

The preceding essay discussed some of the things the future may have in store for us. A great many technological advances will be found entirely feasible. Must we accept them, simply because of their feasibility? Does the fact that they are possible mean that they are inevitable? In the following essay, Dr. Ozbekhan examines this question.

THE TRIUMPH OF TECHNOLOGY: "CAN IMPLIES OUGHT"*

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I.

The theme of this paper, which is really part of a larger general subject that might be called "The Quality of Life in the Future," will be discussed in terms of normative planning. Without dwelling on preliminaries, during which definitions would need to be established, assumptions ordered, and clarifications - semantic as well as logical - provided so that the argument following can be glued together as tightly and neatly as possible, this discussion will move directly to the somewhat special perspective of "planning." Such a perspective may help to organize a number of surrounding points into a pattern, in ways that are not always obvious and in terms of a frame of relationships that may lead to some interesting conjectures.

II.

The title "The Triumph of Technology: "'Can' implies 'Ought,'" is almost a riddle, to be approached with some degree of indirection. Otherwise its meaning may be hard to uncover. Yet this difficulty of approach does afford some freedom.

The title describes a special conjuncture created by "technology," "can," and "ought." The situation underlying this conjuncture is one in which we view technology as triumphant. It is with this situation that we will begin.

There are, no doubt, many ways of judging what the advent of the technological age has done to--as well as for--mankind. It has changed and is changing, under our very eyes, the face of the physical environment both in the technologically advanced and the technologically backward countries, although the advanced countries are more visibly affected by the direct application of science and engineering to the environment. Probably more important by far is what the age of technology has done to the geography of human outlook and expectation. In this area it would be wrong to make assessments that differentiate between countries and peoples, as here the effects of technology are universal and by their very nature represent a unifying force.

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They could perhaps be described as having led to a generalized phenomenon of expansion: of possibilities, knowledge, ambition, mobility, relationships, needs, wants. All this is not so much an external happening as it is an experience, an event of the mind. Nevertheless, the event is occurring throughout the world, affecting, in various ways but strongly, the American, the European, the Asian, the African - whoever and wherever he may be.

Events of this magnitude have a price. The price of this particular event is that sense of strange and powerful disquiet we feel in the face of the heaving horizon that confronts us. Old institutions, known ways of life, established relations, defined functions, well-traced frontiers of knowledge and feeling - all are changing as we go. We are constantly subjected to new configurations of perceived reality; we are constantly asked to adapt faster and faster to requirements generated by new information, by a narrowing and always changing physical environment, by an increasingly confused and proliferating set of goals, outlooks, and aspirations. It is as though the entire environment of man - all the dimensions of his ecological, social, political, emotional, and physical space - were becoming less solid, less permanent, and less constant. It would seem as though we were in the midst of a vast process of *ephemeralization* or *liquefaction*.

Within this process, interlinked with it, and activated by it, the old problems remain, or renew themselves, Phoenix-like: famine in India, upheavals in China, lack of industrialization in all underdeveloped countries, a confused and confusing revival of nationalism in Europe, warring ideologies and interests in Vietnam, relative deepening of poverty among the poor, relative growth of despair among the young - the multiple disequilibria of a world in full expansion and constant flux in which expectations and achievements fail to match.

To repeat, there are no doubt different judgments that one can pass on such a situation. However, the passing of a judgment is fruitful only insofar as it leads to decision and action. Yet, in the case of the larger dynamics of our situation, it would appear that there is not much we can do any longer - it is all, by now, probably beyond our control. As Pascal said, "You are embarked" - and, once we are embarked, "*Il faut parier*" - we have to wager. There is no choice. What counts are the ends we shall put our bets on.

III.

But these ends, these *goals* as we would rather say in our epoch, what are they? How are they revealed, implemented, attained? To answer these questions, we must look more closely at the situation, at how we came to it and at what we brought into it.

When our situation is viewed in its current immediacy its most striking aspect is complexity. When we try to imagine it in terms of the future what strikes us most are the uncertainties it unfolds in the mind. Thus we stand, perhaps more conscious and knowing than ever before, in the grip of present worldwide complexities and future uncertainties trying to define those modes of action that will best order the one and reduce the other.

