

The Environment and System Response Capability

A Futures Perspective¹

The world is in transition between an industrial and a postindustrial order. The degree of change involved is as great as that which, during Neolithic times, produced what Gordon Childe (1942) called the “urban revolution” when cities and written language first arose on a background of settled agriculture, irrigation and metallurgical advance.

The Industrial Revolution, of course, started the particular change we are now in. But only relatively recently has it begun to be realized—and not yet by the majority of people—that the advanced industrial societies which have been growing unabated through the last 150–200 years (albeit through depressions and wars) are not likely to persist too much longer without substantial modification. Our present pattern is not an end state, but a way station to a post-industrial order which will be built on radically different premises. It is quite possible, however, that we may not succeed in negotiating this passage, in which case there are a number of doomsday scenarios available to suggest what may happen to us.

Industrialism's Costs

The successes, the achievements of advanced industrialism are now producing increasingly dysfunctional and negative effects. Unless these are coped with by means as yet scarcely evolved, they will result in severe dislocations which will prevent the realization of a more beneficial future. Some dislocations are already beginning to manifest themselves.

We now have to think in world terms, to accept the advent of global interdependence. But the cultural heritage of the Industrial Revolution (in values, thought ways, policies, institutions and technologies) has left us unprepared for this. There is a mismatch. Much unlearning will have to take place before the

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way is open for new social learning to occur of a kind which can form the basis for constructing a viable human future.

Given the accelerating change rate, deriving from the information-based technologies of the Second Industrial Revolution, it is small wonder that the environment in all its many aspects has emerged as a major concern. These aspects include the economic, technological, organizational, urban, political, socio-cultural and ecological. As Dennis Gabor (1964) has said, "One cannot predict the future, one can only invent it" (or fail to invent it). In fact, there is no such thing as the future; only "futures." Which of the possibilities will be realized depends not a little on the choices we make—which in turn, depend on our values—and also on our taking an active rather than a passive role. The paradox is that under conditions of uncertainty one has to make choices, and then endeavor actively to make these choices happen rather than leave things alone in the hope that they will arrange themselves for the best.

Extrapolations of global trends tend to yield "disaster" scenarios. Things do not seem to be going to arrange themselves for the best. But it is the function of reference projections to disclose the areas in which the "continuous critical problems" of society are likely to become most acute (to use a term of my Wharton colleague, Hasan Ozbekhan [1969]). Reference projections make the case for intervention. At least that is how recent planning theory looks at them.

Shifting Viewpoints

But we did not think this way at all until a very few years ago. We took the wider environment as given. We thought it would stay put.

By the early 1960s, wider environmental factors were having so much impact on organizations involved in projects undertaken by the Tavistock Institute that my colleague Fred Emery and I (1972) felt compelled to extend our understanding of them (Table 1).

As the environmental field becomes more "richly joined" (in Ross Ashby's [1960] sense), as the parts become more interconnected, there is greater mutual causality (Maruyama, 1963). The denser the organizational population in the social habitat (and the more this itself is limited by the increasing constraints emanating from the physical environment which is no longer perceived as boundless) the more frequently do the many strands become enmeshed with each other in the causal texture of the environment. This means that forces from L_{22} (the contextual field) begin to penetrate the organization set (Evan, 1966) composed of the L_{21} and L_{12} relations with which the organization is primarily concerned. This creates what we have called "turbulence" for the organization whose internal repertoire (L_{11}) may only too easily lack the "requisite variety"

TABLE 1 The Set of Organization/Environment Relations

	L_{11}	L_{12}
	L_{21}	L_{22}
L_{11}	= Internal Interdependencies	
L_{21}, L_{12}	= Transactional Interdependencies	
L_{22}	= Contextual Interdependencies	

(L = Link; $_1$ = Organization; $_2$ = Environment)

for survival. Ashby's law of requisite variety states that when a system's response repertoire cannot match increases in variety emanating from the environment, that system's survival is endangered. This is our situation at the present time.

