

LAW AND TECHNOLOGY

A Technological Bill of Rights

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"Anyone who thinks that science is going to make our lives a little better is an idiot." Albert Einstein, 1928

"There is only one revolution tolerable to all men, all societies, all political systems: Revolution by design and invention. Every nation welcomed the transistor. Every nation will welcome desalinization. All the world, properly informed of the significance of the design and invention revolution, will welcome it. Science, not politics, centralizes society. The telegraph wire communized the world." Buckminster Fuller, 1970.

I. The Ghost of Ned Ludd.

In 1781, Ned Ludd, a British mill worker, wrecked newly acquired machines in the mill where he worked in the belief that this new technology could only result in widespread unemployment and misery. He unleashed the Luddite movement which after four decades disappeared. Ludd left behind a legacy of newly defined rights, transformed political parties and the touchstone of reform in the nineteenth century—the Reform Bill of 1832. Ludd ignited a value conflagration which consumed the rights of established interests and in the process created a new cluster of interests which brought about a new balance of rights in that society. The ghost of Ned Ludd periodically returns and today looms larger than ever before.

II. Prometheus and Epimetheus.

Since early history, from Daedalus and Icarus, from Prometheus and Epimetheus, from Ivan Illich to Herman Kahn, man has Janus-like vitriolically debated the essence of "progress" in society when instigated by technological innovation and change. Technology will be used here to describe the applications of scientific discovery

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The ideas expressed here arise from a broad range of materials and are neither new nor unique.

to products and people whereby human capability is technically extended.¹

Why is technology of paramount concern today? Technology has changed the very nature of our lives by transforming our physical, cultural and social environment and our individual physical and mental state. Limits to our manipulation of our physical environment are now clearly discernible. Our definitions and perceptions of life, death, food, fertility, communications, transportation, leisure, pleasure, happiness, philosophy, art and religion are different as a result of technology. Yet, technology has controlled disease and can create a limitless supply of synthetic health foods. Then why the compelling concern about technology? Does technology of itself not create countervailing forces to correct any short term economic or social distortions? The dangers of technology arise simply because it has become so overpowering and powerful in its impact. The rate of innovation, the scale, the pervasiveness and the very magnitude of change wrought by technology are now immeasurable by criteria and standards we can presently comprehend or accept. Machinery is now larger and faster than even conceivable a decade ago. We are technically capable of total self-destruction. Our pesticides are deadlier and more durable. Our need for non-renewable resources seems insatiable, while scarcity is in sight. Our population is jumping in quantum leaps. Our perceived consumer needs are spiralling at incalculable compound rates. Technology must be examined now because simple errors or miscalculations may have irreversible and irretrievable effects.

It may be impossible to foresee the effects of technological change, or if foreseeable, only after it is too late to control such effects. Technological innovation developed in one area of human activity to remedy a given problem can cause irreparable damage in other areas of human activity.

Can these dangers be controlled? Are these dangers inevitable because of the nature of human conduct in its pursuit of happiness through greed, negligence or failure of vision? Technology, so enmeshed in the change ethic, is compelled to unravel the unknown and thus, of its nature may be uncontrollable.

III. *A New Technological Balance.*

Is a prophylaxis needed to establish a new technological balance

¹ Biological technology deals with physical changes in human life. Technical technology deals with changes in external life. Both affect psychological and physical life. Biological technology may change the nature of life, death and physical well-being. Ethics arise in both technologies. Theological issues of life and death are only more self-evident in biological technology. This article concentrates mainly on technical technology.

or can existing institutions and existing value systems be reshaped to adapt to different norms? Our purpose is to assess the relationship of our legal system to technology. The momentum and power of technology requires that we be less concerned about the benefits and more concerned about the dangers. Thus, we will emphasize the controls and the dangers of distortion by technology. The benefits of technology need no new proponents. Counter weights to technological supremacy are now required.

IV. *Law as a Conveyor Belt.*

The legal system as the conveyor belt of values requires obvious renovation. The limits of our environment are now in sight. A crisis mentality may stimulate a revolution in values that per force will be reflected in a different context within which the legal system operates. A far different legal system will evolve to that which we have become accustomed. Changing a system which of its nature is loath to change has particular problems. Change by consensus rather than edict or interdiction is preferable in a free society.

Lawyers should have no fear. The complexity of the relationships which are being accelerated by technology will ensure that lawyers maintain their monopoly over the fulcrum decision-making interfaces in society. Other authors here deal with legal training and interdisciplinary imperatives. This article will examine relationships, recommend new definitions and suggest new perceptions for human rights all within a voluntary framework of the common law and re-allocation of resources available to the legal profession. What is needed is an agenda, a consensus, a common strategy acceptable to lawyers and judges alike. Such a collective strategy will bring needed legislative institutional change in due course. Lawyers' lobbies are not ineffective.

V. *The Rate of Technological Change.*

We live in an epidemic of change. Technology in its first stage is directed towards solving a particular problem. We are now capable of solving any given problem if in fact a concerted economic effort is made to allocate resources towards such solutions. Society is transformed equally by planned technology and more often by unplanned technology. Others have described the unplanned technology as "secondary" or "tertiary effects", "invisible effects", "hidden costs", "negative goods", "unaccounted costs", "spillover costs or effects", "bads", "disamenities", "disservices"—simply those elements that are not measured or accounted for in the true costs of a technological development.

Are we able to measure the effect of the pill, pollution or television on our physical environment or upon an individual?

Indeed, such effects are invisible by any current sociological or private right criteria. Thus, the true cost of technology by existing legal, social or political measurements cannot be ascertained by design within our definition of rights.