The organizing principles of these modes of action are what we have recently become reconciled, with some reluctance, to calling "planning."

The notion of planning did not come easily, because we did not arrive in total innocence at this pass in our affairs. We reached it armed with traditions, institutions, philosophies, self-images, achievements, failures, hypocrisies, prejudices, languages, values, and a world view: in other words, with everything that ultimately adds up to that state of mind called Western Civilization - with a capital W and a capital C.

Western Civilization, the ground and essence of technological civilization, is however, the very complicated result of very complicated forces that were set in motion partly during the Renaissance by Galileo and partly during the eighteenth century - the Age of Enlightenment. Like other civilizations, ours is (or used to be) a way of life in which uncertainty is reduced by means of stable and dependable continuities while complexity is organized into those routines we call institutions.

During its long history, however, Western Civilization also developed certain characteristic features, with regard to freedom and the individual's decision-making role, that permitted it to accommodate a great deal of loosely controlled initiative and even of venturesomeness. In fact, it could be said that our civilization nurtured two of its contrary inner tendencies with astonishing care and insistence: One was a deep commitment to detailed molecular disorder, which it cherished as the stepchild of liberty; the other was an almost superstitious belief in the idea of automatism (as exemplified by Adam Smith's "hidden hand," or by the extraordinary notion of laissez-faire equilibrium), which it viewed as capable of regulating the disorder into a livable environment. This commitment to microcosmic disorder and concomitant trust in the automatism of macro-processes - including social processes - are, in some truly nontrivial ways, the progenitors of our present situation.

Planning, in the sense we are beginning to understand it - as informed decision and calculated action - refutes and rejects both these parents. That is why we came to it late and with reluctance; that is why we are still half-hearted about it. Clearly, we are not yet convinced that a reduction in social or political randomness need not necessarily result in a grievous narrowing of acquired freedoms; and although we have learned at great cost (the last major settling of accounts and paying of bills being the Great Depression) that what we took to be automatism in social processes was nothing but a myth, we are still not wholly reconciled to the proposition that conscious and rational decision making at the sources of power might be effective in reducing the uncertainties of the future.

Of our two basic tendencies, the long-run effects of automatism have undoubtedly been the more disastrous insofar as the current state of planning is concerned, for the cast of mind that was able to rationalize automatism into a jealously protected belief was also the cast of mind that, almost unconsciously, shaped our initial conception of planning.

This initial conception was formulated when it seemed natural to be inspired for our basic planning model by one of the enduring and no doubt fruitful traits of classical Western thought, which is a pragmatic commitment to determinism in various forms. The deterministic model of planning is both simple and elegant. It tells us that there is sequentiality and linearity in events and that what we call the "future" descends in direct line from the past and can be explained in the same way. The fundamental tool of deterministic planning is extrapolation. The fundamental result of extrapolation is a single outcome, or future. In

such a model the decision variables yield a single future for each decision. Among such parallel futures, issued from parallel decisions, one can then choose in accordance with a preestablished system of values. Some outcomes are good, while some are bad, if one knows what good and bad are. Consequently, one plans in terms of the decision that is going to yield the good, or at any rate the best possible outcome. Thus, some futures are more advantageous than others, less painful than others, some more worthwhile than the rest combined. The choice is always clear as long as the value system that serves as frame of reference remains solidly and operationally grounded, and as long as there are institutions to enforce it within a particular environment.

The great weaknesses of deterministic planning are obvious: First, there is the inability to accept events that are exogenous to the single closed decision system that is its main constituent. Second, and, as we are only now discovering, by far its most crippling feature, is that it postulates and requires a value system that is given and constant and outside both the conceptual boundaries and the operational jurisdiction of the planning process. Clearly, the choices such planning offers could never be concerned with ethical alternatives that find expression in "oughts"; they are concerned instead with feasibility - "can" it be done? - namely, with technoeconomic alternatives.

Since the end of the Second World War, the economic component of the technoeconomic equation has weakened considerably. Abundance, relative though it may be, has lifted a great many of the limitations that scarcity had imposed on the spectrum of open choices. With this, technological feasibility has tended increasingly to become the sole criterion of decisions and action. Thus, technology, as many in recent years have proclaimed with increasing shrillness, has grown into the central, all-pervasive, governing experience of Western man today.

