasons, they possess a forward-looking quality which is lacking in most non-scientifically educated governmental administrators. In his opinion, Western society is desperately short of foresight.

Times, April 10, 1961, p. 16, col. 2, re general trend toward greater secrecy in political-military affairs.

General J. B. Medaris (USA, Ret.), long associated with the Army missile development program, has commented:

With particular respect to the public administration of technological programs, I submit that the very nature of these programs will continue to demand greater concentration of decision-making powers into the hands of those who have immediate knowledge of the decisions that are needed.


Possibly other major modern trends are also tending in the direction of a less democratic decisional structure. "We are beginning to understand that automation means more centralized decision-making, more and more influence in the hands of fewer and fewer people." W. H. Ferry, Director of the Center for the Study of Democratic Institutions, On the Failings of Big Business, Washington Post, March 19, 1961, p. E-4, col. 6.

99 See also Snow, op. cit. supra note 98, at 100.
100 Id. at 102.
101 Id. at 104. In June 1961, Congressman Melvin Price (D-ILL), Chairman of the subcommittee on research and development of the Joint Congressional Committee on Atomic Energy charged that the scientific advice being given top government policy makers is too "monolithic" with too many scientific advisers of the same point of view. He called for a more diverse group of scientific and technical advisers with "fresh viewpoints" and suggested that the whole policy-making mechanism in governmental areas involving scientific and technological advice and judgments needed a complete re-examination. See Washington Post, June 15, 1961, p. 3, col. 1. On this general subject see PRICE, op. cit. supra note 76, at Ch. VI—The Structure of Policy.
102 See note 98 supra. Sir Charles has also etched in the starkest terms the present policy dilemma of the West:

We are faced with an either-or, and we haven't much time. Either we accept a restriction of nuclear armaments. This is going to begin, just as a token, the stopping of nuclear tests. The United States is not going to get the 99.9 per cent "security" that it has been asking for. It is unobtainable, though there are other bargains that the United States could probably secure. I am not going to conceal from you that this course involves certain risks. They are quite obvious, and no honest man is going to blink them. That is the Either. The Or is not a risk but a certainty. It is this. There is no agreement on tests. The nuclear arms race between the U.S.A. and the U.S.S.R. not only continues, but accelerates. Other countries join in. Within, at the most, six years, China and several other states will have a stock of nuclear bombs. Within, at the most, ten years, some of those bombs are going off. I am saying this as responsibly as I can. That is the certainty. On the one side, therefore, we have finite risk. On the other side we have a certainty of disaster. Between a risk and a certainty, the sane man does not hesitate. It is the plain duty of scientists to explain this "Either-Or." Newsweek, January 1, 1961, p. 75.
Early in 1960 the Jackson Senate Sub-Committee on National Policy Machinery undertook to seek ways for the government to act more speedily in crucial decision-making contexts involving scientific and technological components which might “radically affect the world balance of power.” Matters of prime concern to the Sub-Committee included the delays in developing a hydrogen bomb, and the satellite and intercontinental ballistic missile programs. Most questions posed concerned how the State and Defense Departments could furnish more useful guidance for over-all political and military objectives without placing a straight jacket on technological development. Institutional changes in governmental departments were also to be studied so as to achieve better scientific-political analysis and planning on crucial national problems. Certain moderate changes have been recommended.

This wide-ranging concern with decisional processes involving important technological elements has not been overlooked by the new administration. In President Kennedy’s First Report to Congress on the State of the Union, he repeatedly directed his attention to the need for a more effective organization of the governmental decision-making function, especially in the political-military sector. He asserted that we must make arms control the central goal of our national policy, and that we must make certain our negotiators are better prepared to formulate workable proposals and to make sound judgments about the proposals of others. He asked for international cooperation so as “to invoke the wonders of science instead of its terrors” and invited other nations to join with us in developing weather prediction programs, communications satellites, and in probing outer space.

Not to be overlooked in our concern over technological complications in the international area is the controversy over the quality of the decision-making processes of our various independent regulatory agencies which—to

104 Ibid.
105 Ibid.
106 Ibid.
109 Ibid. See James Reston, New York Times, April 21, 1961, p. 32M, col. 4, re President Kennedy undertaking to re-examine certain of his original assumptions about governmental decision-making effectiveness after the Cuban invasion fiasco. It is suggested that “rethinking” was needed with reference to such policy decisions in view of their complexity and world-wide political-military ramifications.

The important thing is to learn from this grievous mistake (the Cuban fiasco). We must postulate our acts on sounder information and weigh more surely the consequences of failure. We must obscure our methods of cold warfare and get the C.I.A. right out of public life. Democracies can sometimes be too curious. And we must learn to obscure our official reactions in a cooler, more studied way.

110 Note 108 supra.
111 Ibid. See also W. H. Lawrence, New York Times, March 5, 1961, p. 57, col. 1, re President Kennedy’s approach to the decisional machinery within his immediate executive staff, including his plan for a staff of “thinkahead advisers” who will concern themselves less with the day-to-day problems of the Presidency than with the potential crises that lie ahead.
a considerable degree—are supervising functions arising from continuing technical advances. The President has also recommended changes in the operations of these agencies.

This brief review of recent events should serve as ample notice that technological advances in the past twenty years have placed enormous strains upon our national legal-policy machinery and that the need is urgent to invent organizational procedures and techniques of decision which will enable us to exercise some appreciable control over rapid technological change.

D. The Need For Cross-Disciplinary Approach to Legal-Policy Problems

In a recent Yale Medical Symposium one of the speakers, noting the fact that there are enough nuclear weapons in existence to kill the world's population three times over, said:

The human race for the first time is in trouble. We're the first human generation which holds veto power over continuing evolution.

The one great problem of this generation is to enlarge our loyalties and to become members of the human race. We can never again survive as groups competing with other groups.