The very rate of change compounds that problem. How can one amass a quantifiable framework when the variables, in constant flux, are being compounded and never stabilize. The time period from discovery to technological applications is now virtually closed. It took sixty-five years to transform the discovery of the electric motor into technology available to the masses. It took from 1948 to 1951—three years—to apply the discovery of the transistor to a mass market. There is virtually no lag between the recognition of a problem and its technological solution. Only costs intervene. Yet, as global markets become the base, even the economic allocation of costs for innovation does not present a barrier to solution. Our institutions, legal and political, have not developed a capability within the same time frame to either make an assessment of problems or ascertain options. The slower rate of change in our institutions is the source or proximate cause of technology's unrestrained "growth".

VI. *A Crisis in Definitions.*

If a crisis is growing by the momentum of change and the exploitation of technology, our existing legal framework requires fresh definitions of rights and obligations that are generally acceptable in society. Where do we start? What do we now mean by "private property"? Do we need a new definition of "public" and "private" rights? Do we need a new definition of "public interest"? Do we need equal access to tools of assessment—the expertise monopoly? Do we need institutions to screen technology? Which institutions should have responsibility for measurement? Should new agencies be developed and located within existing institutions? Should such agencies be centralized? Should these agencies be decentralized? Do we need a different definition of "progress"? Do we need a different creed of economic criteria? What of the "Gross National Product"? Must we re-examine, particularly in Canada, what we mean by "competition"? What of "corporate rights"? Should the legal myth of a corporation in its total entitlement to "due process" be perpetuated? What do we mean by "damages"? What is "cost" if the victim inevitably pays through redistribution in higher prices? Are national political institutions capable of dealing with questions of international pollution or weather change? What different participation mechanism should be available when we deal with the questions of life and death or any synthetic changes in our bodies?

VII. *Advocates of a New Equilibrium.*

These questions create no insurmountable challenge to the lawyer. The lawyer's professional monopoly (planted between change and stability) will be expanded exponentially. New legal balancing devices must be designed and tested to develop acceptable norms. Lawyers must become advocates for a new equilibrium. The lawyer must develop new skills in bargaining, propaganda, measurements of economic well-being and calculations of changing social values. If technology has transformed society in an invisible and undesirable fashion, then the lawyer must expose the inequities. The pill has revolutionized the family and triggered a revolution in women's rights. The family has become an eroded value. Thus, much of our legal system, supported by the family concept, is being changed accidentally.

We are still capable of creating for ourselves a desirable future, while avoiding the present trends towards technological breakdown. Some observers suggest a total breakdown may be required to stimulate a revolution in value reassessment. The source of our collective problem lies not so much in technological momentum but inability to create measurements of assessment and lack of method to equitably redistribute the beneficial effects of technology. Galbraith has shown that technology is international in scope. The Club of Rome has now outlined the limits of growth and finite global resources. For historical reasons we have developed a tacit policy of technological freedom which in the words of Toffler mean an "anything goes policy". Technology has developed the unlimited capability of creating options. Perhaps too many options at too many levels have been developed. Over-choice with respect to goods, cultural products, services, life styles, is a characteristic of technology. The wide spectrum of choice has resulted in needless expectations and anxiety in making such choices. Any basic change will require that we establish a different definition of "growth", "progress", "costs" and different methods in choosing between technology.

VIII. *Growthmania and Technology.*

Before examining the nature of technology, we must ask whether or not technology is good.

Technology has achieved desired ends not otherwise possible—new methods of communication, ready access to vast information, protection from the elements and disease, creation of new synthetic nutritional foods, relief from boring and repetitive labour and ease of transportation.

Technology's undesirable by-products, also not otherwise possible, include:

- rate of change;
- scale of change;
- increased destructive power;
- exploitation and undue consumption of non-renewable resources;
- removal of craft from the marketplace;
- increased concentration of economic power;
- alienation of labour;
- stress and anxiety in human conduct;
- shift in stable patterns of behaviour through mobility;
- growing differentiation between industrial and non-industrial nations;
- increase in unproductive consumer choices;
- misallocation of resources.

Technology's by-products are always submerged within the semantics of "growth" and "progress". So often are these terms used as the rationale for technology that they have become interchangeable. The Club of Rome, Ezra Mishan, Ivan Illich and others have been attacking the fundamental normative values premised on "growth". Futurists, headed by Kahn, have implied that only by greater growth in productive power can there be a better and just society. "Growth" allows more to be redistributed to "more". "Growth", it is further argued, is not only beneficial but necessary to avoid revolution and destruction by the "have nots". Technology has multiplied goods and reduced the gap between rich and poor. Technology is cumulative. Old technology is not discarded. A new innovation provides yet another new, at times, unwanted choice. Artificial "growth" continues unabated. The skimobile has not eradicated snow shoes or skis.

Uncontrolled compound economic "growth" by affluent developed societies has increased "costs". "Costs" are borne by all sooner or later. "Costs" include economic and social dislocations and distortions. North Americans represent over five per cent of the world population and consume over fifty per cent of the world production. Much of this "growth" emanates from created needs. Internal social costs are created. The internalization of these "costs" through the legal system has been called "growthmania" by Mishan. Political systems measure "progress" by various indexes of economic growth, like the Gross National Product. While "goods" are measured, "bads" are not. The "growth" mechanism, argues Mishan, creates only greater alienation, pollution, traffic and nervous breakdown. "Growth", through the market mechanism, has expanded the base and appetite of corporations whose

lifeblood has been "growth". "Costs" have never been a controlling factor. Technological "costs" have not been digested by these corporations. Where "costs" are digested, the price increases as does the "growth" of the corporation.