One of the results of this encroachment has been that we are now envisioning our future almost exclusively in relation to alternatives predicated on feasibility, or "can." And because the realm of what we actually can do has expanded almost beyond belief, feasibility tends to define our ends and to suggest the only goals we are willing to entertain. "Can" has almost unconsciously and insidiously begun to imply, and therefore replace, "ought."

This evolution has been strengthened and encouraged by the neglect into which, since the eighteenth century, our traditional values or "oughts" have fallen. The confines to vision and action imposed by these "oughts" have been pierced here, overcome there, obliterated in most places. We continuously failed to develop a new ethic commensurate with our technology, yet the old ethic lost much of its meaning and guiding power. It has become abstract - hence operationally invalid as a policy-making or planning tool.

Today, in the situation that surrounds us, to act in the light of old dicta that used to relate the "good" to events - e.g., population increase is good, or the extension of the benefits of modern medicine to all men is good, or individual high productivity and hard work and thrift are good, or education for everybody is good - means to act blindly and to contribute to a set of vast consequences whose risks or even value content (namely, whose goodness) we have no way of calculating or judging. None of the above instances may be bad, but we can no longer be unquestioningly certain that they are good.

Having made these points, let us now attempt to clarify what the title of this paper really means in planning terms. It means that in a technology-dominated age such as ours, and as a result of forces that have brought this dominance about, "can," a conditional and neutral expression of feasibility, begins to be read as if it were written "ought," which is an ethical statement connoting an imperative. Thus, feasibility, which is a strategic concept, becomes elevated into a normative concept, with the result that whatever technological reality indicates we *can* do is taken as implying that we *must* do it. The strategy dictates its own goal. The action defines its own telos. Aims no longer guide invention; inventions reveal aims. Or, in McLuhan's now fashionable slogan, "The medium is the message."

In sum, the above-mentioned developments have had two major effects on the deterministic planning model outlined earlier: First, the power and scope of strategies open to us have been increased and enlarged to the point where it is no longer possible to make sense of any method that derives a single outcome from a given decision. Second, the model has lost the independent frame of values that once made it operative. It has not only lost it, it has taken it over, swallowed it, ingested it. In spite of this, we have not developed a new operational model. Hence, we are no longer sure of the direction in which our momentum is taking us.

The recognition of this fact is the source of the general disquiet most of us seem to share. And this disquiet can, probably, be reduced to the following question: Is feasibility a good enough end to pursue, and by which to reach decisions and calculate human risks and consequences of action in these perilous and complex time?

Offhand, the answer seems to be "No." But this "No" needs to be probed, elaborated, and operationally understood; and, if possible, some positive solutions need to be pointed out. Let us try to do this with reference to some emerging conceptions in planning theory, policy, and implementation.

IV.

Today, in many countries, including those of capitalist persuasion, something called "planning" is going on. In fact, it appears possible now to ascribe much of the unexpected success of Western economics to the systematic application of this particular type of economic calculus at the government level. Generally speaking, the attitudes that underlie this application have been derived from welfare economics while most of the operational concepts and tools that have been adopted are Keynesian in origin.

All this activity, which involves great effort, is still relatively primitive. It is built on a number of desirables such as government control of extreme fluctuations, international balances, investment trends, employment, etc. More recently, attempts have been made to extend it to social fields such as housing, urban development, education, health, old age, and poverty. For the moment, the results of these newer attempts do not appear too impressive. There is a sense of floundering - a feeling that we don't exactly know where it is we want to end up, or that we have not really understood the problems we are trying to solve. The words that have guided us along our paths are a set of reasoned clichés: Some still talk in terms of Keynes' particular vision of the "civilized life," others prefer to stand by something they call the "dignity of man," still

others find inspiration in the "fulfillment of the human being." In the United States we have even derived a number of National Goals from similar desirables that have since been costed-out and priority-ordered in relation to expected economic growth through 1975.

