



Can We Automate the Good Society?

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Even a cursory survey of modern history reveals the socio-political influence of technology. The ebb and flow of empires can be correlated to the introduction of the cross-bow, cargo ship, gun powder, or steam engine. Similarly, the process of local government was inevitably altered when engineers devised public water supply systems, making a daily trip to the town well unnecessary. Today, television may be encouraging such strong feelings of participatory democracy that traditional nominating conventions for Presidential candidates in the United States may soon be abandoned.

The manned moon landing prompted numerous public statements regarding its presumed salutary effect on world affairs. Perhaps. But part of the uncertainty regarding the long-range social effects of both US and Russian space programs is that, whatever influence is exerted, it will be a "spin-off" or by-product of the technology. That is, the apparatus will not have been designed, in any technical sense, to *directly* influence or control human behavior. Perhaps, afraid of a Brave New World, we would not want to build such an apparatus even if it were feasible to do so. But the possibilities are, at the very least, intriguing.

Most technological advances of social significance to date have been either: 1) developed initially for reasons other than regulation of group social behavior (e.g., electric power, telephone, transportation devices), or 2) developed specifically for social control by means of physical restraint or injury (e.g., stockades, guillotine, military weapons). Indeed, relatively few devices have been specifically designed for regulation of social behavior which do *not* rely on some form of negative sanction. This may be, in part, why the very idea of behavior control is abhorrent to many people. The techniques of the past

have been, all too often, purposefully unpleasant. A brief sampling of some that are not may be useful.

One of the most successful contemporary social regulatory devices is the traffic light. This relatively simple apparatus can effectively control the speed and duration of certain types of movement for a large number of people within a limited geographical area. "Left to their own devices," both drivers and pedestrians in urban areas would be even more hopelessly entangled than at present. The traffic signal does not, of course, completely avoid the use of punishment, inasmuch as violators are subject to fines and loss of driving privileges. Parking meters follow the same principle.

Probably the most common social-mechanical regulatory apparatus is the clock. We may regret the loss of some individual freedom in such matters, but timing procedures seem to be an efficient means of reconciling natural differences.

One particularly innovative use of the clock as a social control should be credited to the English shipbuilder, William Willett, who suggested daylight saving time in 1907. Despite fairly wide agreement regarding the value of an extra hour of recreational daylight, the means of obtaining this benefit seemed too painful. Enacting legislation to the effect that, as of a certain date, business hours would be changed and employees expected to arrive at work an hour earlier would certainly raise public resentment. Businessmen would grumble; employees show up late for months; the unemployed and bored might cook up a few street demonstrations protesting this infringement of civil liberty. Few, if any, elected officials would risk their office to obtain the extra hour of daylight almost everyone agreed they wanted.

The critical issue—as in so many proposed social reforms—was *not* disagreement over goals, but conflict over procedure. To this extent, social administration is a matter of technology rather than philosophy. In the case discussed here, the procedure of

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setting the clock ahead one hour keeps the usual controlling stimulus intact (*i.e.*, we still go to work at "8:00" o'clock), but it functionally alters the behavior. Until administrators have at their disposal more practical tools for behavior modification, even the most beneficial and unselfish social reforms may go unaccomplished. Many of our social control techniques, such as bribes, threats, incarceration, are primitive and *in themselves* sources of suffering.

Another effective behavior control device is the cash-register. The use of this non-punitive machine is not usually resented by employees but has effectively reduced their rate of theft. The cash-register, door key, credit card, light bulb, and photo-cell alarm more effectively reduce stealing than do courts and prisons (at considerably less expense), because they are less obvious, more immediate in effect, and prevent rather than punish the unwanted behavior.

We Are What We Invent

The impact of future social hardware (in the form of communication devices, behavior-recording instruments, transportation and entertainment apparatus, labor- and "brain"-saving machines) is inevitable but uncertain. Almost any of the major projected technological developments of the next few decades could prompt lively discussion. As the pervasive influence of such technology becomes generally recognized, planned "social instrumentation" will supplement, if not replace, social legislation as the dominant means of regulating human behavior.