The contemporary world is characterized by much higher levels of interdependence and complexity than hitherto existed. These have led in turn to much greater uncertainty. The consequent variety overload is experienced by the organization and the individual alike as a "loss of the stable state" (Schon, 1971). It is producing increasing stress.

THE TURBULENT DECADE

During the 1970s turbulent conditions have become increasingly salient. Here are some examples:

- When the Organization of Petroleum Exporting Countries (OPEC) quadrupled oil prices, a long latent energy crisis became manifest.
- The international monetary system based on fixed exchange rates has broken up—a quarter of a century after it was agreed at Bretton Woods—causing the present turmoil of floating exchange rates, including the U.S. dollar devaluation. No alternative system to Bretton Woods is in sight.
- Stagflation has appeared—endemic and persistent inflation, along with endemic and persistent unemployment. Neither can be understood in terms of current economic models. No alternative models are yet available.

All these events—and there are many others—have come as surprises. They were not predicted. They are not understood. For this reason they create bewilderment, raising levels of anxiety and suspicion. Such is the experience of turbulence and loss of the stable state.

TABLE 2 Environmental Types

	<i>Environmental type</i>	<i>Survival mode</i>	<i>Market analog</i>
I	Placid, random	Tactics	Perfect competition
II	Placid, clustered	Strategy	Imperfect competition
III	Disturbed-reactive	Operations	Oligopoly
IV	Turbulent	(Negotiations)	(Macro-regulation)

Sources of Turbulence

- Large numbers of larger organizations pursuing independent (short-term) goals in societies based on continuous growth and expansion in a finite planet with R & D accelerating the change rate
- The communications revolution reducing response time and increasing information overload
- Regulatory mechanisms unable to cope with unanticipated consequences in inter-dependent sectors

THE EVOLUTION OF ENVIRONMENTS

Four generalized environmental types with different kinds of what we called "causal texture" may be distinguished. They are ideal types to which reality may approximate (Table 2). They grow from simple to more complex, from being poorly to richly joined. The level of mutual causality becomes higher with each step taken. Though they may exist simultaneously, historically the emphasis has varied immensely. In earlier times Type I and Type II were salient. Since the Industrial Revolution, first Type III and now Type IV have become salient. Types I and II are marginal in the contemporary world. They continue to exist in local niches (of which there are quite a number) or in out-lying segregated areas.

- In the *placid, random* environment, goods and bads (goals and noxiants) are randomly distributed. As regards system response concerning survival, there is no difference between strategy and tactics: the optimal strategy is the simple tactic of doing one's best on a local basis. The market analog is perfect competition (the world of the small factory, corner shop, family farm).
- In the *placid, clustered* environment the field is still relatively unchanging but goods and bads are clustered. The survival mode becomes that of finding the optimal location, i.e., strategy becomes differentiated from tactics. The market analog is imperfect competition (businesses become more specialized and complex, seeking comparative advantage).

- Under *disturbed-reactive* conditions, the environment becomes dynamic, as other organizations (large ones) wanting the same optimal locations are present in the field. We react to them. They react to us. We all know this.

This leads to “operations,” in addition to strategy and tactics, to reduce the ensuing disturbances—to campaigns to draw off the others, and to gaming. It is no accident that the theory of games arose in relation to the disturbed-reactive environment in its late and mature form. The survival mode in this environment becomes the amassing of power—to make and meet competitive challenge with accumulated resources and abundant expertise under one’s own control. The bigger one can become, the better one’s chance. The market analog is oligopoly.

The disturbed-reactive environment is the world of big industrial organizations, of conglomerates, and equally of outsize government departments. It is a world in which everything gets centralized—the world which J.K. Galbraith (1967) has called the New Industrial State, but which, as I will attempt to show, is now becoming the Old Industrial State. It is, however, the world we have all grown up in. It got under way in the latter half of the nineteenth century when the joint stock company (the corporation)—a major social innovation—enabled capital to be amassed on the new scale required to develop the new technologies then arising, e.g., turbines and the electrical and chemical industries. The scale of production went up rapidly.

Most people still think they are in this world. This is a mistake. The very success of this world has brought it to its own limit, thereby creating a very different environmental state.