Though some people have sounded the hopeful lyric that the very efficiency of military technology must somehow convince rational men that war is no longer a feasible means of settling international disputes, we cannot rely upon the proposition that the efficiency of war has abolished war. The fact that the stakes are so high and the problems so complicated has prompted the assertion that the judgments demanded of us today are of an entirely higher order of magnitude than in the past. Consequently, new emphasis

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112 See Report on Regulatory Agencies to the President-Elect by James M. Landis (December 1960) (Senate Judiciary Committee Reprint). See also Earl W. Kintner, former Chairman of the FTC, Federal Administrative Law in the Decade of the Sixties, 47 A.B.A.J. 269 (1961).


115 If the creation of a peaceful world is to be the dominating purpose of U.S. foreign policy—and I believe it must be because war has been made obsolete as a way of settling disputes between nations—then the pursuit of peace must be the all-pervading purpose of all of our acts on the international scene. No one single policy such as disarmament is the answer. All our major policies must work together to produce the result.

Thomas A. Finletter, Foreign Policy: The Next Phase, 22-23. See also Chase, op. cit. supra, note 77.

Herman Kahn in his book On Thermonuclear War rejects the possibility that nuclear weapons have replaced war as the ultimate arbiter between nations and instead emphasizes the probability of war, "how to prepare for it, to adjust to it, and to win it." See Marseille, On Thermonuclear War, Bulletin of the Atomic Scientists, April 1961, p. 157.

116 See Chase, supra note 77:
must be placed on creating procedures and training personnel capable of dealing with this new order of responsibility. As James Reston in the New York Times has said, the President "is now saying that the nation needs different skills, not for an agrarian society but for a revolutionary technological society; not for the conquest of the frontier, but for the defense of the Union and the conquest of the Heavens."

There is growing recognition of the necessity for bringing together a wide variety of professional backgrounds to illuminate complex problems of public importance, but there is also a substantial difference of opinion as to how this function can best be performed. At one extreme, individuals representing all relevant disciplines may be the preferred pattern, although the idea can

moorings. Most of us, however, seem to be so many Don Quixotes, unaware that the old verities have disappeared. The prime questions posed by the nuclear age are not the U.S. against Russia, or Russia against China, or Communism against capitalism; the prime question is the continuity of the human race. This requires a profound shift in one's value system.

See also, Renault St. Laurent, Q.C., President of the Canadian Bar Association, in A.B.A.J., November 1960, 1175, 1176:

The adoption of federalism in the United States at the end of the eighteenth century was a landmark in the history of human self-government. It was also a landmark in the extension of the rule of law. It seems to me that what humanity is crying for today is another breakthrough comparable with the invention of federalism. A breakthrough in political ideas which will make possible the extension of the rule of law to the whole world.

and

The most exciting thing in Europe today is Britain's slow but steady movement toward joining the European Economic Community (Common Market) and throwing over 500 years of history to make common cause with Europe. This is more than an economic movement; in fact, all the economic jargon surrounding it has tended to obscure the central fact that, like our own founding fathers in Philadelphia, these men are talking about forming 'a more perfect union.' This is, in short, another of those moments in history when great decisions are in the making. The Continent is in flux. The possibilities are great, but once again the West needs the unifying engine that can adapt their work to the even greater and more menacing forces of the twentieth century.

James Reston, New York Times, June 7, 1961, p. 38-M, col. 3, urging that political arrangements be devised which will be adaptable to social change, as contrasted with the static concept of the Congress of Vienna of 1815.

On the neglected but badly needed function of policy planning, see Saville Davis, How the Scientists Have Prodded Lagging Politicians Along the Trail, Saturday Review, December 10, 1960, p. 57: "One point is plain: the procedures of the recent past have been notably inadequate to the need. There are two aspects to this shortcoming, in immediate operation and in long-range planning." See also by same author Recent Policy Making in the United States Government, Daedalus, Fall 1960, p. 951, 965-966.

See Born, Physics & Politics, Bulletin of the Atomic Scientists, June 1960, p. 194, 199, wherein the author calls for the type of revolutionary conceptual thinking in political system that has taken place in science: "What should come now is an attempt to apply to politics methods of reversed thinking successfully used in physics, and to point out seemingly irreconcilable contradictions as complementary and reconcilable situations."


118 "Government, to be effective, demands an understanding, cooperative relationship among men of various educational backgrounds and experience to mount a constructive unified attack on the policy and administrative problems which the specialists, and the general administrator and politician, are together called to solve." President Nathan M. Pusey of Harvard, New York Times, January 15, 1961, p. E-11, col. 3, discussing Harvard University programs which "emphasize the way in which the various scholarly specialists of a university can be brought together to illuminate complex problems of public importance and put the experience of scholars at the service of those of diverse background who are grappling with the solution of governmental problems."
be advanced, however difficult to implement, that there must be some professionals in national policy-making positions and on graduate school faculties who combine the learning and talents of multiple skills. This new order of competence will, no doubt, take many shapes. A former scientific advisor to the President, commenting on the close relationship of science to national policy decisions, has stressed the importance of having relevant scientific facts properly interpreted to the ultimate political decision-maker, and indicated that the question of interpretation may well depend on a new breed of men who must rise to resolve it. \[^119\] [Italics added]

Certainly lawyers will have an important role to play at the legal-policy level wherein problems having significant technological components must be analyzed and appropriate courses of action recommended. On many such problems a lawyer's special skills will be indispensable in devising the most effective alternative solutions, in finding workable arrangements, in bringing order out of human confusion. \[^120\] But to be of maximum effectiveness in such decisional contexts, the lawyer must have the capacity to understand the significance of a wide range of diverse and apparently disconnected factors, to organize and appraise these factors and place them in a framework in which the possible

\[^119\] See Kistiakowsky, \textit{Where is Science Taking Us?} Saturday Review, December 10, 1960, p. 61:

Another kind of individual must be added to the team: An individual trained in the usual disciplines of the foreign service, but literate in science. The general opinion is that science is too specialized to provide scientific inputs to policy formulation except as advice from practicing scientists on an \textit{ad hoc} basis. I submit that as valuable as such advice is, it does not fill today's requirements for a continuing and intimate involvement in the policy-making process of competent people who understand science and its significance to policy enough to work effectively with the practicing scientists supplying the specialized \textit{ad hoc} studies. We have entered a new era \ldots in which science and technology are transforming our way of life and the relations between nations. Scientists and other enlightened citizens cannot stand aside and simply watch this process, regardless of where it takes us; we must and we can use science and technology to achieve the humanistic goals of our free society.