Take, for example, the recent political assassinations in the United States. One immediate and natural reaction was an attempt to pass more stringent federal gun regulation. A strong opposition developed, however, and passage of truly effective regulation is doubtful. A number of technical alternatives might be investigated. Devices such as tranquilizing guns which mark and paralyze targets might be acceptable to hunters, for example, if they were then permitted to kill the animal by knife, anesthetic, or other short-distance and less violent means. This procedure would allow demonstration of personal skill and courage and would yield less damaged souvenirs. At the same time, as reasonable substitutes for legitimate purposes are provided, the motivations and arguments of paramilitary political groups become more apparent. Another technical alternative might consist of placing a radio receiver in the stock or handle of firearms. If the device were activated by a fellow hunter or by security agents at a political event, the gun would be disabled. Also, batteries to operate the receiver and other essential electromechanical parts would be obtainable only through a licensed organization. In a society which presumably has the economic and technical resources to develop anti-missile missiles, a "safeguard system" against small, conventional hand weapons would appear to

be a relatively minor technological undertaking.

Critics will be quick to point out that such arrangements, even if technically feasible, do not deal with "the cause" of violence. Nor, it might be pointed out, does gun regulation or an international arms control agreement. The reasons for human aggression are undoubtedly complex. It would appear fairly obvious, however, that even the innate aggressive impulses of one human toward another might not be of serious consequence if we had not developed weapons, inasmuch as we are ill-equipped anatomically to kill one another.

The point is this: We become what we invent. A human can be distinguished, in part, from other animals because, having invented chairs, he is a chair-sitting creature. He is a flying creature because he invented airplanes. We are dangerously aggressive animals when we give ourselves tools which kill; or we are gregarious animals when we give ourselves apparatus (such as musical instruments) which augment other latent behaviors.

As long as persons of political influence believe in the primitive psychology of deterrence and punishment ("primitive" because it immediately rewards the punisher by suppressing unwanted behavior, but in the long run builds resentment and rebellion), in-

TABLE 1
PREDICTED TECHNOLOGICAL ACHIEVEMENTS
(adapted from T. Gordon and O. Helmer, *Report on a Long-range Forecasting Study*, Rand Corp., 1964)

Year	Achievement
1972	Automated language translators
1975	Biological agents that destroy aggressor's will to resist
1980	Focused energy weapons—laser death rays
1982	Artificial electronic and plastic human organs and organ systems
1985	Electronic prosthesis (radar for the blind, servomechanical limbs, etc.)
1989	Creation of a primitive form of artificial life (at least in the form of self-replicating molecules)
1992	Increase by an order of magnitude in the relative number of psychotic cases amenable to physical or chemical therapy
2000	Feasibility (not necessarily acceptance) of chemical control over some hereditary defects by modification of genes through molecular engineering
2010	Man-machine symbiosis, enabling man to extend his intelligence by direct electro-mechanical interaction between his brain and a computing machine
2012	Feasibility of using drugs to raise the level of intelligence (other than as dietary supplements and not in the sense of just temporarily raising the level of apperception)
2023	Breeding of intelligent animals (apes, cetaceans, etc.) for low-grade labor
2024	Control of gravity through some form of modification of the gravitational field
2028	Feasibility of education by direct information recording on the brain

creasingly potent weapons will be developed. A new psychological strategy would yield new tools, and, ultimately, a new estimate of the "nature of Man." If even a small portion of our current \$71 billion defense budget were shifted from the development of hardware for punishing *unwanted* behavior to devices for reinforcing *desired* behavior, the treacherous course of urban and foreign affairs might be substantially altered. Furthermore, such an effort might actually prove to be administratively enjoyable as well as challenging, because the best schemes and apparatus, such as daylight saving time, credit systems, contraceptives, televised elections, slot machines, etc., contain the possibility of a relatively immediate reward for the users.

An International Cooperative Index

As a heuristic exercise, I would like to outline how a well-established principle of behavior modification, such as positive reinforcement, might be partially automated to promote international cooperation. The use of reinforcement techniques in international affairs is not a novel proposal. Evan Luard, in his *Conflict and Peace in the Modern International System*, for example, has claimed that ". . . The desire for respect, admiration, love and good name is today almost as clearly marked among nations as among individuals, and the sanctions these rewards bestow may furnish the most effective means of socialization in this case, too." Certain technical requirements of reinforcement procedures must be met, however, to assure even a remote possibility of success in such complex undertakings. It is for this reason that instrumentation becomes something of a necessity.

Procedures for shaping or reinforcing a desired response include: precise definition of goal behavior, measurement of normal or base-rate strength of desired behavior, selection and application of potential reinforcers for the parties involved, and finally measurement of results with modification of procedure as necessary. When we speak of reinforcing the behavior of a nation-state, an abstract entity consisting of numerous multi-directional forces, we refer to a process of altering the direction of the sum of the forces which comprise that entity by means of behavior-contingent consequences. In practice, it means reinforcing predetermined actions of various individuals in the body politic who are influential in producing a nation's foreign policy.