The critical difference between this new state and the disturbed-reactive environment is that the dynamic properties now arise not simply from the interaction of the organizational actors, but also from the field itself.

- The new environment is called the *Turbulent Field*. In such a field, large competing organizations, all acting independently, in many diverse directions, produce unanticipated and dissonant consequences in the overall environment which they share. These dissonances mount as the common field becomes more densely occupied. The result is a kind of contextual commotion—as if “the ground” were moving as well as the organizations. This is what is meant by turbulence. Subjectively we experience it as “a loss of the stable state.”

Learning to Survive

What is the survival mode for a Type IV turbulent environment? There is as yet no clear indication. In my own view, however, it would seem to have something to do with moving toward a negotiated order—in which organizations take the purposes of other organizations into account. No organization is so big

that it can go it alone in a Type IV environment. The new value base, therefore, is collaboration—rather than competition. But this value base goes against the grain of our Type III inheritance.

What is the market analog? It would seem to have something to do with “macro regulation” (Metcalf, 1976)—policies which meet the need for a new economic order, about which Jan Tinbergen and his colleagues (1976) talk in the “Rio Report” to the Club of Rome, but which we have not so far created and which is strongly resisted by establishments in the advanced countries.

Let me now turn to another aspect of response capability under Type IV conditions made clear by recent work of my Wharton colleague Russell Ackoff (1974/Vol. III). He has noticed that the response capability of organizations is greatly affected by their attitude to the future. And attitude to the future, as we have seen, is particularly important under Type IV conditions. The attitude to the future determines the planning mode. Again, as we have seen, to evolve an appropriate mode of planning is vital under Type IV conditions since an active interventionist role now becomes mandatory.

Ackoff has distinguished four modes (Table 3) with corresponding attitudes:

- In the *inactive* mode, the present is regarded as better than the past or the future: “now is the hour”—it is therefore better to wait and see; to coast along; to let sleeping dogs lie; to engage in masterly inactivity.
- In the *reactive* mode, the past is regarded as better than the present or future. Therefore the aim becomes that of restoring the lost good state—the good old days; Arcadia; Paradise Lost; back to normalcy.
- In the *preactive* mode, the future is regarded as better than the present or past. The task now becomes that of figuring out where and when the best opportunities are likely to turn up. One must, therefore, *predict and prepare*—diagnose these opportunities and seize them, with all the arts of the calculable: econometric models, technical forecasts, operations research, algorithms and simulation.
- In the *interactive* mode, neither the past, present nor future seems all that

TABLE 3 Attitudes to the Future as Planning Modes

<i>Mode</i>	<i>Past</i>	<i>Present</i>	<i>Future</i>	<i>Posture</i>
Inactive	—	+	—	Wait and see
Reactive	+	—	—	Put it back
Preactive	—	—	+	Predict and prepare
Interactive	—	—	—	Make it happen

Source: Ackoff (1974).

TABLE 4 Environmental Types and Planning Modes

<i>Type</i>	<i>Mode</i>
Placid, random	Inactive
Placid, clustered	Reactive
Disturbed-reactive	Preactive
Turbulent	(Interactive)

good—any worthwhile future depends on our *making it happen*, proactively; on our being able to build the kind of world that represents our choices; to create, as Ozbekhan (1969) puts it, a *willed future*. We cannot do this alone or against others—only with others as co-producers, with those who compose our interdependence system. It must also take account of the physical environment as a co-producer, as we are also members of it.

Let me now match these modes and postures with the four environmental types (Table 4). The correspondences are clear:

- The *inactive* mode is the appropriate system response to the placid random environment. This is a nonplanning world.
- The *reactive* mode is an appropriate system response to the placid clustered environment. There is a best place to be. Restore it if damaged. Recover it if lost.
- The *preactive* mode is an appropriate system response to the disturbed-reactive environment. One must find out where the best waves are going to come in and then ride in on them—keeping others off. All the techniques of management science and forecasting are used and program commitments are made accordingly. This is technocratic planning as we have known it (blueprints) but this does not give a model of decision making for coping with high levels of uncertainty.
- The *interactive* mode would seem to be an appropriate system response to a turbulent environment. None of the first three modes requires basic system change but the interactive mode is predicated on system change. It is therefore appropriate to Type IV conditions which require it.

