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Technology as a Way of Life

TECHNOLOGY HAS BECOME the common mode of human living, and is invading every institution and activity. It has not only a physical effect in changing man's material way of life but it brings with it mental upheaval as well.

The sudden growth of technology has created social problems of the first magnitude. Old customs have crumbled; the relationships between parents and children, teachers and pupils, employers and workers, kings and commoners: all these have been changed.

Some people have expressed the fear that the products of technology will impoverish the quality of human life, taking away the very features which make humanity unique, robbing it of opportunities for individual creativeness.

This can, indeed, happen if we allow technological skill to continue to outstrip social understanding.

What is progress?

Is technological complexity a sign of progress? When mankind was in the simian stage, men may have had an attractive dream of the future. In it, they saw their native forest transformed into a paradise where the trees were all laden with fruit and the sun always shone with gentle warmth. But there were conditions attached to making the dream come true. Men had to give up their lovely fur, dispense with their decorative and useful tails, and offer their food to the fire-devil before eating it. They had to adapt.

We are still debating whether this was really what we wanted. It is true that practically everybody in an advanced country can have as much of material goods as is necessary to happiness, without excessive hours of labour, and with the opportunity for developing mental culture to fill leisure time. But the improvement has been in methods and things, not in purposes and ambitions.

It is impossible to turn back the clock. You cannot buy peace of mind or continued existence by imposing ignorance on yourself. No business man dare leave all innovation to his competitors: he may find it

impossible to catch up if a competitor takes the risk of the first step and keeps going.

Change is imperative. Our standard of living has been advancing, on the whole, ever since we came down out of the trees. In our industrial society, health has been improved, life is longer, and working hours are shorter. The commoner of today enjoys comforts that were not imagined by the kings and barons of three hundred years ago.

A speaker said wittily during the Duke of Edinburgh's Study Conference that whereas men used to worry about whether their children would die of hunger, their worry today is about whether they can keep up their payments on the television set.

The changes brought about in the lives of men and women in the past hundred years have been almost entirely due to the work of scientists and technologists. The fullness of life now within the reach of advanced nations could not exist without the complex paraphernalia which science and industry have provided. There has been an increase in human dignity because muscle has been replaced by inanimate sources of energy. Slavery has declined and mass democracy has arisen.

All these advances have raised people's expectations to the level of fantasy. Many have allowed their essential human qualities to wither because they look only for things that technology makes available to them and are willing to become its passive beneficiaries.

Society has problems

In changing the patterns of physical living, technology has altered our social pattern in a major way, but it would be naive to suppose that all our social and economic troubles have been caused by technical changes. There were great social troubles long before we had machines or knew anything about chemical reaction or physics.

While it is true that our efficiency in technology demands revised political and social ideas, it is just in this area that we are hindered by our age-old social laziness and our resistance to change. We have high expectations of happiness, but we are reluctant to

make the individual and social adjustments that would make them real.

We may take it for granted that the characteristic product of scientific research is neither good nor bad.

Men of goodwill dream of the benefits inherent in the products of science and technology: men of evil design will not be deterred by such dreams from attempting to employ the forces of science for selfish and destructive purposes. What is needed is to breathe life into the social sciences so as to synchronize the purpose of our lives with the purpose of machines, and to assure beneficial use of the products of the physical sciences.

As a result of the scientists' discoveries, we have powerful instruments in our hands by which we can set all the world free from drudgery, fear, hunger, and pestilence, or we can obliterate life itself. The choice is ours.

What is of social importance is not the invention or development of a new machine, a new chemical or a new vaccine, but what service it will provide that is good for the human race. Technology and civilization should march in step.

Change demands adjustment

Technology changes society by changing our physical environment, and we must adjust ourselves to the changed surroundings. Our dilemma arises from the ever-widening disparity in terms of accomplishment and of magnitude of consequences between man's physical inventions and his social adaptation to the new conditions which the inventions create.

Some of the responsibility rests with science, which has the ethical duty of being concerned with the consequences of its revelations.

Every human invention and discovery can be used for good or for evil. Science does not prescribe our purposes or dictate our morals. Kepler discovered the planetary movements, but he placed a spirit in each planet to guide it in its course. How beneficial it would be if today's scientists, developing their powerful new things, could provide each of them with a spirit to ensure proper use!

The harnessing of nuclear energy is an easier task than is controlling human conduct in the use of this elemental force. Dr. P. W. Bridgman, who was awarded the Nobel Prize for physics in 1946, disposed of the scientists' responsibility for the atomic bomb in these words: "If society had not wanted to construct an atomic bomb it need not have signed the cheque for the two billion dollars which alone made it possible." Speaking about radium in 1905, Pierre Curie said: "I am among those who think, with Nobel, that humanity will obtain more good than evil from the new discoveries."

These opinions cast responsibility for humane use of discoveries and inventions upon the common people. But because the scientist and the technologist are highly educated persons, they should naturally

expect that society will ask more of them in the way of judgment than it would of the general body of the people.