Our approach to all this has been unimpeachably orthodox: From inbred notions of the good we have derived a selected number of socioeconomic desirables and translated them into a set of socioeconomic problems. The criterion for translation was the feasible, and the calculus of the feasible was mostly economic in character. So now we know that, if the GNP grows as forecast, by 1975 we shall be able to do certain things. From this point we generally pass to the implementation phase.

What we have failed to do in all this is to ascribe operational meaning to the so-called desirables that motivate us, to question their intrinsic worth, to assess the long-range consequences of our aspirations and actions, to wonder whether the outcome we seem to be expecting does in fact correspond to that *quality of life* we say we are striving for - and whether our current actions will lead us there. In other words, in this writer's conception of planning we are in the deeper sense failing to plan.

One of the major causes of our failure to plan is that, the human mind being what it is, it would appear almost impossible to plan without a conceptual and philosophical framework made up of integrative principles - in short, without a generally accepted theory of planning. We have not succeeded yet in developing such a theory.

Whenever this point is raised, the difficulties that surround such an undertaking (and that also explains its lack) become crystal clear, and the questions grow tense. In such a theory is one to deal with facts or goals? With the present or future? Are we concerned with continuity or new departures? Should one write for planners or policy makers? And so on.

These very questions indicate how much our intellectual traditions stand in the way of the needs we feel, how much our positivist inheritance vitiates our ability to grapple with the normative requirements of policy generation. Yet, despite such obstacles, the foundations for a unifying theory of planning must be laid. Hence, an effort will be made here to answer the above questions.

Much of what has been said up to this point shows this writer's personal conception of planning to consist of three interrelated approaches that could be formulated as three plans that unfold in conjunction with each other. These are: the normative plan, which deals with "oughts" and defines the goals on which all policy rests; the strategic plan, which formulates what, in the light of elected "oughts," or chosen policies, we *can* actually do; and, finally, the operational plan, which establishes how, when, and in what sequence of action we *will* implement the strategies that have been accepted as capable of satisfying the policies. Thus, a planning-relevant framework needs, in this particular conception, always to reveal what *ought* to be done, what *can* be done, and what actually *will* be done.

Strategic and operational planning fit more or less well into current practice. Normative planning, however, is not seriously considered yet as an integral element of that same practice. Policy considerations still remain outside the planning process and enter into it as exogenous

givens. In the system outlined above, such a differentiation would not exist. Policy making, strategy definition, and the determination of implementing steps would be viewed as parts of a single, integrated, iterative process.

Normative planning has interesting conceptual dimensions that should be noted briefly. To begin with, it deals with the consequences of value dynamics, hence with the delineation of qualitative futures. In this sense, it abolishes the old distinction between goals and facts in favor of viewing goals *as* facts, thereby ascribing to them the necessary practical weights. Similarly, it is in the course of normative planning that some new approaches to temporal relationships and interactions between what we call the present and the future are recognized and established. To use a play on words, we might say that the future is the *subject* of normative planning, but the present is its *object*. A close analysis of the consequences of value dynamics reveals not just one *single* future deducible from the parameters of a given decision but a multiplicity of discrete possible futures that have to be delineated and explored. Any choice, under these circumstances, tends to apply to a spectrum of states, thus enlarging the entire field of decisions. And, again, decisions made in the light of such future "images" initiate that backward chain of calculable events that, once they reach the present, can be translated into it in the form of calculated "change." The possibility of acting upon present reality by starting from an imagined or anticipated future situation affords great freedom to the decision maker while at the same time providing him with better controls with which to guide events. Thus, planning becomes in the true sense "futures-creative" and the very fact of anticipating becomes causative of action. It is at this point that the policy maker-planner is able to free himself from what René Dubos has called the "logical future," and operate in the light of a "willed future."

It is the introduction of this element of conscious and informed will into the system that frees us from the remnants of automatism while at the same time allowing real policy considerations directly to enter the planning process.

It would be a mistake to believe that this method represents some rather convoluted way of making long-range predictions. On the contrary, the actual assertion is that planning does not really *deal* with the future as we think of it - it deals with the present, inasmuch as it concerns itself with possible consequences that action taken in the face of future uncertainties will have on the present. Planning is directed toward the future not so that one can predict what is there, for clearly there *is* nothing *there*. (The forecasts we make about things like population increase, resource availability, etc., are obviously not based on what is there, but on what was here in the past, what is here in the present, and what we *think* the configurations of these things will be some years hence.) Planning is directed to the future to "invent" it (as Denis Gabor has said) or to "construct" it (as Pierre Massé has put it). And this is done to reduce uncertainties that confront current decisions by encapsulating each decision within a firm enough normative "image" to provide the kind of information needed to attain the desired ends.