The interactive mode is very new. It requires the collaboration of interest groups (interest group planning in Michel Chevalier's [1968] sense) the identification of shared values (common appreciative systems in Sir Geoffrey Vickers's [1965] sense); continuous learning (future-responsive societal learning in Don Michael's [1973] sense); and continuous evaluation and modification (as

Ackoff always insists). It is an open-ended unfolding process. Ackoff has called it “adaptive planning.”

THE LIMITS OF REDUCTIONISM

Type IV conditions seem also to require a change in our approach to problem solving. If, under Type II, trial and error is appropriate, and if, under Type II, craft knowledge is appropriate, Type III has been associated with the rise in the scientific method as we have known it, which has proceeded by analysis (as rigorous as possible)—breaking down problems into their components, i.e., reductionism, the logical positivist philosophy of science. But complex interdependencies defy this approach. Michel Chevalier (1968) has shown how problems gather themselves into multifaceted “metaproblems” affecting wide areas of society. They become subjectively perceived as such an interacting totality, so that policies simply about this or that aspect carry no conviction. The urban crisis, poverty, energy, etc. are examples. The French call this a “problématique.” Ackoff (1974/Vol. III) talks about “messes”—there are no longer problems but systems of problems that constitute the messes of which the Type IV environment is full.

The metaproblems of the new environmental situation require a “systems approach,” which is concerned with relating parts to wholes, organizations to environments. It is synthetic, holistic, seeking to capture the gestalt of system-connectedness.

But a holistic approach requires intuition and feeling as well as logic, i.e., the other side of the brain. The discovery of the complementary function of the two cerebral hemispheres is pertinent to the development of response capability to meet Type IV conditions.

Since Descartes and Newton, Western culture has been built on the left brain. We have become incapacitated as right brain people. A widespread movement to replace left by right arose in the countercultures of the 1960s. Interest in Eastern philosophies spread widely. Television viewing and drugs both reduce left brain functioning. Children, especially, read less. Left brain dominance is associated with the visual culture of print. McLuhan (1964) has made a strong case that an aural-tactile culture associated with the new media is supervening, which is right brain dominant.

But mere substitution of right for left is likely to be maladaptive. I have no intention of dropping science just because there are other wavelengths to which I now want to tune in. Type IV conditions seem to require us to be both-siders, capable of linear and nonlinear thinking. These processes represent profound changes in cognitive structure which are beginning to emerge in our cultural

environment. In my hypothesis, they improve our chances of successful adaptation under Type IV conditions.

The Threat to Bureaucracy

The consequences for an organization's response capability of environmental shifts are no less considerable. It is necessary to take a historical attitude to organizations. Organization theory has done us a disservice by not having done so. It has too much regarded the bureaucracy as if it were an everlasting form. No organizational forms are everlasting. They are linked to environmental types which change in salience. This salience also is not everlasting.

Under Type I conditions, organizations are essentially personal in ownership and in the execution of their activities. I recently met a small boat builder in Nova Scotia who incarnated this pattern.

Under Type II conditions organizations become patrimonial, to use Max Weber's (1947) term. Ownership is still not separated from management, though organizations may be sizable and quite complex.

Only under Type III conditions do *bureaucracies* supervene as the salient organizational form (though they have been around in the wings since Ancient Egypt). In its modern form, bureaucracy has become technocratic, competitive (in the public sector for budgets, in the private for markets) and singular—it pursues only its own objectives.