Our value system has been manipulated by the corporate ethic of "growth" to emphasize and maximize profits. Thus, "spillover costs", "hidden costs", "negative costs", "negative goods", "bads", "hidden subsidies", "social dislocations", "disservices" and "disamenities", are transferred to other segments in the community other than the consumer of such products. The "price of progress" it is called.

Corporations have perpetuated myths of growth measurement and have created demands and perceived needs which are only satiated by technological innovation and "progress". Technology obeys its own internal imperatives of infinite innovation without concern for either utility or danger. Auditing the financial records of corporations by accepted accounting and tax principles maintains the myth of "growth". Accounting fails to measure either true costs or social responsibilities of corporations. "Growth", unplanned and unassessed, fuels the momentum of technology. Does a car need 400 hp? This technological conclusion is the price of "growth" at any "cost". Faster travel, pushbutton appliances, synthetics, around the clock entertainment, all tend to transfer dependence from man to machine. Technology contracts communication between man and man. Thus, Mishan argues, growthmania has dictated that we have more and more and enjoy less and less. Our appetite for "growth" has commenced to digest and ultimately destroy our physical environment. Economic and accounting principles conserve this "growth" ideology without regard to "cost" or social corrosion.

IX. *Growthmania and Law.*

The magnitude of technological growth has caused a legal explosion. Delineation of rights and settlement of controversies, have become unmanageable because of the quantity of the problems and the size of the problems arising. Population growth alone is not the issue. Technology has compelled legal problems to take a quantum leap beyond our present legal order. True damages from a computer error or from a faulty drug are beyond the limits our courts are prepared to allocate. This momentum in conflicts has clawed at our legal system and distorted our methods of conflict resolution. Our legal system, confronted by the secondary effects of technology, has proven incapable of re-allocating these "costs" within our existing framework. Consequently, lawyers and the legal system are seen as barriers to change and conspirators in social disorder.

The legal system may be only able to adjust by a Red Guard approach to change through continual revolution within itself. Examine the necessity of specialization in the legal profession. This theory of specialization tends to over-judicialize human conduct and enhance the radical monopoly of lawyers' expertise. Specialization *per se* creates higher "costs" for services without commensurate increased social utility, thus feeding our "growth" mentality. If change is the only constant in our society, the stabilizing force of the legal order must establish different norms and provide an acceptable framework for dealing with the settlement of disputes.

The difficulty of placing legal limits to technological growth is inherent in the two dominant mechanisms of technology. One is the mechanics of technology while the other is the motive force of man to tame his environment.

In *The Year 2000*, Kahn and Weiner list over 100 technical innovations that will cause significant changes in our social, cultural and psychological environment. Lasers, new sources of power, new transportation vehicles for land and air, three dimensional photography, human hibernation, are but a few of the areas where we will be inundated by a choice of innovation. Man's ability to adapt to this spectrum of overchoice has been described in *Future Shock*.

The legal system, by design, aptitude or training, has not been able to cope with problems of sheer size and scale. Normal legal remedies and procedures were neither established nor appropriate to the problems of technology. Remedies of tort, breach of contract, fraudulent misrepresentation, warranty, manufacturers' liability or the nature of the adversary process, all of which are retroactive in nature, seem incapable of dealing with the secondary and invisible technological effects. The legal system was not fashioned to deter the proliferation of high level problems and the magnitude of damages, if assessable, that would be involved. How can one assess "damages" for a polluted stream or from a destructive drug and who can make what claim?

Statutory economic remedies are equally inappropriate. Anticompetitive law, designed to deal with a particular economic environment as perceived through an accepted economic format, has not controlled "growth" or enhanced "competition" according to its theoretical premises. Consumer protection laws tend to deal with low cost surface problems. The size, scale and concentration of economic power surrounding technology seem incapable of direction or control. The magnitude of damage and the proof of secondary effects that arise from technology make the legal order hesitant to redistribute such damages through traditional common law remedies. The results are manifest symptoms of a breakdown

in legal institutions. The legal order, slow to adapt to the new context, is perceived by technologists to be archaic and by anti-technologists, to be unjust.

X. *Law as a Control Mechanism.*

Legal and political systems have been traditionally accepted as the predominant planning and controlling elements in society. They have been given traditional responsibility for redressing imbalances between vested interests, individuals and the state.

Is the legal system, in its present form, capable of assessing the products and by-products of technology and its impact on society? Of its nature, is it capable of diverting from its traditional role of dealing with problems in a retroactive fashion to play an anticipatory role? Should the legal system be an institution for assessment, direction or control of technology? Can planned legal intervention diverge the probabilities of a certain conduct or behaviour arising from technology? Is our legal system able to redistribute power, through its present mechanisms, to meet the just needs of society? Where the law is a carrier of norms, can it establish new norms and value systems? If the legal system were ready, is it capable to measure the impact of technology on society? Should judges, arbitrators or lawyers be given this role? Is the concentration of economic power capable of legal redress? Can counter-technology be developed by incentives within the legal system to offset "bad" technology?

The legal system historically has been capable of adapting itself to change. Indeed, the "growth" in technology and the growth of law have conceptual parallels. The common law, with its unique melding of old and new ideas, when joined together, developed different values based on past experience. While retroactive and given to decisions on narrow grounds, it established, per force, new norms. The process of *stare decisis*, playing a fictional Blackstonian role, tipped its hat to stability yet was in a constant flux of change. It was peaceful yet commercial England that married philosophic thought through the common law to establish new rights. Labour rights, manufacturers' liability and tort, were shaped on the anvil of the common law. Our present legal system accepted, tongue in cheek, the Blackstonian thesis that conduct could be measured by a set of known rules. Holmes and Cardozo brought a different reality to the legal system by holding the view that law is merely what the courts will do with a narrow set of facts. Holmes stated that law was the enforcement of the "preference of a given body in a given time and place". The legal system, as the agency of authority, used legitimate means to suppress rights whose time had not yet come and equally used

legitimate means to declare rights whose time was ripe!

