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Lloyd V. Berkner

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Can Technology Be Used To Achieve Social Justice? — The Challenge to the Law

Lloyd V. Berkner

The challenge posed by Dr. Berkner is based upon his thesis that the technological advances of the last two decades have fostered the most remarkable change of man's status in history — from an industry of necessity to an industry geared to better adapting man to his environment. The author argues that it is only by great technological improvements that true social justice is obtainable. Whether the new technology is used for good or evil will depend on the law, morals, and ethics of our society. The basic challenge to the law is to use the regulatory and tax structures to encourage and motivate industry, rather than to stifle and kill creativity. Dr. Berkner concludes that the profit motive must be retained in order to maintain technological dynamism and that only in this direction lies our hope for ultimate social justice.

IN SPEAKING today of the law's response to the challenge of technology I shall, as my main theme, undertake the task of examining the relation of today's technology to today's society. Then I shall ask what in light of the power now conferred by technology on society, can and should be our social goals. Finally, I shall explore, very briefly and broadly, the principal points of impact of the law in society's employment of technology in achieving those goals, as seen from the vantage point of a scientist and technologist. I suspect that the responding papers will not only elaborate my views from the legal perspective, but also critically examine my assertions and assumptions.

THE AUTHOR: LLOYD V. BERKNER (B.S., University of Minnesota, and numerous honorary doctorates) was Chairman of the Board of the Southwest Center for Advanced Studies at Dallas, Texas before his recent, untimely death.

I will assume at the outset that morals, ethics, and laws are the generally accepted rules of society whereby it can conduct its affairs with ease and confidence. These rules provide the means whereby each individual can assume and predict the behaviour of his fellows with reasonable probability in any situation.

Technology is man's means, by the employment of tools and mechanisms, through which he can increase his productivity by better adaptation to his environment. We should recall that the earliest known man, Zinjanthropus, about 1.8 million years ago, is iden-

tified as man primarily because his remains are associated with tools. Thus, a very fundamental and unique characteristic of man with his power of reason is his ability to invent and employ mechanisms and procedures — technology — that can simplify his tasks, multiply his capabilities, and, hopefully, reduce his exposure to the vicissitudes of chance. Man's technology provides the means whereby he can be released from the naked rigors of nature, common to all other animals, to create a considerable opportunity for choice among alternative modes of living.

Through most of man's history, the rise of his technologies has been exceedingly slow and labored. Consequently, in primitive technologies man's productivity was so low as to leave him in the most abject state of poverty, almost directly exposed to the raw whims of nature. Mass slavery, or its equivalent, provided the essential means whereby a few men could be released for intellectual pursuits — the arts, the sciences, and government — thereby slowly creating civilized values out of the dreadful toil of the massive remainder. Uncontrolled death from uncontrolled disease left man with little hope, so brutality was the rule of life. The point is that without technologies to provide sufficient productivity, slavery and brutality must rule over reason — under such circumstances the alternatives are extremely restricted.

As man found it useful to congregate in cities, where a division of labor could capitalize on special skills, he developed new technologies for water and sanitation, roads and bridges for commerce, a more organized and less nomadic agriculture, the spinning wheel for primitive weaving, and better metals and materials for structures and tools. The wind was used for sailing and milling. These were empirical and not very efficient technologies derived from accidental invention, trial and error. Not until the 16th century — a mere 400 years or 18 generations ago — was science formulated with sufficient precision to provide a guide for new technologies. The new science grew out of the philosophies of Bacon and Descartes. With the brilliant work of Kepler, Galileo, Newton, their contemporaries and successors, man learned that mere supposition about nature was useless and even misleading. Nature was governed by fixed and universal laws which could be perceived only through actual experiment and verification. Through precise measurement of phenomena in a variety of ways, and through their interpretation and generalization by brilliant insight, man created an altogether

new science that could predict the course of natural events with ever greater exactness.

That a suitable science could lead to technologies of altogether new power was at first not at all obvious. Plato and his great Grecian contemporaries had missed this point completely. They could not imagine a technology so powerful and so productive that slavery could be abolished. The power of this early philosophy somehow blocked man's views of the advantages that a really productive technology could confer. Not until our own century have the truly science-based technologies appeared on a significant scale.