"Modern technological advances have increased the importance of mind over muscle in getting things done, and demands on Government career aides are expanding as the jobs Government has to get done expand in importance." Secretary of State Dean Rusk, New York Times, April 12, 1961, p. 11, col. 2.

That "new thinking" must take place in U.S. foreign policy, see \textit{Finletter, Foreign Policy: The Next Phase (The 1960's) 3} (1960). "We are in a situation where we have no choice other than to rise to greatness." \textit{Id.} at 227. See also, Price, \textit{op. cit. supra} note 76, at 203.

\[^120\] The lawyer's training and experience fit him especially well for the tasks of translating knowledge into responsible action, of choosing among contingent alternative courses of action, of guiding action through the formulation of policy and law, of institution building. The research approach of the lawyer cannot be that of the physical scientist nor even that of the social scientist. The scientist proceeds on assumptions (tested by experience) that the world is ordered, that this order is to be discovered by him and that from his observation and controlled experiments he can draw generalizations that have universal validity. The lawyer, in contrast, proceeds on assumptions that order has to be created, that the contingency of alternative potential orders has to be resolved through action based on responsible judgment, and that this requires the participation and active collaboration of those among whom relations are to be ordered.

choices can be illuminated.\textsuperscript{121} This type of analysis or "planning" is the indispensable device whereby the responsible official can be made aware of the probable consequences of his decisions before he makes them instead of afterwards.\textsuperscript{122} Not solutions so much as delineating feasible alternative courses of action would seem to be a job that lawyers, even through traditional training, are reasonably well equipped to do. No profession is fully qualified for the job of examining, criticizing and evaluating problems at the legal-policy level. But the basic LL.B. education does provide an analysis framework for systematic decisional procedures which is highly useful in bringing together and organizing material from almost every facet of human experience. Even so, at the higher reaches of legal education there is obvious need for greater emphasis on related professional skills, the types of problems they undertake to solve, their frameworks for analysis and techniques of decision. The sheer complexity of much legal-policy problem-solving and of developing training techniques which might improve this skill would seem to call for a decision-making approach rather than any static system of fixed rules or formulae.\textsuperscript{123} As has been noted, what we most need are more adequate "models for change," models that deal with the total context of a problem rather than with a partial and, by itself, sterile legal dimension.\textsuperscript{124}

It is doubtful that the legal profession and the law schools, especially those which are equipped to give advanced graduate work, can any longer dismiss the demand for a more systematic approach to training for the legal-policy decisional level. Assertions that such matters are so complex as to be unteachable, or that no systematic means can be found to handle such problems, or that such and such a problem falls into another professional field, or that it simply gets down to a matter of arbitrary judgment, or that a judgment is required that only experience can satisfy, or that one can never obtain all of the relevant information for such judgments, may have some kernel of validity but are hardly satisfactory reasons for indifference in today's fast moving world where every educational resource and every unit of trained intelligence is needed to cope with the situation. There may never be an entirely happy solution to the problem of where and how much to spend on space research, but we realize that a choice must be made and we should use whatever rationality we have to do a systematic job.

In view of the concern over governmental decisional machinery during


\textsuperscript{122} See Black, \textit{The Diplomacy of Economic Development} 25, 32, 35 (1960).


\textsuperscript{124} Concern with the "process of change" is a major characteristic of the "research philosophy" approach of the Center for International Studies at the Massachusetts Institute of Technology. See Ninth Annual Report, 1959-1960, p. 43, 45. See also Henry A. Kissinger, \textit{The Next Summit Meeting}, Harper's Magazine, December 1960, p. 60; C. P. Snow, \textit{op. cit. supra} note 98.
the past few years and the prospect of issues becoming more, not less, complicated, it would appear likely that increasing attention will be given by most professional schools, as well as industry and governmental units, to the invention and managing of decisional machinery and techniques—the function of determining the nature of the problem and mobilizing the facilities and skills necessary for a complete analysis. Decisional managers will not necessarily be lawyers, of course, but there will be constant need for the lawyer's skills at the legal-policy level of decision, and the better grasp the lawyer has of the total decisional context, the more effective part he can play in this operation. It does point to a new dimension in professional training.

Assuming the need for major emphasis to be placed on the decisional function in professional legal training, especially in the "public law" sector, several inquiries are immediately posed relating to: principles of staff organization; channelling information; types and levels of expert advisory assistance; function of the "staff" as information processor, advisor or planner; locus of decisional sequences within the organization; composition of the final decision-making unit; appraisal of the ultimate decision product with respect to efficiency of operation, quality of judgment made, etc. In addition, at least three component functions of the decision process need continuing if not greatly extended consideration, namely: 1) Goal-value clarification, the reduction of general goals to concrete operational indices and the necessary interplay between postulated goals and the means of their achievement; 2) Conceptual thinking, particularly in terms of "models" of societal activities which will provide some insight into the consequences of alternative policy projections, and; 3) The employment of the newly developed communications theories and informational skills and techniques which should vastly improve the level of relevant information upon which judgments can be made. Only the second of these can be considered briefly herein.