The origins of our legal structure on common law, proceeding from one set of narrow facts to the other, seems incapable of operating in an anticipatory or prospective fashion. Law feels comfortable operating through static premises. Law calls for stability, albeit illusory stability. Our legal system can handle low level secondary problems within the existing framework with little change in emphasis. Our legal system must be transformed to divert technology creating high level, high cost problems which have immeasurable cost factors and imponderable impacts.

Since technology grows within a closed system fed by its own imperatives, individual choice has no place in its corporate structure. Unwanted overchoice suffocates free choice. Technology diminishes individual liberty. The legal system must be reopened as an avenue for assertions of human rights.

XI. Law, Economics and Technology.

Technology, good or bad, remains the issue. Technology functions with little heed to the market fluctuations of supply and demand. Technology is now enveloped in a complex structure dominated by few corporations that "administer" prices without relationship to "cost" but geared for "growth". Cars do not fall in price since each car manufacturer budgets for twenty per cent annual growth. Markets are controlled and, through the media, values and needs are created, stimulated, manipulated and controlled. These artificially created demands are now scratching the limits of our resources. Economic surpluses are being ravaged by these synthetic needs.

The legal system has been a passive bystander to structural and economic changes which the rise in technology has brought to our society. The legal system has been a co-conspirator in conserving the existing system. Law has allowed a legal-economic framework to be created by which the fruits of technology are monopolized and the invisible "costs" are disseminated. The legal system, by holding corporate rights to be co-equal with individual rights, have influenced the evolution of technology. The legal system has placed no restraints on the rape of economic surplus developed by technology at great cost to the community and no constraints on the distribution or utilization of this abundance. Technology has unfettered legal and economic freedom without manifesting social utility.

XII. Law and Public Awareness.

If the legal system can increase the level of public awareness of second and third order consequences of technology, this may

be sufficient to preserve desirable future options. The legal system can, with adequate professional support, start to monitor technology, area by area, and thereby minimize technological surprise and deal more rationally with the ramifications of uncertainty. This activity can lead towards establishing a different hierarchy of values. Criminal sanctions can only be implemented if they are defined in advance and in such specific terms that the nature of the conduct you wish to control can be slowed down or prohibited. The nature of technology does not open itself to such early determination. Thus, different standards of advance conduct must be developed.

XIII. The Different Modes of Legal Controls.

Others have suggested that legal control models can be divided into three categories:

1. Specific directives which could result in total administrative regulation of private activity.
2. Change in market incentives which could create new property rights or establish damage guidelines with compensatory rights firmly established. The imposition of taxes are necessary elements of this model.
3. New decision-making structures. This would involve transplanting the decision-making powers for technological development from private corporations to other professional or public institutions responsible to those not concerned with "growth".

Each model allows law to influence the technological process. Yet without examining our fundamental economic decision-making process and seeking to change it, each model suffers from inherent limitations. Different criteria must first be commonly accepted for our different legal models to operate towards a common goal to "de-technologize".

XIV. Our Political System.

When confronting technology, our political system is torn and distorted by "growth" versus control. Since economic power controls technology and "growth" fuels the momentum of technology, the fragmented "public interest" can not develop a constituency wide enough to balance this corporate power. Does the political system act as a check? In Canada we have established a Ministry of Science and Technology to promote greater incentives to "growth". We need our own technology, it is claimed, to survive. The Department of Consumer and Corporate Affairs is hindered

from piecing together a consumer constituency to redress distortions in the marketplace because of our theoretical concept of monolithic responsible government. This mythical concept of responsible government decrees that the government speak with one voice. Thus, it is argued, that two departments of government can not argue for and against "growth" at the same time without limiting government's central credibility and authority. The government must always be on one side. Our political institutions offer little or no solace in redressing the technological imbalance. The theory of responsible government, coupled with the traditional Canadian problem of three levels of jurisdiction, prevent the development of common national goals and national values which could screen the bad effects of technology.

XV. *The Particular Problem of Canada.*

The problem of technological "growth" is an international one. Multi-national corporations, beyond any one government's control, dominate our economic environment. Consumer demands activate large scale international marketing. Economic concentration of power greater than governments and indeed continents, defeat attempts, the fragmented attempts, of our control institutions to develop countervailing checks to technology. Canada, as a consumer of American goods, allows America to set our standards of safety. We cannot develop new norms or values, we are told, without becoming an enclave where "technological progress" slips away because of self-imposed isolation from "technological development". Our laws establishing guidelines for auto safety are only implemented after their establishment in the United States. Any change in this technological process will require ultimate international acceptance. The Club of Rome by its seminal work on "The Limits to Growth" has shown that our concerns are becoming international in scope. Lawyers must, therefore, work on this front.

XVI. *The International "Job" Mentality.*

The thesis that technological productivity would be a major factor in the development and decline of western societies was heretofore dismissed as Marxist nonsense. Marx failed to predict that Marxist states would suffer from the same "growth" ideology. We maintain in Canada the myth of the marketplace and free competing forces. Technology has fused the marketplace and the elements of the laissez-faire theory into a melded circle of economic power that straps together western societies and indeed, communist states by a common adherence to goals of full employment. By our definition of "work" and our right to "goods", we have levered technology to even greater prominence.

XVII. *The Nature of Technology.*

Jacques Elull has divided technology into four rubrics:

1. All technological progress exacts a price.
2. Technology raises more problems than it solves.
3. Bad effects are inseparable from good effects.
4. Technology implies unforeseen effects.