The singular competitive technocratic bureaucracy is to be seen as the organizational paradigm which matches the disturbed-reactive environment, representing a basic pattern in the culture of industrial societies. It is a main denizen of the environmental field today. Now, however, that Type IV conditions are supervening, it is becoming progressively more dysfunctional. It cannot undertake what Argyris and Schon (1978) have called "double loop learning," i.e., learning to learn, which has become necessary in order to cope with the rapidly changing turbulent field. It is also coming to consume more and more of its available resources in internal transfer costs, so that there is less net outcome. This produces an entropic effect, the more serious when linked to the entropic effects some recent theorists (such as Georgescu-Roegen [1971]) believe are now also arising from resource scarcity.

Reorganizing Organizations

A number of promising alternatives to bureaucracy have been put forward. They explore the curtailment of hierarchical forms and lead in the direction of

organizational democracy. Emery (1977/Vol. II) approaches this by postulating two design principles between which there is a choice. Whether for purposes of maintenance and renewal or of communication and adaptation, any organization requires some reserve capacity (redundancy). Both design principles display redundancy, but in the first the redundancy is of parts and is mechanistic. The parts are broken down so that the ultimate elements are as simple and inexpensive as possible, as with the unskilled worker in a narrow job who is cheap to replace and who takes little time to train. The technocratic bureaucracy is founded on this type of design.

In the second design, the redundancy is one of functions and is organic. Any component system has a repertoire which can be put to many uses, so that increased adaptive flexibility is acquired. While this is true at a biological level, e.g., in the human body, it becomes greater at the organizational level where the components—individual humans and groups of humans—are themselves purposeful systems. Humans have the capacity for self-regulation, so that control may become internal rather than external. Only organizations based on the redundancy of functions have the flexibility and innovative potential to give the possibility of adaptation to turbulent conditions. For it is through this redundancy of functions that their response repertoire acquires the requisite variety—in Ashby's (1960) sense—to meet the increased variation emanating from the environment.

Pribram (1977) has suggested the analog of the holograph for the non-hierarchical way in which the brain functions. The holographic principle of organization is one in which the whole is present in the parts which are self-regulating though interdependent. It is a mode which has evolved to cope with complexity. This is precisely what is required in social organizations under Type IV conditions. The bureaucratic form is becoming outdated.

The importance of this holographic property is related to the increasing salience of information-based, as distinct from energy-based, technologies, whether in computerization or communication. Treated in the Type III manner, they can only too easily lead to increased centralization and exacerbate totalitarian tendencies. Treated in the Type IV manner, they can enhance opportunities for decentralization and the dispersion, rather than the concentration, of power. Advances in microelectronics have great potential for urban as well as industrial disaggregation, which would alter the present imbalance between center and periphery.

There are important implications also for organizational and social learning. Argyris and Schon (1978) have distinguished between model 1 or "single-loop" learning and Model 2 or "double-loop" learning. In model 1 learning proceeds simply in terms of experience and is incremental. In model 2 it becomes aware of the assumptions and values on which it is based and is capable

of major shifts in frame of reference. Bateson (1972) has advanced a similar idea in his theory of "deutero-learning," in which the learner becomes conscious of the context of the learning—even to the extent of this context. Such a capability at a social as well as a personal level would seem to be an adaptive requirement in a Type IV environment.

There are similar implications for planning. Comprehensive planning of the master plan, blueprint type which flourished as the planning mode that matched Type III conditions is no longer appropriate. The level of uncertainty generated by the faster change rate is too great; plans become out of date before they can be implemented. The new planning mode, which Ackoff (1974/Vol. III) has called continuous adaptive planning, is an interactive one. It is continuous in that emergent changes require frequent modifications; participative in that all stakeholders must be involved; integrated in that all levels must make their inputs from their own perspectives; and coordinated in that the interdependence of decisions has always to be considered. Such a mode emphasizes the process rather than the product in planning. Dependent on model 2 learning, it is concerned with ends before means. As Ozbekhan (1969) has shown, it is normative. Only when what ought to be done has been considered and a general direction set, can questions of what will be done (strategies) and what can be done (operations) be usefully addressed. Moreover, the relations between these phases are not linear. They modify each other through feedback.

The changes in the set of characteristics outlined enable the resulting response system to be variety increasing rather than variety decreasing. This is mandatory for successful adaptation in a Type IV environment. Otherwise, the requirements of Ashby's (1960) law of requisite variety will not be met.