We all know of the advent of the steam engine during the industrial revolution of the 18th century; of the great usage of electricity with the telephone, telegraph, and radio of the 19th century; of the new chemical agriculture; and of the explosive rise of all the science-based technologies we have found in the 20th century. It is characteristic of all the new science-based technologies that they could not be conceived or even dreamed of until the underlying science, the precise knowledge of nature, was sufficiently acquired; then these technologies became obvious. Man's learning time is slow (or shall I say his unlearning time of ancient traditions which block his forward vision). Consequently, the real impact of the science-based technologies has only been fully felt in the 20th century. Even at the turn of this century, man's products and services were of primitive vintage. In 1920 our gross national product was only \$70 billion dollars. Today that figure has multiplied by more than 10 as the result of the current bulk of products and services which were unheard of in 1920.

Prior to the present century, industry could be characterized basically as an industry of necessity — the ever more efficient provision of food, clothing, and shelter with a minimum of related essentials and their associated transportation and communications. Since the turn of the century, the new science-based technological industry has taken on a quite different character. Modern industry is *not* directed to satisfying basic necessity; it is aimed at adapting man better to his environment. So I contrast the old industry of necessity that dominated man through his history down through the last century, with the adaptive industry of our present century. In its explosive growth, the adaptive industry has surpassed the traditional industry of necessity at the mid-20th century. So in a sense the adaptive science-based industry — computers, unlimited power and communications, and space, as examples — has become revolu-

tionary in the two decades since the midcentury. With this revolution has come *an almost unlimited rise in man's productivity*. This is indeed the most remarkable change in man's status that has arisen in his whole history; and it is occurring right now — in front of our eyes.

We have already said that inadequate technologies, with their concomitant low productivity, severely circumscribed man's aspirations. The intellectual pursuits were rigidly restricted to the privileged few — the masses were glued to brutality, slavery, and death. Morals, ethics, and law were necessarily confined to this unhappy state of living so vividly described by Hans Zinsser in his great work *Rats, Lice, and History* published in 1935. From our present perspective, we can see that with inadequate technologies the status of the underprivileged masses was totally unavoidable; amelioration of their lot by humanistic laws and philosophy could only slightly improve their situation. Poor technologies are simply incapable of yielding sufficient wealth to lift man from misery! This fact may explain why the traditional religions all rely on the hope of a better life elsewhere as a reward for conformity in an obviously inequitable society.

Then quite suddenly man's situation is changed. He is given powerful technologies with the promise of almost unlimited productivity. Already, we in the Western World are dominated by an affluent "middle class" — a majority — who really live better than the kings of old. This powerful and extensive "middle class" has arisen only out of the vast new productivity and consequent wealth that the new technologies are capable of providing.

After untold millennia, society has suddenly mounted a new peak; spread out before it is a whole panorama of new social opportunities that were utterly inconceivable before.

The problem that confronts society today is which opportunities to select out of this vast array and how best to achieve their promise. In examining this problem I will resort to some specific examples.

Consider the problem of poverty. Already vast areas of poverty have disappeared as men have grasped the new levels of productivity. In mastering the new technologies, society has been forced to new levels of education. Nowhere is the character of our technological revolution more vividly illustrated than in the rise of American advanced education in this century, as shown in the following table:¹

¹ Taken from L.V. BERKNER, *THE SCIENTIFIC AGE* 26-31 (1964).

<i>Year</i>	<i>College Graduates (Annual Rate)</i>	<i>Doctoral Degrees (Annual Rate)</i>
1900	28,000	400
1920	50,000	550
1940	200,000	3,000
1960	400,000	10,000
1980	(est.) 1,000,000	25,000

Quite clearly, no comparable social development has ever before occurred in the history of mankind. At these mass levels, a significant proportion of the whole population will have acquired advanced education by the end of this century.

Yet vast areas of poverty and large underprivileged groups still exist and are now all the more apparent in contrast to the large and affluent middle class. In a sense, our technological society is differentiating people into statuses directly related to their capabilities. Yet as a people we are keenly conscious that a stable society cannot exist unless social justice is afforded to the less competent in our society. Equality of opportunity, which is quickly becoming a fact in a highly productive society, is no longer a sufficient social goal. We must somehow reach those unfortunates at the bottom of the intellectual heap.

And so a variety of measures are proposed. The President's Automation Commission, comprised of hardheaded national leaders, recognizes the potential need for a negative income tax. The President, with the Congress, launches an antipoverty program² and a model city program.³ Under the antipoverty program we are retraining those individuals whose intelligence can qualify them for more advanced responsibilities thus vacating their jobs for the less fortunate to take. Underlying these and other measures to alleviate the suffering of the less fortunate is the implicit recognition of a new morality. In our technological society, each individual is morally bound to carry the highest level of responsibility for which his intellect can qualify him. Only then does he not block an opportunity for one less fortunate, the next in line.