Technology is moral-free, autonomous, self-determining and, thus, in reality, a closed system. Decisions are made irresponsibly—without public or even corporate shareholder participation. Technology grows through a connected process wholly directed towards means, as observed from the preceding stage of development.

Technological development does not move in a straight line according to a given plan but takes unexpected turns of direction. This constant shift in direction occurs in response to new problems. This is very much part of the technological process. Each innovation, shift or intervention aims at solving the new problems as they arise along the way to meeting the requirements of the first problem which was the starting point. Nothing can be done which has only the intended result. Secondary or invisible effects are the rule. The parts of the problem hang together but it is impossible to affect one aspect of the first problem without affecting other aspects of the first problem and the new problems that have been solved in the process. The focus is ever on means. Ends need not be examined. Technology is the end.

XVIII. *Law and Technology.*

While the legal system converges on ends of technology and its impact on society in whole or in part, law does not curtail secondary technological effects. Law has protected technology through due process. Corporations, while morally culpable as technological criminals, are not inhibited by our legal system. The automobile is protected. It has a right to the streets paramount to that of a pedestrian. While the law states that a pedestrian has paramount rights, in practice, the reverse is the case. A car at any speed and whatever cost has made pedestrian rights illusory. The political structure, through the creation of highways by expropriation, and through the elements of insurance policies, patents rights, tax (particularly depreciation) laws, zoning by-laws, building laws, architectural freedom and police protection are all designed to enhance the freedom of the automobile. Thus, the automobile is

beyond the reach of the legal system. Mechanics are paid more than nurses according to our society's dictates.

Legal principles, therefore, flow from given values and premises rather than from alternate thinking about different and desirable goals. Common law is retroactive in effect and remedial in nature. The legal system emphasized stability and the illusion of equal rights. The corporation has the same rights as an individual. The corporation has the same rights to private property as the individual. Economic power distorts premises of equal rights and makes illusory any remedies to restore any balance. Law does not operate early enough in the technological process to be an effective mechanism for control. The legal system is able only after substantial or irreparable damage is evident to activate and impose social or economic controls. The failure to protect common rights by the legal system allows environmental deterioration. Retroactivity limits the legal system's ability to respond. Law, therefore, has been the private conservator of technological "progress".

Public law (transportation, broadcasting, patents, energy, tax system) has been the guardian of technological "progress". Administered law, through regulation, provides technology with stability, freedom from interference to innovation and ability to maximize profits—and thus acts as a public protector of technology. Definitions of "public interest", by failing to make technology accountable for secondary effects or hidden costs, has prevented arbitrators in our administrative process opportunities to equalize or reduce the economic power of technology—even by imposing partial "hidden costs". Technology has been given unequal freedom through the theory of due process by denying access to other forces to examine or redistribute technological costs.

The "growth" of technology has been established as a paramount social goal. Any individual rights or human rights which are limited or damaged have not received adequate redress through our legal system. Public law and administrative law serve to implement public policies which stimulate technology. Technology requires large economic units to support the exploitation and mass application within our economy. Thus, corporations have become sources of power. Corporations have become private socialists with governments becoming their agents. National corporations have been allowed to develop their own internal political structure and perform functions of government. Airports are built for private corporations to use without digesting the "costs". The line between the private and public sector is thus evaporating.

Technology remains unregulated. Our value system allows this growth because we confuse technology and innovation with "progress". Unions and labour have become the handmaidens to corporations as the corporations remit higher rates of pay commensurate with their growth.

surate with the increased "costs" of technology. The alliance between big labour and big corporations which in turn controls research and development for more technology, has led to even greater economic units of technological concentration of power. Our legal system has not established any checks or balances or indices of social factors to divert this result of technology. Technology, like cancer, feeds on growth. Without moral purpose, no limits are established for technology.

Our legal system allows technology to accrue profits by transferring hidden costs to society in general without prior agreement by those who must bear this cost. The size and nature of these hidden costs distort our social system and have overloaded our political and judicial structures. Technology has become the agent of social distortion.

Any change in society by technological innovations should be achieved when measurements have been developed to allocate the costs and benefits. Yet, true measurements have not been developed to measure secondary effects. Myths of measurement are now carried on *ad hoc* in the marketplace, the courts, the legislatures and the agencies of the government.

XIX. *The Marketplace.*

The marketplace maxim is to magnify profits through higher prices and reduced costs. Corporations in the marketplace, in their need for profits, fail to recognize and indeed disclaim liability for hidden costs. The corporations ignore hidden costs by declaring the need to maximize profits and thereby maximize jobs. Consumers of given products are not prepared to pay such costs. Hidden costs are thus transferred to a different group who feel the first wave of impact of these hidden costs. Later these costs are re-distributed in whole or part throughout society. The marketplace values profit, not costs. Even costs may be impossible to measure when the cost relates to consumption of non-renewable resources or pollution of our environment. The marketplace fails to measure intangible social costs which become the responsibility of the state to re-allocate.

XX. *The Courts.*

The magnitude of the hidden costs and the time frame required to rectify damage seems incapable of redress. The courts as a medium to redistribute costs through established remedies (remedies of mandamus, prohibition or remedies of tort, negligence or manufacturers' liability) are reluctant and thus clearly ill-suited as mechanisms for just distribution. The court system requires the presentation of a conflict on a narrow set of facts. The cost of

presentation, judicial delay and the level of damage recoverable never acknowledges the true hidden cost. The doctrine of *stare decisis*, the adversary process and the primacy of corporate property rights, make it prohibitive to detect and re-allocate these hidden costs. Legal, judicial training, traditional remedies and the court process which require measurements of damage and approximate cause to be ascertained, are barriers to preventative or remedial action. Failure to recognize common environmental or psychological rights compound the difficulties of individuals. Courts are remedially retroactive, not anticipatory, when seeking to restore the balance even where damages might be averted.