There is a special advantage to society when technically trained men and women take an active interest in social matters. Their thoughts and acts in their professional duties are characterized by definiteness, decisiveness, and promptness. These are virtues greatly needed in the organization, planning, and administration of society.

All the problems of men cannot be solved by making calculations and assessing chemical reactions and noting physical changes. The danger of technology to the technologist is this: the specialist may become like a man who lives in his own house and never leaves it. There he is perfectly familiar with everything, every corner of it, much as Quasimodo in Victor Hugo's *Notre Dame de Paris* knew the cathedral; but outside it things are strange and unknown and not of his concern. Yet the technologist trips over the principles of his art if he fails to take into account the over-all performance of society while devoting all his attention and skill and energy to perfecting one mechanism in it.

C. R. Young wrote to this effect in *Engineering and Society* (University of Toronto Press, 1946). As Dean of the Faculty of Applied Science and Engineering he said: "Young engineers in training should realize that it will be their high duty to utilize their technology in such a manner as not to endanger social stability. Both sound understanding and professional courage are called for in these situations."

We have not kept up

Expo '67 prompted us to ask whether Man and his technological world is in the same orbit as Man and his social world.

Dr. Halbert L. Dunn says in *Your World and Mine* (A Banner Book, 1956): "The power of science, unleashed for less than four hundred years, has transformed the physical world for mankind. Yet man's social, economic, and religious institutions have not progressed to match the pace set by science."

How is the lag to be eliminated? The social institutions of government, business and labour need to become as flexible as the institutions of science. Science is dynamic; no abstract ideologies stand in its way: social institutions remain rigid, resisting change, respecting sacred cows. The application of the scientific mode of thinking to social life has hardly begun.

The problem is very, very difficult. Social change is not easy to subject to scientific-type study. Every example of change occurs only once in exactly similar circumstances.

We cannot, however, await the assurance of success before moving toward a social adjustment to technology, but must take positive action based upon the mere hope of success. There is no alternative road. As Prince Philip said in an address to the British Associa-

tion for the Advancement of Science: "Of what use is science if man does not survive?"

We need to cease taking our humanity for granted as something assured, and realize that we have to protect and develop it. It is virtually impossible to think of a single scientific discovery or technological innovation the social consequences of which were studied systematically and planned for in advance. Here is the place where the physical and social sciences should come together to apply the principles of truth-seeking to social problems.

The implications of science are now so great for all of us that scientists can no longer afford the special luxury of communicating only with their fellows. Dr. Hans Selye declared in his book *From Dream to Discovery*: "Whether he likes it or not, the scientist must occasionally find time to leave the isolation of his laboratory and try to stimulate public understanding of what he is doing, for he is the only one who can do this."

In our democratically organized nation, social organization and adjustment to change must be preceded by public discussion of the basic issues. Unless people are kept informed, mistakes are bound to occur.

Technology has given us facilities for collecting and transmitting facts, so that we have — if we choose to use it — a hitherto unparalleled opportunity to base our judgment and our decisions upon evidence collected from all over our country and from all the world.

There are satellite relays which will make available vast new bands of the radio spectrum, providing space for at least a million simultaneous television channels, or a million million radio circuits. Have we anything to say? Are we willing to listen?

Many organizations with good intentions accumulate batteries of steel files filled with statistical non-explanations of our dilemma. There is an opportunity clamouring at the doors of all research bodies in universities and social service: to set up research in the very practical field of helping human beings to survive in a technological society.

Those who write doctoral theses would profit mankind by directing their attention toward solution of the problems of living in a world governed by technology, thereby showing their capacity to assess what has occurred, their ability to contemplate what is happening now, and their intelligence in suggesting what man must do if he is to accommodate to the new conditions.

Governments have responsibilities

All of the obligation for bringing mankind into line with the new world order does not rest upon the scientists and technologists.

Up until recent years men were willing to accept themselves and their environment as the unwitting outcome of preceding conditions. But now science has opened Pandora's Box of ideas and stimulated thought

in every part of Canada and in every corner of the world.

The planet is inhabited by human beings who have grasped something new: they see themselves as factors in the evolutionary process, able in a measure to guide and further it. Government, technology and social science are obligated to help them to express their urge in an educated and wise way.

The most appropriate way to deal with the problems arising from technology is to create an appropriate society, world-wide and national. This demands socially literate governments which have studied the needs of their people in the light of present environment and developing trends, and are diligently engaged in action that will meet those needs.

The technological attitude of mind can contribute to the social life of the world. Every technologist knows what every politician and every business man needs to learn: there is a time to stop tinkering with the nuts and bolts and think of the whole machine. Governments must develop far-sightedness, looking beyond the next election and the next invention to the continuing good of the people and taking the measures necessary to assure it. This is far from the plane of fragmented, compartmentalized decision-making, failing to take account of the interconnection of things and their results.