E. Conceptual-Model Thinking at the Legal-Policy Level

In Goals for Americans a so-called "Imperative of Responsibility" is spoken of as the indispensable element in the conduct of those having control over the critical matter of nuclear weapons employment. Maturity of judgment and prudence are the essentials. Goals adds:

125 See Price, op. cit. supra note 76, at 93, wherein the author calls for a new type of governmental administrator who can confidently evaluate policy problems having important scientific and technological components and suggests a new synthesis of studies in "controls systems" or systems analysis. He states with respect to such an administrator that "He has to consider not only the scientific and engineering and commercial systems, but also how they may be managed in relation to political, legal, economic, and diplomatic problems." Id. at 94. A much better qualified administrative corps is called for, though not a closed administrative elite. The idea is advanced that good administrators come from highly diverse backgrounds. Id. at 188. For a special indication of this trend see New York Times, June 1, 1961, p. 8, col. 2 re statement of Dr. John R. Pierce of the Bell Laboratories that: Top-notch human brains will be needed henceforth to make wise use of computers... (wise decisions) certainly cannot be made by even a bright specialist in management unless that specialist is willing to devote years of hard effort to learning things quite outside of his specialty, things that have to do with machines and systems of machines, with data and information, rather than with organizations of people and human idiosyncracies.

126 Goals for Americans 75 (1960).
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So, too, must the "imperative of anticipation," for these same decision-makers and administrators must have a perception of the future, a grasp of the predictable and an instinct for the unpredictable, that managers of the democratic process have not found quite so necessary to cultivate in the past. The stumbling reaction of our government to the immense legal and administrative problems raised by the swift advance toward practical exploitation of outer space is example enough of the need for a new order of imagination all through the structure of democracy.127 [Italics added]

While some professional training may be oriented toward the type of conceptual or "model-thinking" that would assist in achieving this quality of judgment, our legal training would seem to be somewhat deficient in its lack of emphasis on this phase of legal-policy decision-making.

"Model" may be given a variety of meanings but has ordinarily, in scientific and technical literature, been employed to denote the representation of a segment of reality.128 That is, it refers to aspects of actual behavior or events or to how certain functions are, in fact, performed rather than to preference statements as to how such functions should be performed.129 In discussing "models" in this sense, one is primarily concerned with facts (conditions, trends, inter-relationship of variable-factors, projections and predictions of factual consequences) rather than goals or values130 although a model might be formu-

127 Id. at 76.
128 See Bross, Design For Decision (1953) : Ch. 10 discusses the character and various functions of models and the more common types: abstract, symbolic, mathematical, and statistical. Dahl, Hierarchy, Democracy, and Bargaining, in Politics and Economics 45, (Brookings Lecture, 1955), emphasizes need for models of the three foregoing "systems" in his title. Dahl discusses the relationship of models to reality and acknowledges that models for analysis of social processes must necessarily oversimplify. Id. at 67-68.
129 See generally Bross, op. cit. supra note 22, Chapters II, III, & IV.
130 As for example, Hanson, op. cit. supra note 129, at 89 states: "Triumphs in contemporary physics consist in discovering that one parameter can be regarded as a function of some other one." But it is, of course, evident that the Is and the Ought, that Fact and Value are interacting elements in most decisional processes. Their separate consideration
lated on the basis of postulated factors or even of a conceptual structure or hypothesis for the purpose of analyzing certain data or for verification as to its accuracy of representation. A model then becomes a tool of purposive rational action; depending upon its adequacy, it brings order and arrangement into a confused factual context; it provides for a meaningful organization of relevant factors and assists in ordering relationships between variables. Frequently, the major significance of a model is as a formula for predicting consequences of given courses of action.

Lawyers and law students are, of course, familiar with the concept of "model," or most certainly should be in that they have been exposed to models of man, models of society, models of various jurisprudential systems, and, most surely, to models of judicial decision-making. But there seems to be a

is, however, most helpful to a clarity of analysis in many types of legal-policy problems.

For an excellent discussion of the tendency of the Is and the Ought to be merged in judicial decision-making see MILLER and HOWELL, supra note 23, at 665-667.

131 See HANSON, op. cit. supra note 129, wherein the author uses the terms abduction and retrodiction to describe "studying facts and devising a theory to explain them." Id. at 85.

What is a "model" theory? It is to offer an "intelligible, systematic, conceptual pattern for the observed data. The value of this pattern lies in its capacity to unite phenomena which, without the theory, are either surprising, anomalous, or wholly unnoticed.

Id. at 121. See also BROSS, op. cit. supra note 128, at 161-174.

132 See BROSS, op. cit. supra note 128, at 37, 165, 169; DALL, op. cit. supra note 128 at 68 re predicting in terms of cost and gains; HANSON, op. cit. supra note 129, at 71, 72, 91; LEWINSOHN, PROPHETS AND PREDICTION (1958), at 49-50 (methods of prediction), 276-279 (models as "conditional predictions"), 284 (success with prediction in economic models), 290 (predictions in industrial operations), 304 (the "future of prediction"), 306 (restricting "chance"), and 308 with respect to the development of effective methods of prediction in the technological area. The author states: "... the sphere of unpredictable events is rapidly contracting." Ibid. See also SHUBIK, op. cit. note 128:

"Game theory offers a way of thinking systematically about the limiting conditions under which choices must be made... Game theory assumes that the conflict or competition element in political situations can be measured with precision and that often results can be predicted. [Italics added]."

On models and their use in prediction see Introduction to the Nature of Game Theory, Id. at 1. See also, Fleisher, The Influence of Technology on Urban Forms, in Symposium: The Future Metropolis, Daedalus, Winter 1961, p. 48; New York Times, April 3, 1961, p. C-11, col. 1, re the development of a mathematical "input-output" technique (model) for predicting the degree of economic dislocation that substantial disarmament would produce in the nation. Such predictions have a use in guiding policy makers in government and industry with respect to certain assumptions made regarding disarmament measures. See also Harrison E. Salisbury's review of VERNON, METROPOLIS 1985, New York Times, November 13, 1960, p. 3:

The author is careful to avoid absolutes. He concedes that even the most careful and scientific projections are inherently subject to major error.