XXI. *Agencies of Government.*

Agencies of government are developed to implement policies of "growth" which inherently protect and stimulate technology. While some imply they are judicially "independent" all become agents of the "growth" syndrome. These agencies have chosen not to allocate costs to those they regulate. The regulatory imperative is to maximize growth of their units of regulation. Thus, individual rights are diminished in the process of making regulated monopolies economic. The Canadian Transport Commission is less concerned with reducing taxes than the economic viability of the carriers. Hydro boards are more concerned with more power than lower rates. The Canadian Radio-Television Commission is less concerned with costs of cable service than the need to make cable operators economically viable to underwrite the cost of their "public interest" directives. The National Energy Board is less concerned with finite reserves or energy rates than ensuring economic viability of oil corporations to explore new sources of energy. All regulatory agencies feed the "growth" ideology.

XXII. *Legislatures and Oversight.*

The legislatures have not redressed the balance through legislative oversight. Government's economic purpose is to stimulate "growth" and to redistribute costs through the tax system. The myth of legislative oversight persists—the courts propose and the legislatures dispose. The rate of change, the lack of public awareness, the lag and overload of the legislative process all make legislative oversight an illusion. Legislators traditionally respond to crises. Legislators are already overloaded with crises and, therefore, establish internal priorities to settle the greater or immediate crises. Too often, the squeaky crises get the grease, leaving the invisible crises to fester.

Legislators are slow to act because the nature of the legislative

process and the problems confronting an institutional framework make legislatures incapable of dealing with problems unless isolated and brought to an acceptable public boil. Political leaders are loath to develop a public awareness. All political parties today recognize population at zero growth as a desirable goal, yet for religious theory and other reasons are not prepared to establish abortion on demand without a national consensus which they are not prepared to arouse. Legislators are loath to accept crises until public opinion polarizes. Thus, society requires other advocates to educate the public towards a change in fundamental assumptions.

XXIII. *The Problem of Communication.*

Lawyers have traditionally established a monopoly of legal expertise utilizing legal language as a protective covering. Can technological ideas be expressed in legal language? In order to develop comprehensive and comprehensible measurements, we must use the same words having the same meaning. While law and technology rely on a sequential system of thought, language remains a barrier. Technology depends heavily on statistical measurements with observations of probability to develop a conclusion. Law relies on social values and opinions to develop probabilities and conclusions. This communication gap must be closed. Multidisciplinary education can start to close this gap.

XXIV. *Technologists and Lawyers—A Common Frustration.*

Technologists and lawyers share common frustrations. Technologists refuse to make definitive statements concerning factual observations. Technology traces conclusions based on observations that repeat themselves over fifty per cent of the time. Technological conclusions are based on probability and reliability. Technology develops options. Law traces conclusions based on opinions of observations. These opinions are based on viewpoints of values and material issues. These conclusions are not given to statistical repetition. Law, therefore, deals in conclusions rather than options. Law is a synthetic analysis of problems. Technology deals with concrete applications of problems. Technological conclusions are different from legal conclusions. The recognition of these different perceptions from two disciplines is necessary in order to agree on common goals. While technology can say what "may" be done, law is required to say what "ought" to be done. To bridge the gap between the disciplines is essential. In a transitional stage both groups must develop jargon that each can understand. Law and technology share common elements. Both proceed from logical and sequential conclusions. Interchange of information between the legal structure and the technological structure

must be accelerated. There are no written bridges to close the gap. Legal and scientific periodicals have traditionally not exchanged or combined both disciplines. Law and technology act like two separate solitudes. This is changing slowly. *Time* now provides more law for technologists and television provides more insight into technology for lawyers than scientific or legal periodicals. Technology has uncovered a fundamental dislocation between the structure of society and the structure of law. Law may need an overhaul to relate it more nearly to the social structure. Technology does not take cognizance of theoretical or behavioural problems. Law is more flexible in its discipline, is subject to change. Technology is value-free. Law is value-full. Technology is a series of methods. Law is a series of solutions. Common ground on long range goals can pre-establish acceptable guidelines within each discipline.

XXV. *New Adversary System.*

Can a new adversary process be developed for assessment of future technology? The development of such an adversary system utilizing technologists in the adversary process might be a positive element in screening technology. Cannot these issues be raised within the context of common law damage suits and by extraordinary remedies brought by *amicus curiae*? Can the legal problem of time lag and the cost of due process in such a new adversary system be minimized? Is legal lag a benefit if it *per se* slows the rate of technology? The adversary system has certain advantages. It can develop a social awareness, develop options, expand the scope in decision-making and materially enhance the legitimacy of any decision.

If equal access to technological expertise were available, different technological options could be developed through this form of public debate. The public could participate in the debate for creating better futures.

XXVI. *Futurists and Law Planning.*

A number of new methods have been developed to anticipate probable and desirable futures. To date, law has played no role in these methods. Most methodologies have accepted uncontrolled "growth" as an assumption. One method, called the "Delphi" method has attempted to deal with futures by making a systematic analysis of opinion by large numbers of experts on probable consequences. In the development of this method, analyses have been made tracing the effect of one innovation on the other, analyzing for the first time the complex relationships of social to technological options and the rates at which they are likely to occur.

Kahn's *The Year 2000*, premising "growth" as an acceptable assumption, developed a technique to assess the future by statistical trending of existing goals and measuring possible diversions from those goals. B. F. Skinner's *Walden Two* started a literary tidal wave concerning the basic structure of futuristic experimental communes. Skinner describes rights and conduct within societies based on high technology and low complexity. Machines, in Skinner's model society, are ultra-sophisticated while the social and cultural relationships are simple and simplified.