The fundamental questions with which normative planning must be approached are: If this good/ then what future situation? If that situation/ then is it good? What this amounts to is saying: If we want full employment, education, health, housing, equality, etc., we must want them for certain calculable reasons that will be reflected in a new situation.

Hence, we must determine: full employment for what? Education for what? Health for what? Housing for what? Equality for what? Only as a result of such determinations can we define which possible outcome will really correspond to what today we keep calling "the civilized life," "fulfilment of the human being," and "the dignity of man." If we don't plan in this manner, then we in fact may continue to act in good faith but without knowing whether our actions can satisfy the ends we have in mind. Nor will we obtain enough alternative solutions to achieve some workable (optimizing) conjunction. The latter point is important because one of our problems consists in the requirement that we achieve several such goals simultaneously; we are no longer advancing step by step.

Perhaps the major lesson to be derived from these very sketchy considerations is that in normative planning the important thing is not to be surpassed or overcome by current events. This always tends to happen. Whenever it does happen, planning reverts to becoming mainly responsive to current situations rather than creative of future, and as long as planning is not futures-creative, it must be an after-the-fact ordering exercise dominated by present events. Such an exercise is, obviously, not planning, but something less.

Now let us discuss briefly the next phase of the planning effort - strategic planning. As has been repeatedly noted, strategic planning is grounded in the concept of feasibility. However, if feasibility is approached as a parameter rather than as a norm, then its nature changes. The major result of establishing norms and assessing feasibility in their light is the effect of freeing policy making from its traditional prison of "expediency" and beginning to understand it in terms of "relevance." Expediency is often confused with practicality, which is undoubtedly important, but, in terms of the line of thought developed in this paper, it is clear that a multiplicity of goals based on a multiplicity of norms enlarges the traditional boundaries of the practical and thereby broadens the spectrum of alternative policies among which we are called to choose. Thus, in strategic planning, that which can be done must always refer to a particular number of alternatives that have grown from work done in the normative stage. There is no doubt a narrowing of vision at this point, but this narrowing is a result of the elimination of conflicting alternative possibilities that, under the circumstances, have been found either irrelevant or insoluble. What is eliminated is the open-ended perspective, which, while deepening perception, paralyzes action. What is introduced is coherence, numbers, milestones, steps, intermediate or in-process configurations that are relevant to the ends we have chosen. It is during this phase that one of the most difficult aspects of planning is encountered. It consists in formulating objective action links between the norm, or the "ought," and the "can." It is at this point that the analysis is made of whether or not a particular goal is relevant to a particular situation and to a particular strategy. Here again, the issue is not so much whether the earlier parts of the plan are feasible as whether or not they are consonant with reality and whether such a consonance can be translated into the probable realization of the goals themselves. The issue to emphasize in this progression is that solutions to subsystemic problems are approached not with reference to the subsystem itself, but to a predetermined meta-system that permits the encompassing and the ordering of the alternative strategies that such solutions define.

Now, finally, the last step, operational planning, is reached. This consists mainly in the determination of how to implement the adopted strategies. In some sense, it is the phase of the plan that delineates what *will* be done. It is during this phase that a translation takes

place from the plausible to the probable. The set of priority-ordered interlocking decisions, of course, must foresee, within the temporal framework, a continuity of action, and, in its turn, that continuity of action must be so conceived as to be able to overcome the momentary uncertainties, the immediate disjunctions that every act creates, if, as it must, it creates change within a given system.

Taken together, the general outline of the planning methodology developed in the preceding pages constitutes a continuum - a self-feeding application of intellectual analysis and synthesis to events, whereby the present processes of society and of organization can be constantly guided with reference to the future. It is in this sense that we must understand planning as representing a fundamental and uninterrupted activity, whether it takes place in the corporation, the city, the nation, international relations, or whatever it is we choose to call "environment."