But, as he adds, "a careful guess is better than a heedless one; and our guesses may provide a better basis for major business and government decision... Without necessarily accepting the final numbers we generate some may find our intermediate judgments of some value!"


133 See, e.g., COHEN & COHEN, READINGS IN JURISPRUDENCE AND LEGAL PHILOSOPHY (1951), Ch. 6: The Nature of the Judicial Process; PATTERSON, JURISPRUDENCE: MEN AND IDEAS OF THE LAW (1953), Part V, The Judicial Process; FRANK, COURTS ON TRIAL (1949); CARDozo, The Nature of the Judicial Process (1921); O'Meara, Natural Law and Everyday Law, 5 NATURAL LAW Forum 83 (1960).

For recent studies see Auerback, Garrison, Hurst and Mermin, The Legal Process (1961); WASSERSTROM, The Judicial Decision (1961); SCHUBERT, QUANTITATIVE ANALY-
tendency, perhaps for good reason, to merge the predictive and valuable components of the decisional process in legal thinking, as for example, in such "standards" as the "reasonable man" or the "public interest." It is suggested here that lawyers, and especially those moving into the Public Law legal-policy sector, should place greater stress on model thinking and the predictive element. Developing a sensitivity to social movement (trend thinking) and to relationships between or among factor-variables (scientific thinking) would seem essential for a confident grasp of legal-policy problem contexts. We permit the predictive element to remain ambiguous with resulting loss in rational judgment. Whatever concept we entertain of our own decisional process, we inevitably proceed on certain assumptions, draw images, and make predictions, whether conscious or unconscious, in arriving at decisions. It is urged, therefore, that this component of the decisional process be made more explicit.

Whether or not lawyers have contributed a proportional share to the legal-policy model-making function of recent years, there has clearly been no lack of such effort by others. Scientists, mathematicians, political scientists, social scientists, city planners, and particularly, economists have given us models of such actual or postulated patterns of conditions and activities as: the present world political configuration—of enemies, allies and neutrals; of the USSR...
and its internal decisional structure;\textsuperscript{138} of the relationship of the USSR to Red China;\textsuperscript{139} of Soviet Man and of Western Man;\textsuperscript{140} of the unfolding operations and prospective results in event of nuclear war;\textsuperscript{141} of the possibilities of accidental war;\textsuperscript{142} of the operations of the deterrent concept and of graduated response;\textsuperscript{143} of the probable operations of various disarmament arrangements;\textsuperscript{144} of the consequences of continued nuclear weapons testing on mutational changes


The significance of American Strategy for the Nuclear Age lies in its analysis of the international situation and its appeal for direct action. To a very large extent, the theme depends on the particular estimate of Soviet intentions that is presented and the particular prophecy of the Communist future that is forecast.

The shorthand label for this particular model is that of "Protracted conflict." \textit{Id.} at 104.


\textsuperscript{140} See C h u l l, SOVIET LEADERS & MASTERY OVER MAN (1960), with special attention to the Epilogue, p. 151-157. See also Arnold J. Toynbee, \textit{Spiritual Freedom is the Great Difference}, New York Times Magazine, January 15, 1961, p. 8: "The toleration of minority beliefs made the Western world what it is. The difference from Russia is vital."

\textsuperscript{141} See \textit{K ahn, On Thermonuclear War 576} (1960):

If we are to anticipate, ward off, and prepare for crisis and trouble, if we are to design for safer and better security systems, if we are to control our destiny, we will need much better mechanisms than we have had for forward thinking, for imaginative research into problems of strategy and foreign policy, and for anticipating future technical and military developments and planning to meet them.


Accidental war is often adduced as a powerful motive for disarmament. The multiplication and dispersion of ever more powerful weapons seems to carry an ever growing danger of accidental war; and many who are confident that deliberate attack is adequately deterred are apprehensive about the accidental-war possibilities inherent in the arms race. . . . We ought to cultivate the enemy's belief that we shall respond to what may be the opening moves in a general war with deliberate care and control and sensitivity to what is going on, not with an instant, all-out, indiscriminate effort to destroy all the enemies who may have been involved.

Thomas C. Schelling \textit{Meteors, Mischief, and War}, Bulletin of the Atomic Scientists, September 1960, p. 292. See also Washington Evening Star, April 5, 1961, p. 1, col. 2, and the New York Times, April 5, 1961, p. 1, col. 1, with reference to the organizational steps taken by Secretary of Defense McNamara to prevent "false alarm war" and to retain "tight control" over our retaliatory action in case of an apparent enemy attack. The Secretary had, at this time, two sets of recommendations under consideration designed to devise a mechanism to provide for "controlled response and negotiating pauses in the event of thermo-nuclear attack," and "to insure that the command and control system and its equipment will permit the designated authorities to react to an attack in a deliberate position."


\textsuperscript{144} See Symposium: \textit{Arms Control}, Daedalus, Fall 1960. See also, \textit{Disarmament Comparison of Soviet and Western Proposals}, Bulletin of the Atomic Scientists, October 1960, p. 336, and numerous other articles appearing in this periodical during the past several years.
in future generations;\textsuperscript{145} of the pre-industrial nations and their apparent movement toward totalitarianism or democratic processes;\textsuperscript{146} of the impact of automation on employees and on industries;\textsuperscript{147} and of the trend to urbanization.\textsuperscript{148}

Whatever the comprehensiveness, adequacy and reliability of these models of significant social and power processes, the irrefutable fact remains that if rational thought is to be applied to such matters, there must be some basis for predicting the movement of events and the probable results of certain eventualities, this being the basis both for formulating feasible alternatives and predicting the probable consequences of such courses of action.\textsuperscript{149} Continuing

\textsuperscript{145} See Barnett, Who Wants Disarmament? (1960):
Would a moratorium or a ban on the testing of nuclear weapons increase confidence and provide a basis for genuine disarmament? Supporters of this measure have given primary emphasis to the necessity of reducing the world radiation hazard rather than the political implications of stopping the tests. Soviet propaganda has insisted that an immediate end to the tests is essential to remove the immediate threat of harmful genetic changes. Many scientists in the United States agree with this position. Others take a more conservative view. All are agreed, however, that any substantial increase in the world radiation level is highly undesirable.