That we are floundering at this stage, searching for those measures that can alleviate poverty, is not surprising. The problem is set in the utterly new context of a society which can envision unlimited capability for productivity and wealth. The solution requires motivation of each individual to assume the highest level of

² Economic Opportunity Program, 42 U.S.C. §§ 2701-981 (1964), *as amended*, (Supp. I, 1965).

³ Demonstration Cities Act of 1966, 80 Stat. 1255.

responsibility possible. The intellectually subordinate are not easily motivated. Yet social justice is now imperative for a stable society. Here is a problem that will challenge law and regulation to the utmost.

Intimately related to the problem of poverty is the population explosion. Throughout the ages, man has longed for release from sudden and unnecessary death from contagious disease. Now suddenly with our new science disease is almost conquered by medical technology. Where civilization has battled to maintain population levels over most of history, these levels are now multiplying beyond control. Where the doubling time for populations at the time of Shakespeare was 300 years, today it is a mere 35. Our 3.2-billions today are rising toward an anticipated 7 billion at the turn of the century. This is quite beyond the world's capacity to supply food, quite aside from the unlimited damage of overpopulation to the environment. Moreover, before the population explosion can be controlled, much damage will be done — hunger and anarchy will reign over large portions of the world within the next two decades.⁴

Here again we see the new sense of morality required by the radical change in man's technological status. Where maximum fertility was a social and religious "must" over most of man's history, it today becomes an immorality of the worst kind. Yet because of our religious and legal traditions, many of us look upon family planning with a sense of "sin." And the idea of providing strong motivation to enforce fertility control makes us shudder. Yet quite clearly we have reached the time when we must not merely ask "how many people can we feed," but "how many people do we need." I must assert flatly that no technology, however powerful, can solve the problem of feeding an exponentially increasing population! And we have at hand the technical means of controlling the population at will.

I could go on through a long list of brand new social goals which our powerful technological posture places technically within our reach, but with each goal there are seemingly insurmountable problems imposed by the habits, morals, ethics, and law of our ancient, unproductive, and poverty-stricken civilization. As examples consider the problems of keeping a peaceful world in the face of now utterly destructive weapons and a rising tide of narrow nation-

⁴ For a more detailed analysis, see Address by L. V. Berkner, Colorado College Roberts Memorial Lecture, Mar. 8, 1966, in 22 *POPULATION BULL.* 83 (1966).

alism, and of achieving social equality among all peoples in the face of growing, and now radical, inequality.

As we look at such social goals with their intervening problems, I would make certain generalizations.

Any new technology that can advance society's power and productivity, that opens the opportunity for new human goals, can be employed for either good or evil. How such a technology is indeed used depends on the law, the morals, and the ethics that a society adopts.

In our new technological world with its vast productivity, we are indeed in a new social game. Out of our old unproductive, poverty-stricken game, we have acquired a traditional set of rules — laws, morals, and ethics. Some of these rules are now inapplicable to the new game, and indeed, some are now quite wrong. Since the new game has been imposed suddenly, we are confused in identifying the new rules — we are without social experience in applying them. As we use the old and improper rules, the evils of our productive technology are emphasized, and the proper social goals are beclouded.

If society is to achieve these new goals that our productive technology now places within our grasp, we must identify and adopt the proper rules of the new game. This is the great challenge to law, to religion, and to philosophy in this new day. The stakes are high — survival of society on one hand, its rise to new levels of achievement and social justice on the other.

I will now make a few comments on the relation of law to the rise of technology, as a discrete relationship. I think it is self-evident from the technological preeminence of the Western World that its encouragement of individual motivation under our system of free enterprise leads to the most rapid technological progress. There can be no doubt that the individual imaginative entrepreneur is given reign for his self-expression.

The failure of socialistic systems, in the large, to initiate new technologies has been noted by many students of the modern world. Let me quote professor Jerome B. Weisner, Provost of the Massachusetts Institute of Technology, former science advisor to President Kennedy, and organizer of the President's Office for Science and Technology:

We have examined governmental attempts to stimulate industrial innovation in England and the Soviet Union, the only countries

in which the governments have made major efforts. In my judgment both have failed.