Of the three phases of planning just described, we know more (in empirical terms) about strategic planning and operational planning than we know about normative planning. For the first two, we have borrowed from certain commonly used methodologies, which will therefore be merely mentioned here - such things as systems analysis, system design, operations research, simulation, etc. The introduction of the computer into our lives and the advances we are making in natural language processing - an advance that will permit nonprogrammers to deal directly with the computer - has greater enlarged our ability to question a wide variety of facts and variables. Our main effort should therefore be directed to the development of methodologies and techniques having the same kind of power for the making of normative plans. In this area we are lagging. And in this area the point is not, as it is often purported to be, that we should make efforts to eliminate man and computerize the entire system, but rather that we should develop a greater understanding of how to relate the computer to man in more efficient ways so that we can benefit from technology in our attempts to firm up a theory of normative planning.

V.

Earlier in this paper it was stated that what counted were the ends we put our bets on. That statement obviously leads to the question: What are the possible ends - if feasibility, by itself, is insufficient? In this concluding section, let us review the portions of the present analysis that may contain clues concerning an answer to that question.

To begin with, it seems obvious that the goals of practical human action cannot be established as immutable truths, and that each situation encompasses a conjuncture that, if anticipated, operationally defined, and caused to happen might satisfy whatever is generally considered as good in a particular civilization at a particular time. The problem, therefore, is not in reinventing the good, but in being able to redefine it in terms of meanings that have the most value for us, in our present state. The dynamics of our situation is such that we can no longer be sure of being able, automatically, to derive *consequences* we can judge as good from *actions* we do judge as good. Somehow the ability to link the value of a present act to the value of its chosen consequences must be created and made operational. Only such a link will permit us to determine those ends we should be betting on.

An attempt has been made here to outline the idea of such a link in terms of a particular planning approach. In the formulation given, goal

valuation is integrated into the planning process itself. For this manner of planning we lack two things: first, a worked-out theory and methodology; second, the required institutional setting. These, clearly, are very major shortcomings.

Insofar as theory and methodology are concerned, it is evident that our current economic calculus is not enough. We need something in the nature of a social accounting system as well as a value calculus (an axiology) to supplement it. Some work is being done in both these areas but it is as yet at a very tentative stage. Insofar as the institutional setting is concerned, progress is very slow--a fact that needs no elaboration here.

In this connection, it should nevertheless be noted that a still ill-defined symbiosis, or at least a symbiotic interaction, between technique, theory, and institutional setting appears to exist. The absence of theory inhibits our ability to extend our techniques to the field of norm definition and goal valuation. Theory building, in turn, is affected by our current institutions. This is visible mainly in the difficulty we experience in determining *who* is going to plan. This difficulty arises partly from our political tradition, which often views solutions that satisfy individual self-interest as the major expression of freedom in society. This tends to make us look upon any extensive planning--namely, system-wide integrated solutions--with grave misgivings, as being outside the mainstream of the concepts that underlie our political organization. This, of course, is frustrating, for it is indeed difficult to see how any alteration in our planning can be obtained without ultimately raising some basic questions about our current institutional arrangements. We do not know whether the answer to this dilemma lies in pluralistic, or advocate, or expert planning.

We do know, however, that the power of ideas is very great. What Keynes used to call the "primitive stage" of the argument is probably behind us. After this stage, many things become possible. There is some ground now on which we can stand. The European experiment in planning is a prodding example for us. In the United States we have, after all, concluded that massive unemployment ought not to be allowed. We have decided that economic fluctuations are onerous and that they ought to be controlled. We have committed ourselves to certain notions of equality with regard to the distribution of wealth, with regard to education, with regard to civil rights, even though we have not been too successful in defining the "what for" of these commitments beyond the words "The Great Society". In short, we seem to have understood that these "oughts" will not occur by themselves, that there is no automatism in social processes that transcends human will and calculated action. We should now be able to exert that will in developing the knowledge and information that will sustain it. Only by that means can we succeed in distinguishing the real problems from the false ones, and choosing among real answers--that is, answers that have some degree of precision, and are capable of showing us some direction in this present of ours which contains all the future we can ever hope to have.