\textsuperscript{146} Specifically, see Rostow, \textit{The Stages of Economic Growth} 134 (1960).

\textsuperscript{147} See note 85, supra.


\textsuperscript{149} Policy alternatives are more or less defined by the model adopted. For example, Herman Kahn, who rejects the idea of total annihilation for that of substantial human survival after a nuclear exchange has proposed that $500,000,000 on an annual basis be provided for civil defense. See New York Times, May 19, 1961, p. 2, col. 4.


The arms control school, according to Warburg's analysis, believes that "human nature" makes war inevitable but that it can be limited in scope and in the nature of the weapons employed. The disarmament school denies that war in a thermonuclear age can be limited or controlled and asserts that abolition of war can only be done through universal disarmament and adequately enforced world law. . . . At bottom, arms control, in Warburg's view, is a theory created by wistful men who can't accept that war is obsolete but who do recognize that in war's modern form there can be no victors, only victims; and who, not without reason, question man's ability to settle disputes among nations judicially through a supranational organization.

On the two prevailing concepts or models of USSR strategy and the practical consequences of each view with respect to US policy toward Cuba, see Edward Crankshaw in the Washington Post, May 8, 1961, p. A-16, col. 6. Mr. Crankshaw describes Khrushchev's thinking as seen by Walter Lippman as that of viewing current social and political unrest as an inevitable revolutionary movement with Communism the predetermined victor. Hence, the USSR leaders are relatively unconcerned with such temporary and local complexities as Laos and Cuba. President Kennedy's supposed view is contrasted and described as seeing the tactical picking-off of vulnerable areas by subversion and infiltration as the major preoccupation of the USSR.
scholarly reassessment of such conditions and processes is essential to rational policy-making. The writer of a survey of several studies of American foreign policy, prepared at the request of the Senate Committee on Foreign Relations, concludes by stating:

The findings of these reports are very important... we see that scientific, technological, and social changes are increasing rapidly, and are profoundly affecting the world situation and our position in it. Our relative economic and military power has declined, the problems of the underdeveloped countries are increasing, and European stability is far from certain. At the same time the Soviet Union is not only increasing in power, but is developing into a far more complex society than we had believed possible; the same is true for China. This world reality is far different from the one presented by our press and government.\(^1\)\(^5\) [Italics added]

Lawyers involved in international legal-policy problems will surely find two recent studies by economists stimulating and meaningful for the models they construct. While it is still necessary to analyze international problems in terms of power relations, models such as that of W. W. Rostow in his Stages of Economic Growth, take change rather than the status quo as the basic assumption, and accept certain balance of power shifts on the world scene as inevitable.\(^1\)\(^5\)\(^1\) New ideas and new technologies are beating against the old social and political structures of the pre-industrial nations, Rostow finds, and are making substantial headway, aided by the spread of literacy, increasing use of information media, and the pressure of population growth.\(^1\)\(^5\)\(^2\) If the “take-off” into industrialism is prevented or frustrated, this inevitable change will eventually erupt in drastic or violent form.\(^1\)\(^5\)\(^3\) Policy judgments should, therefore, undertake to guide or contain such change rather than suppress it.

A second study by four eminent economists entitled Industrialism and Industrial Man\(^1\)\(^5\)\(^4\) creates a comprehensive model of the movement toward industrialism with all of its consequent commitments. From this “model of change,” the authors derive or project a wide range of highly significant developments in societal organization and function. It is not productive to argue whether such extrapolations are or are not correct. It can be said that there is substantial evidence to support the model and considerable plausibility in the deductions and projections therefrom. Until a more plausible model is invented, this study offers legal scholars a highly suggestive array of trend material for analysis in terms of impact on legal system. The value of such models is that, if skillfully utilized, they offer a possible means by which the legal-policy participant can get into the van of events and bring the legal factor into play to shape, to some degree, important social trends instead of being dragged along by them.

\(^1\)\(^5\) Feinstein, American Scholars Analyze US Foreign Policy, Bulletin of the Atomic Scientists, January 1961, p. 30, 34.
\(^1\)\(^5\)\(^1\) See Rostow, op. cit. supra note 146.
\(^1\)\(^5\)\(^2\) See Feinstein, op. cit. supra note 150, at 396.
\(^1\)\(^5\)\(^3\) Ibid.
\(^1\)\(^5\)\(^4\) Note 18 supra. The four authors are Clark Kerr, John T. Dunlop, Frederick H. Harbison, and Charles A. Myers.
tions. The model of "pluralistic industrialism" is discussed in terms of a number of striking assumptions and projections, as for example: the sources of uniformity; the threads of diversity; the state that does not wither away; the crucial role of productive enterprise; the expanding "web of rules"; the movement from class war to bureaucratic gamemanship; "associated man" and the shift from class to special interest group identification; and the organization man and the new bohemianism. These generalities are reduced to meaningful and specific criteria. Extrapolation into the future poses the eternal tension between the forces promoting uniformity and those perpetuating diversity. Industrialism is offered as a powerful source of uniformity. Strong conflicting ideologies tend to fade and sharp ideological alternatives cease to be posed about the "best way" to organize industrial society. Unworkable utopias give way to a more pragmatic realism. "Solutions are negotiated among representatives of leading interest groups rather than fought out on the level of principle. . . . The negotiator takes the place of the prophet, the idealist, the demagogue." The administrative functions grow in maturity and administrators become increasingly skilled. "Balance" among competing power centers is the crucial continuing problem. Debate on ideological principle gives way to compromise over more mundane demands. Societal organization under whatever name is essentially "guided." A broad consensus prevails.