These statistical and literary techniques for forecasting the future are all premised on an existing value structure of "growth". Allergic to "growth", Illich has posited the importance of convivial tools and de-schooling to deflate radical professional monopolies. Could we not through new legal planning institutions, supported by the profession, develop social plans without "growth" as an underlying premise? Law planning can bring to this process definitions of the social dislocations resulting from straight line trending. The inherent difficulty in law planning is the requirement that assessments must be made of future conduct. Complex social economic variables must be considered. Criminal law was a narrow attempt to detail and curtail in advance socially undesirable activity. The law has shown it can develop adequate responses to change established norms or values. The legal profession can show its depth of social commitment by participation in "Delphi"-like future analyses, sensitive to the "growth" syndrome.

XXVII. *Prism of Reform.*

Where can we narrow our focus, through a prism of reform, and reduce the ravages of technology? Our strategy must recognize the pluralism of our society as a strength rather than a weakness. Any checks can bring new balances. Let us examine three areas open to lawyers and judges to develop.

1. *Iron Rule of Costs.*

All legal attempts to reform our system by protective measures have inexorably increased the cost and thus the economic power of technology. For example, pollution control does not prohibit the activity of a given type of undesirable technology. Rather, another technology is added at increased cost to sanitize the first undesirable technology. Nader's clean car movement has resulted in higher capital costs and higher fuel consumption costs to be borne by the consumer victim. The new technology added to existing technology causes inflation by unproductive increases in costs. Regulation sets off a molecular "cost" reaction that accelerates the race towards the limits of our finite resources by stimulating

greater "growth". Compensatory damages, or taxes, to offset secondary effects may internalize costs in a satisfactory fashion in the first instance. This mechanism merely increases the concentration and private property monopoly of the corporation to develop even more costly technology.

To properly restrain bad "growth", any remedy or change in our legal system must not increase the "costs". Rather, remedies must be developed that will replace or, better, reduce or minimize costs. Cannot the courts prohibit dirty technology? Counter-corporations might be developed to create counter-technologies. The concept of technological rights must be "cost" sensitive. "Cost" sensitivity includes cost of governmental or legal interventions as well as direct economic or social costs of technology. "Cost" reduction can impede "growth" yet result in a more productive allocation of our resources and economic surplus.

2. *Reduction of Corporate Rights.*

We have argued that corporate rights have distorted desirable balances in society. Corporate property rights are given more protection than individual property rights. Corporate rights can be fairly reduced in three ways:

a) *Limit to Size.*

If corporations were limited to size, by whatever legal means, a new scale would be introduced. Will Bell Canada or General Motors, each generating billions of dollars in sales annually, be less effective if divided into three Bell Canadas and six General Motors? Are our cities just too big? Can we establish a simple economic-legal guideline to limit our scale? The curse of "bigness" remains a root problem in our social system. Could not all corporate legal remedies be reduced or set off unless full corporate responsibility could be shown for all costs?

b) *Removal of the Corporate Veil from Technology.*

Trade secrets rights have been used as a method to increase the growth of the technological monopoly. By removing rights on the premise that the public pays the true "costs" of innovation, the door could be opened up to the process to counter technology and public debate. Corporations would be more utilitarian in technological research.

c) *Onus.*

Corporations must have the onus of showing all effects of technology before introducing such technology to the market. Could not a simple claim of alleging bad secondary effects be sufficient to shift the onus to the technological

producer? Barriers of access to market must be raised for technology to show that new technology will be good. Onus will involve proving that technological rights have not been breached. Thus, the car manufacturer must prove that a 400 hp car is not a threat to the pedestrian or to finite resources.

3. *A Technological Bill of Rights.*

Four waves of human rights have coursed through our legal system. The first wave was the long and tortuous development of civil liberties within the framework of the common law. This development was recognized as the need to redress an unjust balance in society between man and his feudal bonds and man and the state. As the state's control withered and was replaced by concentrations of economic power in the private sector, a second wave flooded our legal system demanding economic rights. These economic rights included recognition of a right to a job, a right to bargain for better working conditions, a right to a decent home and a right to health care. The gap between rich and poor which began to widen with the onslaught of the industrial revolution and heightened mechanisms of communication, caused the state to recognize economic rights uncovered by the common law by direct subsidies, legislative goals of full employment, social and medical insurance and receptive legislative norms. A third wave of women's rights started early in this century, has been gradually building up momentum. Each wave has resulted in a new legal equilibrium of rights by justicial evolution.

We are now feeling the tidal strength of the fourth wave which requires that we redress the present imbalance created by technology by developing technological rights. Technological rights cannot be developed by political institutions alone. While this new strategy for developing new norms can be started by lawyers and judges, an acceptance of the need of new definitions of rights dictates that we dialogue and debate with economists, technologists and auditors to mutually reform our system by consent rather than revolution. Historically, the common law has extended recognition of rights by constant and repeated claims. Judges decide, not in a vacuum, but in a crucible of changing political and social values. Continued consent to the legal system requires judicial acceptance of changing social norms.