The first step of the procedure is to specify the goal behavior of the target group. For example, certain principles in the United Nations Charter describe a state of affairs which might be widely accepted as a desired sociopolitical goal (*viz.*, "International peace and security, absence of acts of aggression and breaches of the peace; friendly relations among nations based upon respect for the principles of equal rights and self-determination of peoples").

The second step requires some means of accurately

and continuously monitoring the goal behavior in order to determine critical points for delivery of the reinforcers. But such measurement must translate vague and subjective intangibles such as "friendly relations" or "peace and security" into some form of quantitative calculus amenable to rapid computation. The degree of cooperation/conflict between various units in the international system might be quantified by using measures already employed by some analysts—*e.g.*, exchange or withdrawal of diplomats, trade agreements, allegations of treaty violations, editorial opinion in leading periodicals, armed conflict, etc. This sampled data could then be processed by an on-line computer in a manner similar to that now used to predict election results. The output would be a number on an arbitrary scale indicating the degree of cooperation/conflict between each member nation and every other nation. The numerical value of every possible combination could be added to obtain a total value representing the degree of "international peace and security." The resulting index might be reported daily as a brief news item comparable to stock market indexes.

Reinforcing Good Behavior

The possible value of the UN index is far-reaching: certain subscales could be used by UN agencies as a basis for awarding or withholding desired commodities or services; the General Assembly or Security Council could be called into session whenever the value reached some predetermined negative number; international investors could use the index as an indicator of risk, etc. Most important, however, is the fact that it might provide a reliable, systematic and overt indicator of *small and gradual* improvements in international relations which are traditionally overlooked and therefore go unrewarded. Major publicity and attention are still given to conflict rather than the slower, yet essential, positive process of shaping international cooperative arrangements. Persons who wish to strengthen the UN as a regulatory agency should *not* think in terms of a world police force, as this would essentially duplicate already ineffectual methods.

Details regarding the nature of, or procedures for, distributing potential positive reinforcers are beyond the scope of this article, although a number of options seem open to immediate exploration. For example, reinforcers might take the form of monetary grants from intergovernmental agencies or allotment of services below free-market price. It is perhaps significant that the Soviet Union has joined only five of the numerous specialized agencies of the United Nations, two of which—the Universal Postal Union and the International Telecommunications Union—have obvious practical and immediate benefits. The desired but costly services of an agency such as UNICEF might be made partly contingent upon improved Cooperative Index ratings. Of the 93

nations allocated funds by the UNICEF executive board in 1967, 34 had been involved in some form of armed conflict between 1950 and 1965. Another possibility would be the formation of "profit-making" subsections in the UN which might raise initial capital by a small tax on international trade, and subsequently, solicit stock purchases where permitted. Individuals of widely dispersed geography and citizenship would then have a direct and correlated vested interest in peace.

"Brainwashing" and Science Fiction

Any proposal to develop a political technology must deal with the possibility of abuse. The most common fear is that, by some accident or design, our environment will be so engineered that we will lose certain social characteristics highly valued in Western culture such as privacy, creativity, initiative, freedom, spontaneity, etc.

Unfortunately, it is science fiction writers rather than science writers who have tended to speculate about the societies of the future. Only recently and with some reluctance have recognized scholars begun to make such predictions. The very complexity of this kind of task suggests that we still have a large number of options. The traditional academic position is to make the "conservative statement" regarding scientific findings and their possible social implications. For the most part, academic psychologists have maintained this position in the midst of periodic enthusiasm or fear associated with hypnotism, subliminal advertising, "brainwashing," "brain stimulation," chemical transfer of learning, etc. It is quite likely that behavior control procedures will prove to be less effective than proponents hope or opponents fear.

A point which requires considerable emphasis is that the most serious social threat of technology is not over-control in the style of *Brave New World* or *1984* but rather anarchy, chaos, or massive disorganization. Large but delicately balanced and complex organizations are often very vulnerable to serious disruption. The November 9, 1965, electrical blackout of the northeast US coast provides a dramatic example. Guerrilla actions against public water supplies, communication networks, or transportation systems could temporarily paralyze, if not seriously injure, "Big Brother."