Taken together, these changes, which are self-consistent, constitute a paradigm shift. The system of response capability referred to in Table 5 as Paradigm 1 arose in parallel with the Type III environment (Sommerhoff, 1969). With the increasing salience of Type IV conditions a new system of response capability—Paradigm 2—becomes mandatory. Its characteristics are the opposite of those belonging to Paradigm 1. So far as Type III conditions persist, one may expect Paradigm 1 also to persist to some degree, but it will become increasingly subordinate to Paradigm 2.

This transition is founded on a different principle of order—socio-ecological as contrasted with hierarchical. Interdependence rather than dominance-submission is becoming primary.

All the proposed organization responses to the Type IV environment are new and tentative. Our response capability is extremely fragile. The need for search and exploration—for innovation and experimentation—is very great if we are to reduce turbulence and regain the stable state.

TABLE 5 Adaptive Response Capabilities

<i>System characteristic</i>	<i>Salient environment</i>	
	<i>Disturbed-reactive^a</i>	<i>Turbulent^b</i>
Survival mode	Operations	Negotiated order
Market analog	Oligopoly	Macroregulation
Futures orientation	Preactive	Interactive
Problem solving	Analytic	Holistic (systems)
Organizational form	Bureaucratic	Holographic
Design principle	Redundancy of parts	Redundancy of functions
Technology	Energy-based	Information-based
Learning	Model 1	Model 2
Planning	Comprehensive	Continuous adaptive
Power	Concentrated	Dispersed
Variety	Decreasing	Increasing
Basis of order	Hierarchical	Socio-ecological

^aParadigm 1; ^bParadigm 2

The Determinants of Turbulence

I will now attempt to draw up a balance sheet comparing those forces which are turbulence-increasing and those which are turbulence-reducing over a 15-year period. Table 6 lists the main sectors in terms of which we construe society: military, political, regulative, technology, the economy, social services, education etc. Table 7 is concerned with socio-cultural phenomena. I will be both selective and brief.

In the *military* field, most analysts assign a relatively low probability to war, nuclear or conventional, between the two superpowers (despite linked disturbances in the Third World). This is stabilizing. But the technologies involved in maintaining the balance of terror and its conventional counterpart are highly energy- and capital-intensive. We can afford neither the resource drain nor the capital drain.

In the *political* field, totalitarianism does not appear to be increasing. In Western Europe there are fewer totalitarian regimes than there were a few years ago, while in the Third World the drift to totalitarianism has been halted in one or two countries. The danger lies in the increasing dysfunctionality of the traditional Western democratic model. There is mounting disbelief in the responsiveness of overcentralized national governments to the complexities of increasingly pluralistic societies, while electoral customs keep political parties and leaders focused on the short term. These centralized national systems are unlikely to change in the foreseeable future and the level of their performance is likely to get worse. Regional movements and the appearance of community politics point to possible long-term correctives.

The absolute gap between the advanced countries' GNPs and those of the Third World countries continues to widen, the oil rich states apart. There is little likelihood of population control becoming effective in the next few years in most parts of Africa, Latin America or Southeast Asia, despite recent signs of some decline in rates of population growth. The large cities will continue to grow chaotically; malnutrition will be prevalent. Much better understanding of

TABLE 6 Sectors List

<i>Field</i>	<i>Increasing turbulence</i>	<i>Decreasing turbulence</i>
Military	Resource and capital drain	Nuclear stalemate
Political	Dysfunction in Western democracies	Containment of totalitarianism
Third World	Widening gap	New development strategies
Legal	Voluminous piecemeal legislation	Some improvement in macro regulation
Energy	Fossil fuel depletion Nuclear costs, hazards	Alternatives nearer
Technology	Mass unemployment Dangerous High technology	Decentralization through microprocessors
Welfare state	Rising costs	Community services
Economy	Inflation Slower growth	Self-reliance
Education	Present formal system	Continuing education innovations

development processes has been obtained by indigenous planning authorities and international lending agencies such as the World Bank. Beset, however, with its own problems and slower economic growth, the West is unlikely to provide more than marginal aid. The less-developed-country/advanced-country relationship is likely to be a major source of turbulence.