New recognition of rights creates a natural re-assessment of values, a re-organization of our institutions and a public advocacy of a different order. It will involve an acceptance of the limits of "growth". It will involve a cracking of the corporate monolith controlling technology. It will call for rights to protect the common wealth—our streets, our parks—our natural environment. Our

economic norms will require redefinition. This will require not only a repeated articulation of these rights but the creation of different institutions supported by a different legal infrastructure. Technological rights for better amenities should now become inviolate—the right to clean air, clean water, a healthy and inviolate body, livable space, quietude, privacy, creative work and equitable access to leisure and clean common areas. The last two require amplification. Technology has allowed us greater leisure yet the options to develop our leisure time in a creative fashion have not developed with equal strength. Is it enough to say that we should allow a four-day week without developing wider opportunities for leisure within a framework of economic costs that are accessible to all groups in society? Our common areas, such as our streets, parks, educational institutions, should be protected against technological devastation. Mishan has suggested we set up “people preserves” where only sanitized technology would be used and freedom from technological effects such as crowding. Technological rights should include the right to hear and be heard through the media and the right to technological-corporate information. The acceptance of these rights can only be strengthened by new agencies acting as new legal counterweights. New mechanisms must be developed to develop new remedies.²

XXVIII. *Amenity Advocates.*

Advocates, armed with sufficient resources, should be available to expose problems and have resort to class remedies. Advocates, funded by the technological producer, should be able to intervene in the technological process and determine whether technological rights are threatened or being transgressed.

XXIX. *Agencies for Technological Assessment.*

New agencies to assess technology should be created. Such agencies can be developed within the law schools, universities, or the political framework. Duplication and overlap here is not as important as adding fresh counterweights to technological momentum. Pluralism gathers its own strength. Competing agencies and the price of their duplication outweigh the limited capability of a centralized agency in our pluralistic society. It is preferable to have a constellation of early warning systems developed, be it through a network of adversary councils, policy analysis institutes

² See an Act respecting certain Rights and Liberties of the People and an Act concerning Monopolies and Dispensation with penal Laws, etc., R.S.O., 1867, cc. 322 and 323, respectively, which are found as Appendix A to the Revised Statutes of Ontario 1970 for consolation that there is nothing new under the legal sun,

within the universities, or departments or agencies of government—all moving toward a collective goal. Through competition of ideas, the better institutions will be able to flourish and become more durable.

XXX. *Legislative Oversight.*

Once these decentralized agencies are able to obtain a consensus, legal elements which protected technological power should be inventoried and gradually eliminated from our legal structure, ranging from taxation to insurance, from advertising to patent law. Here, agencies of legislative oversight can be brought to bear to start the never-ending task of implementing changes to protect individual rights.

XXXI. *Mechanisms for Technological Assessment by the Adversary Process.*

Why could we not establish an adversary process as a mechanism for establishing good versus bad technology? This would require equal access to the expertise monopoly. Perhaps professional associations should be established that are required, like lawyers, to make their services available to either the technological developer or the technological exposé. The profession could voluntarily establish forums for debates with assemblies of laymen as judges.

XXXII. *Programmes for Technological Protection.*

Any legislative programme that is developed to enhance technology should carry with it social audit criteria which require regular evaluation. Thus, legislative programmes which support and give incentives to the development of technology, including tax and market incentives, should be subject to a fixed time period for renewal and only renewed if it can be shown that technology has not threatened or transgressed technological rights. Enforced compensation for such transgression should bankrupt that technology and such compensation re-allocated by government to sanitized technology.

XXXIII. *Social Auditing.*

New principles to audit corporations are required. This can be stimulated through professional organizations and through legislative edicts. This would entail establishing quantifiable measurements of technological costs, external social environment, social responsibility, better options for allocation of resources, corporate obligations for education, employee benefits, rights of minorities, and so on. Accountants are slowly coming to grips with this problem. They are beginning to account for the unaccountable.

XXXIV. *Public Interest Representation on Boards.*

Without revolutionary concepts, our existing corporate structures will not change. What can be changed is requiring that all corporations of scale with the technological monopolies be made to appoint public interest directors who will protect technological rights within the technological process of the corporation.

XXXV. *Technological Ombudsman.*

Others have suggested that a technological ombudsman be established to continually survey all areas of technological development. While in the short run this may be a suitable alternative, the centralization of its activity has inherent dangers. Technology is too pervasive to be surveyed by a central source.

XXXVI. *Assemblies of Experts.*

Professional monopolies have historically complicated areas of social activities increasing the cost to any citizen requiring redress in rights. Ivan Illich has decried the power of these radical monopolies and the imposition of economic barriers to equal access for low grade but satisfactory services. If such monopolies are to be maintained, there should be greater rights of access to such monopolies. Assemblies of experts from all disciplines can be useful screens for technology. Professional organizations should encourage their internal expertise to screen new technology and make such information publicly available. Right of access to technological information from such bodies could be easily established as a first step in wider public participation. Planning need not be the sole domain of government.

XXXVII. *Corporations for Counter-Technology.*

Could the government from resources retrieved from "dirty" technology establish principles of re-allocation of resources to clean and sanitize technology that does not increase the "costs"? These counter-technologies could open up the options to decisions not now available. Thus, technology must become accountable and not allowed unplanned growth. Here, government must be the prime motive force.

XXXVIII. *Net Economic Welfare v. Gross National Product.*

Economists can join our common strategy. Economists have recently recognized that the Gross National Product is too gross. Already, experiments have been developed to replace the Gross National Product ("GNP") with Net Economic Welfare ("NEW"). Thus, the Gross National Product is corrected to subtract from

its conventional calculations those non-material disamenities which have been accruing as costs to our economy, whether or not they have been recognized and charged against the corporation or products that have caused them. The Gross National Product has been further corrected to add items which have been excluded from the Gross National Product such as the value of expanded leisure. Thus, accruing costs include the disamenities in the tedious job of commuting to and from work. "Growth" obsolescence is being debated by economists by a new calculus for the quality of life and the just allocation of "costs".

If economists, the purveyors of the "dismal science", can, without legislative edict, come to grips with the dangers of technology, is it not equally open for lawyers and judges to refurbish our own legal environment to create, through the consensus of the common law and voluntary action, a pluralistic strategy that will bring us closer to a desirable future? Lawyers' pride requires no more and demands no less.