... Having a new idea and demonstrating its feasibility is the easiest part of introducing a new product [or service]. Designing a satisfactory product, getting it into production, and building a market for it are more difficult problems.⁵

I might add that in the one case of major Soviet success — their space program with which I am intimately familiar — their own entrepreneurs were given the same freedom and opportunities as our Western technologists, financiers, and managers. What a pity they do not apply this lesson more broadly.

In the development of new technologies we in the West have learned to institutionalize the process. By this I mean the establishment of industrial doctrine, in which ordinary well-educated individuals each can play a defined role in the generation of entirely new and useful products and services.

The doctrine starts with a group of scientist-technologists organized under an imaginative mind who have access to the basic elements of our science as it progresses. It is at this stage that new technologies are born out of the conjunction of a hundred basic scientific ideas and potentials.

As a new technology is conceived, a basic strategy for its development is adopted, visualizing the ultimate creation of a useful and profitable market.

The strategy is then broken down into dozens or even hundreds of tactics, to test alternatives either simultaneously or successively, in orderly solution of intervening problems, from the most scientific, through development, engineering, and manufacturing to ultimate marketing.

Based on the resultant tactical program, a management system is created to effectuate the defined tactics and achieve the basic strategy.

Finally, the tactics must be priced out so that the total cost of the strategy can be predicted and coordinated with the ultimate market potentials.

Traditionally we have thought of capital as the cost of factories and equipment utilized in the production of a product or service. But in light of the doctrine underlying new technologies, we see that the initial capital cost of invention, development, and creation

⁵ Weisner, *Technology and Innovation*, in *TECHNOLOGICAL INNOVATION AND SOCIETY* 11, 15 (D. Morse & A. Warner eds. 1966).

of market may far exceed the cost of mere factories and equipment. Consequently we must now take an altogether new view of capital and its amortization if technology is to be encouraged at the optimum rate.

Unfortunately, in our poverty-stricken economy of old, we viewed profits as a source of special privilege — and in that age, this was usually — and also unfortunately — true. But today we must accept an adequate profit as a means of capital formation, and allow it to be accumulated at a rate that will optimize technological progress. To effectuate this change in philosophy our regulatory procedures must permit amortization at a rate that provides substitution of new and more efficient methods and equipment at a rate that will maintain our productivity always at its potential maximum. Any of today's technological leaders will agree that the rise of productivity from new products and services is not limited by ideas, but rather by the capital available for their development. Here our regulatory and tax structure needs the most critical examination.

The broad science-based industries that have arisen out of these basic procedures are indeed quite new in the history of human affairs. Their success depends on the original thought that their employees can contribute. In a sense, these new industries are more like our better universities in the educational mixing of employees. Typically, such an industry with about 40,000 employees will have 10,000 who have bachelor's degrees, 2,000 who have master's degrees, and perhaps 250 possessing doctorates. The motivations of these new industries have recently been analysed in a remarkable essay by the president of the Polaroid Corporation;⁶ or let me paraphrase Pat Haggerty, chairman of the board of Texas Instruments, who said that the objective of Texas Instruments is to produce useful new products and services; the motivation to do this successfully is a profit whereby we can enlarge our business opportunity. Contrast that statement with the old "profit motive" analysis.

Before concluding this phase of my discussion, I would address myself to a widespread misconception. This misconception was illustrated recently by the assertion of a newspaper columnist that we should stop our space program and turn the funds over to rehabilitation of minority and underprivileged groups. Implied in this assertion is the assumption that our technology is now good enough to serve all the ends of social justice, and, therefore, we

⁶ E. Land, *Industry and the Paradox of Ubiquitous Individuation*, in *id.* at 27.

should halt technological development and turn the capital over to immediate social ends.

No assumption could be further from reality. We are but at the birth of this technological age with its rising productivity; only when it is fully developed can it promise a reasonable social justice. To assume that we have reached a sufficient plateau to provide wealth for all with our present technology and productivity is an utter fallacy. Throughout history, man has believed that social justice could be achieved by this or that ideology. I do not decry the human effort toward equality among men; as a people we applaud it! But if this equality is to be achieved quickly and at an adequate level, we should not divert the effort toward a more adequate technology which is the only means of creating the necessary total wealth. Without this technological progress, ideology, however perfect it otherwise may seem, can only lead to a uniform measure of misery.