The model of "pluralistic industrialism" further postulates that as industrialism develops, the requirement of higher education skills becomes manifest, and that this possibility for all men to become literate carries with it a more common equality, not linked to ideology, and a stronger individual stake in personal independence. Large-scale organization, whether public or private, run by professional managers, is a cardinal characteristic. The state, also, will grow in importance. "Industrialization has been accompanied by the growth of the directing, guiding, managing state as never before so universally in history." The "compulsion toward comparison" will accelerate in force, such pressures developing regardless of culture and ideology — carried, and reinforced by new communication and transportation technologies. The authors state:

The thrust of progress also serves the cause of uniformity. . . . The rising standard of living and increasing leisure create the capacity to read and travel and compare.

People may not be willing to settle for much less in their own systems than the standards and performance in competing systems.
Though a rapidly developing technology is a highly significant motive-controlling factor in the "pluralistic industrialism" model, it is not necessarily a decisive influence in itself. As the authors state:

The fully developed industrial society is too dynamic and complex to yield to the dictates of a single imperative; and a theory about it which yields sole place to any single imperative is too simple to do more than mislead.\textsuperscript{165}

Industrialism is so complex and subject to such contrary internal pressures that it never can assume a single uniform unchanging structure; but it can vary around a general central theme and that theme is pluralism.\textsuperscript{166}

Pluralistic industrialism will never reach a final equilibrium. The contest between the forces of uniformity and for diversity will give it life and movement and change. . . \textsuperscript{167}

The themes of uniformity and diversity, and manager and managed which mark the world today will characterize it in the future as well. There will be constant adjustments between these eternally conflicting themes, but no permanent settlement. They will constitute the ever lasting threads of history: the uniformity that draws on technology and the diversity that draws on individuality; the authority that stems from the managers and the rebellions, however muted, that stem from the managed. These threads of conflict will continue when class war, and the contest over private versus public initiative, and the battle between monistic and atomistic ideologies have been left far behind in the sedimentary layers of history.\textsuperscript{168}

Whether termed theorizing, model-making or conceptualizing, this type of intellectual skill needs to be encouraged, especially among those in the legal profession who are dealing with broad-ranging legal-policy problems and among those students who may expect to spend a portion of their professional careers in some capacity requiring at least a rudimentary insight into the construction and function of patterns of societal behavior and institutional practices.

What is suggested is that for some purposes it is useful to consider the Predictive and Valuative components of the decision process separately although in much actual judgment-making the two are merged.\textsuperscript{169} The encouragement of creative conceptual thought should stimulate greater resourcefulness in the invention of feasible choices for coping with social problems. To meet the challenge of the really complex and dangerous problems confronting us today, to create the means for coping with rapidly breaking events, stress must be

\begin{itemize}
  \item \textsuperscript{165} Id. at 290.
  \item \textsuperscript{166} Ibid.
  \item \textsuperscript{167} Id. at 296.
  \item \textsuperscript{168} Ibid.
  \item \textsuperscript{169} See Miller and Howell, supra note 23. The confusing of fact and value, or otherwise expressed, the refusal to think through consequences on the basis of available information is supposedly illustrated by the thinking of the 1950's to the effect that nuclear war must annihilate and is therefore immoral, instead of analyzing the situation to determine if at least a limited defense is feasible. See Marseille, On Thermonuclear War, Bulletin of the Atomic Scientists, April 1961, p. 157, 159.
\end{itemize}
laid on encouraging skills which will produce useful projections into the future rather than being satisfied with rationalizing the past.

The effective pursuance of this objective not only requires models designed to project substantive trends but also adequate models of the decision process itself, sufficiently comprehensive to encompass all significant influencing factors and sufficiently flexible to respond to conditions of change. Increasing interest is being directed to the nature of decisional processes. A model of decision-making which, in its simplest form, provides a useful analytical tool at the legal-policy level would include the following components:

1) The specification of goal-objectives
2) Contextual factors: identification of relevant conditions and trends
3) Designating alternative courses of action
4) Projecting possible outcomes for each alternative
5) Describing specific consequences of each outcome
6) Evaluation of such consequences in terms of the specified value-preference scale
7) Final choice of course of action to be followed

This general construct may be amplified or modified as desired for specific decisional contexts. In this decisional framework, the previous discussion of "model" was, of course, related to the fact (condition-trend) and prediction components.

Frequently, the suggestion for development of predictive skills through model thinking raises the objection that such predictions are inherently speculative and that reliance thereon involves great risk. Of course projections

170 See references note 133. See, e.g., Feliciano, Book Review, 68 YALE L. J. 1039 (1959), reprinted in McDougal and Associates, Studies in World Public Order, 1020 (1960), for an excellent treatment of decisional "models" at the law-policy level; see also McDougal and Lasswell, The Identification and Appraisal of Diverse Systems of Public Order, 53 AM. J. INT'L. LAW 1 (1959); Bross, op. cit. supra note 128 generally; Luce and Raiffa, Games and Decisions (1958); Rapoport, fights, Games and Debates (1960) (considers "models of conflict" and the "social physics" involving an application of mathematical model thinking to social and political science. He points out that models give us more ideas); Snyder, Game Theory and the Analysis of Political Behavior, in Shubik, supra note 128, at 70. See also Shubik at viii (interest in decision-making growing in political science field); Hempel, Science and Human Values, in Social Control in a Free Society 39 (1960); Williams, The Complete Strategist 217 (1954), says:

While there are specific applications today, despite the current limitations of the theory, perhaps its greatest contribution so far has been an intangible one: the general orientation given to people who are faced with overcomplex problems. Even though these problems are not strictly solvable — certainly not at the moment, and probably not in the indefinite future — it helps to have a framework in which to work on them. The concept of a strategy, the distinctions among players, the role of chance events, the notion of matrix representations of the payoffs, the concepts of pure and mixed strategies, and so on give valuable orientation to persons who must think about complicated conflict situations.