In international affairs, technology, which is still typically nation-based, is also more likely to precipitate a violent breakdown of order rather than mold all people into inescapable homogeneity. When a country puts millions of tiny needles into orbit disrupting international communications, and another explodes a "dirty" nuclear device, and a third places instruments on the ocean floor in international waters, etc., technology increases the conflict potential, and may be considered antithetical to general human welfare.

On a more personal level, the best example of poor technology is probably one's experience in trying to get a phone bill, income tax statement, or social security account corrected. It is not a matter of precise control of our affairs which bothers us but frustration due to ineffectual bureaucracy caused by "information overload." We should indeed take precautions against potentially efficient misuse of a national data-bank, for example; but large-scale wire-tapping or other surveillance procedures on an individual level would not only run the risk of prompting rebellion but be almost impossible to implement in terms of initial capital investment and program complexity.

One "detail" which science fiction writers and social critics who are unfamiliar with behavior-conditioning principles tend to overlook is the strong bias toward detailed study of individual cases. In order to deliver consequences contingent upon a specified behavior (e.g., monetary credits for small increases in international cooperation), very close attention must be given to the ongoing behavior of the particular individuals or group in question. Due to differences in physical characteristics, social customs and previous experiences, simply delivering a standardized consequence in a routine manner is not as effective as more idiosyncratic reinforcers. For example, giving one's wife an unexpected gift of three dollars is not as romantic as giving her flowers of equal value. In providing idiosyncratic and appropriately-contingent consequences, one demonstrates, with more than words, a concern which is intelligently, and perhaps uniquely, human.

The Limits of Social Control

At present, our knowledge of behavior does not indicate that social control can be exercised according to the strictly arbitrary wishes of an authority. Until large groups of people have identical genetic and social histories (an unlikely circumstance), humans will not be interchangeable, especially with increasing specialization of work tasks. Any practical plan of social engineering must create a spectrum of social environments which afford an individual a variety of ways of exploring how he can be productive, socially valued, self respecting, and generally appreciative of life.

Our social environment is so poor that the person who completes high school is still considered a bit of a hero. We have not yet designed the basic structure for assuring a healthy, peaceful and honest human community—to say nothing of systematically strengthening the more fragile behaviors of creativity, love, intellectual discovery. Much of our collective effort is currently directed toward the suppression of novel, unwanted and unorthodox behaviors.

In terms of social/biological evolution, one characteristic of a viable culture would certainly be the encouragement (within the bounds required for some

stability of the social system) of individual variation. It is interesting to note that, during the Industrial Revolution in England, certain species of moths with darker-colored individuals were able to survive predatory birds by matching the carbon wastes of factories. Perhaps similarly, "social mutants" such as "hippies" may be our best assurance under rapidly changing social conditions that something human will be left in the 21st century. The endorsement of individual freedom and variation is not only a philosophical preference but apparently a biological necessity.

Futile Arms Race

The most socially dangerous phase of technical development occurs between initial laboratory demonstration and general public knowledge when state agencies may secretly use a device or technique. Wire-tapping and biochemical weapons are contemporary examples. This phase, however, is time-limited. As Norbert Wiener pointed out in his commentary, *The Human Use of Human Beings*, the very nature of a discovery as a form of information precludes ultimate secrecy. It is only a matter of time until an opposing group develops similar counter-control techniques. Aversive sanctions will not prevent widespread, violent socio-political revolutions because weapons used *against* police will become as effective as those used *by* police. Hopefully, administrators will become aware of this limitation before much constructive human effort of the past is destroyed.

In the foreseeable future, only social organizations which exercise necessary minimal control by means of positive, individually rewarding, non-repressive, non-secretive procedures will survive.

Much of our present hostile technology—this includes devices which indiscriminately cause pollution or destroy natural resources—will simply "fade away" if effective and economically feasible alternatives become apparent. Philosophical discussion, restrictive legislation, Luddite revolutions and the singing of protest songs on electric guitars are more accurately viewed as symptoms than solutions. The main thesis here is simply that we now have the technical knowledge and hardware to begin systematically to implement widely-acknowledged social goals *without relying on traditional procedures of punishment and deterrence*.

As Exciting as War

When the benefits of cooperation are as immediate and tangible as those of conflict, we will have more cooperation; when peace is as exciting as war, we will have more peace. There is nothing very profound about such propositions. Assuming we are not too long deterred by philosophical objections (*e.g.*, "easy" virtue is not really virtuous), we can soon begin to mechanize and automate cooperation as successfully as we have conflict. Then, no longer a slave to the threat of self-extinction, we should be able to turn our creative energy toward the enhancement of the aesthetic qualities of existence.