In the field of *legal* and *paralegal* regulation, the prevailing pattern remains that of piecemeal measures introduced after the fact to correct particular ills—in hindsight. A corrective rather than a preventive, anticipatory posture means that the process is too slow to be effective, while the volume of discrete legislation, its complexity and frequent ambiguity, have become counterproductive.

Regarding *energy*, while pressure on nonrenewable sources will be more strongly felt, nuclear fission looks less and less like a feasible option. Apart from the hazards involved, a massive building program would absorb too much of available capital for too little net energy gain. Not enough has been invested in alternative sources.

While high-energy and environmentally dangerous *technologies* will continue, a major revolution is occurring in the field of *microprocessors* with immense potential for the saving of material (doing more with less in Buckminster Fuller's [1969] sense), the simplification of a large number of engineering processes and for the decentralization of industrial activities. If carried through, however, at the speed at present gathering, *massive unemployment* of intolerable proportions will result. Proposals to shorten the work week will not suffice. What constitutes work and the very concepts of employment and unemployment will have, in due course, to be reconsidered. It is unlikely that these reappraisals, which involve changes in basic values, will be made in time to prevent a great deal of trouble.

The *welfare state* in most countries is entering crisis conditions as regards the rising costs of health and social services. The move from expensive disease- and hospital-centered medicine to less expensive health- and community-centered concepts is meeting strong resistance from professionals and administrators. Statutory bodies are reluctant to share control with community organizations. To permit such developments would require another difficult shift in basic values. Taxation revolts are likely to spread. But these appear to be in the reactive mode.

As regards the *economy*, a high rate of *inflation* is likely to continue, becoming the brutal (unplanned) means through which the value of money income is lowered and people become used to the lower standard of living in material terms associated with slower economic growth. The positive trends are those toward greater self-reliance, more labor-intensive industries, together with decentralization made possible by advanced electronic technology. Some of the interdependencies and complexities need to be reduced so that the environment becomes less richly joined.

Conventional systems of *formal education* also seem to have reached their

limit in most Western countries. What is being taught is experienced as less and less relevant to the needs and aspirations of the younger generation. The postwar baby boom having passed, tertiary enrollments are declining in many countries. "More education" as the best passport to a "good job" is being questioned. Narrow curricular and disciplinary boundaries based on the older analytic and reductionist approach are not holding up as ways of construing the world. However, many promising innovations are appearing, especially in continuing education.

The Stabilizing Revolution

The socio-cultural list paints a brighter picture (Table 7). For a number of "cultural revolutions" appear to be taking place which are becoming connected (as they are congruent). They give promise of a change of values (emphasizing collaboration and sharing, rather than competition and personal gain) and of lifestyles which may indeed be turbulence-reducing and enable a postindustrial society to come into existence.

I have in mind the turning away of increasing numbers of the younger generation from a preoccupation with amassing material goods. The traditional work ethic is being replaced with, on the one hand, a view of work which makes it somewhat less central to life and, on the other, a demand that it should be more interesting in itself. There is emerging a new concern with improving the quality of life—in all its dimensions. The quality of life is being experienced as deteriorating; improving it in the workplace is part of this wider quest.

The growth of the women's liberation movement (its extremes apart) is

TABLE 7 Socio-Cultural List

<i>Increasing turbulence</i>	<i>Decreasing turbulence</i>
Alienation	New collaborative values
Dropping out	Lifestyles with less emphasis on material goods
Drugs	Quality of life ethic
Crime	Equality for women
Terrorism	Pluralistic family forms
Privatization	New attitude to death—and birth
	New attitude to nutrition and health
	New attitude to environment

leading to a redefinition of sex roles which may have far-reaching effects on character formation in both men and women—perhaps more gentleness. The family is becoming more pluralistic. There are several movements, concerning minorities for example, leading toward greater justice and equality. Equally remarkable is the new attitude to death—and to birth.