Taking space as an example, we can now foresee that by the end of this century it will be a mighty and profitable industry. At the national meeting of the American Astronautical Society at Dallas in May 1967, we learned of the promise for a magnificent, economic, and profitable space industry that can now be foreseen. Space provides an entirely new and unique environment for science, education, transportation, industrial research, manufacture, new forms of medicine, and even tourism, art, and pleasure. Like other great technologies, and here I recall aviation, the first steps are halting and costly. During the early days of aviation, even some experts could predict no future. Yet, in 1965, aircraft carried 10 billions of pounds with incredible speed and safety. Who can now describe the added effectiveness that aviation gives to society in improved management, manufacture, happiness, and pleasure? Now space holds this same promise.

Our hope of ultimate social justice lies in maintaining the technological dynamism in the world today. In this, our law and regulation, with its underlying philosophy, its implicit morals and ethics, plays the critical role. We have learned to grasp and institutionalize the new science-based technologies with their promise of limitless productivity. But can mankind find the rules, the law, whereby this opportunity can be turned — not to unlimited evil — but to unlimited bounty?

Before I conclude, I would like to offer my own critique of what I have said in this discussion. Has my analysis been too ma-

terialistic, leaving little room for the humanism of attitude that must predominate if men are to find life worth living? Have I ignored the individual goals to which men as individuals aspire?

Certainly humanism embraces the great thoughts, ideas, and principles which men have conceived and elaborated over historical time. Humanism rose to its summit in the Renaissance as men broke the ties of feudalistic bondage and won certain rights and privileges as individuals — rights and privileges which could not be transgressed. The principles of this humanism have been recorded and codified in our laws, our literature, our philosophy, our music, our arts. They define and develop the extent of man's innate freedom as man, and the distinction between individual license and freedom, so the right of one is not translated into the needless bondage of others. Surely the purpose of life must be to optimize human dignity.

Yet human goals cannot be dissociated from their means of achievement — and so the material foundation for social justice cannot be ignored as an essential part of the whole. As man's command of his environment rises, he can envision new social goals and new levels of individuality. It is for this reason that the book of humanism is only partly written — the more important chapters await consummation of the material means ahead. However great the writers, the artists, the statesmen of the past, we must not be deluded that their pronouncements are all complete, adequate, or even applicable to our evolving technological world. Walter Lippman made this point clearly when he said on St. Patrick's Day this year:

It is this great technological revolution which has transformed not only our ways of living but, in its ramifications dealing with the structure and chemistry of the human personality, is remaking men themselves.

Democratic institutions are derived from a radically different kind of society, one composed of peasants and landlords and artisans and merchants living in villages and towns with perhaps one metropolitan capital like London or Paris.

To preserve the moral and spiritual values of democratic institutions and at the same time to be able to govern this new technological society effectively is a problem which will haunt us for a long time to come.

Nobody has as yet found a solution to it.

We live together today — 3 billion of us — on Barbara Ward's *Spaceship Earth*.⁷ A billion are now traveling first class, but 2 bil-

⁷ B. WARD, *SPACESHIP EARTH* (1966).

lion of our spaceship passengers ride in our steerage in utter misery. How can we guide and articulate our newfound technological power to bring them opportunity and respect? Here lies the challenge for the closing chapters of humanism — chapters yet to be written.

In our universities humanism teaches history, the philosophies, the literatures of the past, but I would ask with William Birenbaum, is it time that our humanists set up a university department of the future to find the true basis for these unwritten chapters of a rising humanism? As Edmund Spenser wrote in the 16th century:

Yet all these were, when no man did them know; yet have from wisest ages hidden beene; and later times thinges more unknowne shall show. Why then should witlesse man so much misweene, that nothing is, but that which he hath seene? What if within the moones fayre shining sphaere? What if in every other starre unseene of other worldes he happily should heare? He wonder would much more: yet such to some appeare.⁸

Or may I be more blunt. Has the time arrived for our law schools to assume leadership in research toward articulation of our rising technological power with the new humanism this power now makes possible? In the words of Thomas Jefferson,

I am certainly not an advocate for frequent and untried changes in laws and constitutions. . . . But I know also, that laws and institutions must go hand in hand with the progress of the human mind. As that becomes more developed, more enlightened, as new discoveries are made, new truths disclosed, and manners and opinions change, with the change of circumstances, institutions must advance also, and keep pace with the times.⁹

⁸ E. SPENSER, 2 *THE FAERY QUEBENE* Prologue, Stanza 3, at 2 (G.W. Kitchen ed. 1899).

⁹ 15 *THE WRITINGS OF THOMAS JEFFERSON* 40-41 (A.A. Libscomb ed. 1905).