Technology cannot control itself. It cannot be controlled by the technicians. It cannot be successfully controlled by any limited or special group. Its effects must, therefore, be controlled by the whole community through its representative agencies. The highest aim of technology and government is this: the good human life of the multitude and the betterment of the conditions of human life.

If a scientific and humanistic statesmanship can bring all the ministries of science to the people, it will endow them with new powers of personal character, political efficiency and social satisfaction.

Education is vital

Automation's most evident impact is on the qualifications needed by employees, and this affects vitally the course of education. If a time is at hand when automation demands electronic techniques from everyone, then those techniques are no longer secondary or higher education, but primary.

This does not mean merely technical training, but a liberal education in the sciences underlying technology. At present we are merely trying to catch up with the machine. It is not enough to prepare a youth for his first job, because under technological advance that job will change radically and often.

Education includes the accumulation of information which can be sorted, arranged, rearranged and brought into association to meet new situations — a broad education that will stress creative qualities not replaceable by machines. It will have a sense of proportion, holding fast to that which is good while adding innovating practices of promise.

The two million people over sixty living in Canada need not feel left out of this educational process. They may recall that in their youth the only science lesson they had was testing litmus paper in lemon juice to see it change colour, but they cannot linger on that experience. They need to learn about their universe as it is and as it is becoming: to realize the meaning of science, her powers and procedures.

One evening a week devoted to reading about the attainments of science would make us knowledgeable about what is going on in the world, and drawing aside the curtain just a little will smack of adventure.

We will be assisted in this by such institutions as the Centenary Centre of Science and Technology in Toronto. It has set itself to demonstrate that the achievement of science is the product of the growth of thought over the ages, developing from generation to generation.

These institutions are not the resting places of dust-collecting artifacts, but places where people may go to see and to study the means whereby we came to the scientific and living environment of 1968. They will show that the past is preliminary to today, and that what is happening today is shadowing forth the conditions of tomorrow, and that age by age man has to cope with change in order to live.

Enjoy true values

It is time that we started to enjoy some of the real fruits offered to us by technology. Its principal gifts are freedom from toilsome work and the boon of increased leisure. We have lost touch with the rhythm of the seasons and the hours. We allow ourselves to be pushed into positions where movement and disturbance seem to be the really pleasurable things.

No man can afford not to accord the world of human values a share in whatever we mean by reality. There were values inherent in the pre-industrial world which we may have sacrificed unnecessarily. Mahatma Gandhi sponsored the revival of cottage industry because he believed this.

Values such as the Good and the Beautiful are not fully described in temporal terms and they stand outside the scientific dictionary. Yet, says Dr. Martin Johnson in *Time, Knowledge and the Nebulae* (Dover, N.Y., 1947), there is nothing in science and technology to discredit the timeless reality of values through which all human character has its chance of conscious superiority over its temporal limitations.

Where is the end?

The question: "Where do we go from here?" is more progressive than "Why did we ever come here?"

It is true that we are moving faster and faster toward unknown horizons and a future dimly seen.

We cannot stop the trend. C. C. Furnas wrote with

smug satisfaction in his postscript to his book reporting on science and invention: "Almost everything has been discovered; not quite everything, for we are still dribbling along, but almost." That was in 1936. Three years later research scientists published papers reporting about uranium fission, and atomic energy was just around the corner.

We do not know what new worlds, what new frontiers of science, what new techniques, are as yet undiscovered. Some forecasts of developments before the year 2000 are: reliable weather forecasts and regional weather control, translation of languages by computers, production of primitive artificial life, blanket immunization against infectious disease, and the economic production of synthetic protein foods.

Expected in the succeeding quarter century — when children born this year will be only in their fifties — are: direct links between the brain and the computer, chemicals to stimulate the growth of new organs and limbs, drugs to increase the life span, and other drugs to increase intelligence, education by direct recording on the brain, and production of a fifth of the world's food from ocean farming.

We have to change

Throughout history, most people have greeted every technological advance with a compound of hope and fear. We have had an uneasy relationship to the machine, covering the whole series of emotions between love and hate, but we have managed to remain people who aspire to more things of value than are dreamt of in a mechanized world.

Among living things on this planet, so far as direct evidence reaches, science and philosophy belong to men only. Science is progressing very well: perhaps our philosophical approach should be a generous open-mindedness to new ideas, followed by a critical look at their potential effect for good or evil in human life, and hard-headedness in putting them to proof by test.

As new wavelets of scientific enlightenment keep creeping up the beach we shall have to change our situation somewhat; we may have to change ourselves somewhat. We cannot "sit this one out".

It is better to arrive at truth now and do something constructive toward preserving our social values than to trust blindly in the optimistic expectation that everything will turn out well. Highly-advanced Rome fell in the disaster that evolved from her political and social forms, and mankind had to wait more than a thousand years before society was again ready to pick up ancient experiments and carry them forward.

Men must not grow mechanical in head and heart as well as in hand, or the virtues in humanity will perish. As things stand now, the human race could have, by exercising its humanity, the swiftest expansion of human well-being that has ever been within men's reach, or even within their dreams.