One may notice also the new attitudes to nutrition and health. The important change here, as in several other spheres, such as the widespread practice of meditation which reduces stress, is that people are taking more responsibility onto themselves. The new attitude to the environment emphasizes being part of the world rather than dominating it. Individuals are in fact changing more rapidly than any of the social systems in which they are embedded, and in a direction which may be regarded as adaptive under Type IV conditions. This could become a major form of turbulence reduction. The other side of individuals' condition is only too familiar: alienation, dropping out, the drug culture, rising crime, terrorism, alcoholism and other signs of increased stress, as expected as turbulence increases and which show no signs of abating. One of the most dangerous trends is increasing privatization, where individuals become dissociated from and unresponsive to others.

Individuals, nevertheless, are to a certain extent freeing themselves from institutional bondage through active use of personal networks and in this way bringing about more positive change than may appear so long as one is looking at societal systems rather than people. The system balance (Table 6) seems negative, whereas the person balance (Table 7) seems to be more positive.

There are a number of movements and groups gathering who propose to build a social order the direct opposite of the present: the "small is beautiful" philosophy, members of the "new left" and those environmentalists who would dismantle most of industry at the drop of a hat. These groups seem to me to represent a reactive posture in Ackoff's terms and to be seeking to reinstate a Type II environment—the placid clustered condition for which nostalgia is growing at the present time. But to follow this course would not afford a serious or an acceptable option. To head straight for it would cause immense disruption and untold suffering. For large-scale industrial and urban societies cannot just be dismantled, especially rapidly. Neither can they continue as they are.

The Power of the Person

A third way must therefore be found if we are to succeed in establishing a postindustrial order. To identify its characteristics, at least in outline, is a task which my Wharton colleague Howard Perlmutter and I (1986/Vol. III) have set ourselves in a book we are at present struggling with. It must acknowledge, on the one hand, the fragility and vulnerability in face of the turbulent environ-

ment of most of the systems in which we are embedded; and, on the other, put some trust in the resilience of the individual and his capacity to change these systems or invent alternatives at present not readily discernible. Under Type IV conditions, he, rather than any institution or system, would seem to become "the leading part" and to be the agent of change in whom there is most hope, if any hope there be. We are entering the age of the *person*.

Ackoff and Emery (1972/Vol. III) in their book *On Purposeful Systems* have found a theoretical reason to support this view. They regard the most distinctive attribute of the human—compared with other species—to be his capacity to be ideal-seeking and to alter his goals and objectives in the service of ideals he can never reach—the power of ideals being their unreachability. I would relate this capacity to the ability of the frontal lobes of the human brain to abstract from the concrete (as Kurt Goldstein [1939] showed us long ago) and therefore to envisage possible worlds and to take account of the future, rather than be reduced to the one world which is actual and present in the immediate environment. Goldstein also related this capacity to will—to being able to sustain purposeful action. This capacity is carried by the individual as a psychobiological person. It belongs to him, not to the social institutions which he creates. These may be purposeful but not ideal-seeking. Emery (1977/Vol. III) is even more emphatic in his recent *Futures We Are In*, stating that the task under Type IV conditions is to liberate the individual from serving the purposes of his institutions so these may serve the requirements of his ideals (not that he is continuously ideal-seeking—we live on more than one plane and have our dark and destructive sides).

My British colleague James Robertson (1978) has come out with a scenario he calls the *hyper-expansionist future* (HE). Another he calls the *sane, humane, ecological future* (SHE). Yes, SHE is a very attractive future—and James is very much in love with her. So, I suppose, am I—except that mine is a conditional passion rather than a grand passion, for I want quite a bit of HE in my future (enough Yang to match the Yin). I want to be a coupled system and to use both sides of my brain. I don't want a divorce to take place in my head. I want Jack as well as Jill. If these two people, whom I have always thought rather delightful, would only get around to being married perhaps they would breed an interactive scenario for our future which would enable us to find a new balance between the various environmental types, reduce turbulence and regain the stable state—at a new level.

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