171 See references supra notes 128-135. See also Lasswell, The Decision Process (1956), for a decisional framework involving seven categories of functional analysis: Intelligence, Recommendation, Prescription, Invocation, Application, Appraisal, and Termination. 172 See Lweisohn, op. cit. supra note 132, at Ch. 11 and Envoi. Also, Thomson, The Foreseeable Future: "Though the extrapolation of trends is an extremely dangerous method of prediction, as all scientists know, it seems about all we can do here. Even so, one must
are speculative depending upon the number of operative factors, the reliability and completeness of the available information, and the adequacy of the model construct for arranging factors in their most realistic interacting pattern. But the rationality involved in model thinking does not take the shape of rigid formulation but as a tool for thought. Our rapidly developing technology and its impact on the social-political sphere requires inventive prediction so that necessary decisions can be made with the highest possible degree of confidence.

Obviously, model-thinking requires a prudent use of this analytical tool. Obsession with the infallibility of prediction of a complex model results in a surrender of responsible judgment. Or one may be audacious to the point of recklessness in employing a model for projections. One may use model thinking in a distorted fashion as a personal "game" or logical exercise. A type of superficial logical model building, which largely ignores human emotions or other factors which cannot be easily reduced to objective criteria, has been appropriately called "Ritualized Rationality" and represents in effect an excuse for avoiding the difficulty of constructing workable models.

The late, great mathematician, John von Neumann, in a provocative article of a few years back entitled: "Can We Survive Technology?" stated the foregoing problem in these terms:

All experience shows that even smaller technological changes than those now in the cards profoundly transform political and social relationships. Experience also shows that these transformations are not a priori predictable and that most contemporary "first
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guesses" concerning them are wrong. For all these reasons, one should take neither present difficulties nor presently proposed reforms too seriously.176

Nevertheless, his basic theme advanced the necessity for model-thinking:

"The great Globe itself" is in a rapidly maturing crisis—a crisis attributable to the fact that the environment in which technological progress must occur has become both undersized and under-organized. To define the crisis with accuracy, and to explore the possibilities of dealing with it, we must not only look at relevant facts but also engage in some speculation.177

F. Conclusion

What special skills of specific professionals will be most useful in model-thinking depends, of course, upon the segment of public policy decision involved. The legal profession, however, must provide its full share of the creative, experimental thinking demanded in the legal-policy area. There are innumerable current problems with important legal components wherein law-trained participants have both the obligation and opportunity to engage in useful model-thinking: disarmament and nuclear test ban arrangements; the shaping of legal codes and governmental machinery suitable to the needs of nations now emerging from pre-industrial status; the myriad problems arising from the urbanization movement and the regulation of activities in urban areas covering interstate regions; the construction of realistic models of mass media operations, especially television, and the formulation of enlightened concepts of the "public interest" based thereon; the special problem of projecting the probable uses of "space" in order that suitable guides can be created for its use and control; and the peaceful application of science and technology to gain greater cooperation at the international level. Lawyers are participating to some extent in all of these problem areas, but there is cause for concern as to whether the degree and quality of legal participation measures up to the rigid demands made of us today.

One specific area for needed model-thinking at the legal-policy level of immediate international significance is that of earth satellite development. These instruments will find valuable use in weather forecasting, as navigational aids, and for international communications. The prospective benefits from communications satellites, in particular, seem impressive in terms of easier, faster, and less expensive international point-to-point communications, but more importantly, in their potential for international information exchange which can assist in striking down cultural and political barriers. Some see in this development the technical means for at last making available the fullest freedom of information among all peoples.178 But the possibility of increased

177 Id. at 32.
178 Both the cultural potentialities and the policy difficulties are discussed in Smythe, Communications Satellites, Bulletin of the Atomic Scientists, February 1961, p. 65-70; Michael (Brookings study) op. cit. supra note 9 at 1-32, 51-78; see also Shayon, Breakthrough in International TV, Saturday Review, January 14, 1961, p. 35.
international tension is also present. Will this potentially most beneficial technological device be permitted to develop in an arena of destructive competitive strife such as we experienced in the early days of radio broadcasting in this country, or shall we begin working now on institutionalizing this new technical tool by cooperative and mutually beneficial international arrangements?  

Advancing technology is of such scope and importance, offers so much for human hope or misery, and is so much a part of our most pressing socio-political decisions today, that lawyers must equip themselves to understand the complexities that arise in such legal policy contexts. To make maximum effective use of our vast scientific and technological resources we must employ realistic models of the extremely complex socio-political-technological interactions within which we move today. If law is to be a device for effectively containing and directing social change toward desired goals, major social movements must be described, analyzed and understood.

Law Schools should take the lead, in particular those in position to pursue programs at an advanced legal-policy level in cooperation with other professional schools, with the profession, and with governmental and non-governmental entities involved in such problems. Further, law schools can perform a highly useful service by establishing continuing programs directed to selected legal-policy areas, as for example: the standards, practices and effects of policy actions in one or more of the independent regulatory agencies, or a continuing appraisal of the most effective means of employing technological innovation to serve the peaceful pursuits of mankind. Or attention might be given, for example, to a project such as the communications satellite program: analyzing the events and issues posed to date, projecting alternative constructs of development, anticipating the decisions that will have to be made, appraising the probable consequences of such decisions and commenting upon such effects in terms of national policy objectives. The project would follow formal governmental action closely, analyzing it, and evaluating its effects. Pursued through the developmental period of the communications satellite program, this project would be useful to both governmental and non-governmental representatives having responsibilities therefor. Such non-partisan analysis, if
thoroughly and intelligently done, would keep legal education abreast of significant legal-policy problems, would constitute a substantial public service, and hopefully, would train professional personnel better equipped to handle such problems in future years.

scope of authority of such activity? 7) Will allocation of time between various sorts of programming be required? 8) Will effective use of satellites require international standardization of equipment? 9) What is the effect of control over the satellites going to be in terms of the “free speech and press” principle?