For The Record: Technology And The Human Person[1]

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There has always been a doubleness in American attitudes towards science and machines. Some men welcomed their advance from the beginning and found in them the ripest fruits of progress, the true fulfillment of the ancestral dream. Others looked upon them as alien invaders, intruders in the mythic "garden" where Adamic free men were intended to dwell.

The doubleness and the accompanying tension have intensified with the development of technology, which brings science and machines together in a single enterprise. When technology is spoken of in connection with education, there are ambivalent reactions; and buried value conflicts break through the surface into the light of day. If, as Edward J. Green puts it in "Technology and Instruction," educational technology "is the systematic use of any and all devices and media within a contrived sequence of instruction based upon sound engineering principles,"[2] it is easy to understand why those who prize spontaneity, uniqueness, and discovery take battle positions with respect to those who are apparently arguing for deliberate, perhaps manipulative planning and control. If it is indeed the case, as Francis Keppel has said in the Phi Delta Kappan[3] that—because of insufficient support—education "lacks the sound research and the knowledge of the results of its own experience and tested ideas on how to meet the demands that will confront it in the almost immediate future," it is easy to understand why those committed to improving the quality of education should oppose themselves to colleagues who appear to be giving personal inclinations priority over "excellence."

There are certain ones among us who greet the prospect of educational technology with an enthusiasm reminiscent of 19th century supporters of the "useful arts"—otherwise sober men who were inspired to rhapsodic prose by new inventions and who described what they saw with adjectives like "magnificent" and "sublime."[4] Representative was a Dr. Daniel Drake, when he addressed a lyceum audience in 1820. "Let the architects of our national greatness," he said, "conform to the dictates of science; and the monuments they construct will rise beautiful as our hills, imperishable as our mountains, lofty as their summits, which tower sublimely over the clouds." Not only scientists, but businessmen and statesmen were prone to talk that way when they pondered the utility of "profitable knowledge" or the relationship between a burgeoning technology and the destiny of their New World.

Most artists, however, and many philosophers tended to see other meanings in science and the machines; and there are numerous people in education who share their feelings even today. They respond with a lurch of recognition to the recurrent scene in American literature which presents a locomotive breaking into the serenity of the countryside, staining the pure air with smoke, shattering the stillness with the whistle's shriek. ("The whistle of the locomotive penetrates my woods summer and winter," wrote Thoreau, "sounding like the scream of a hawk sailing over some farmer's yard, informing me that many restless city merchants are arriving within the circle of the town….") Those intrusive shapes and sounds still have the capacity to evoke images of breakage, futility, and constraint—images many teachers still associate with machines.

The heralds of technical progress saw a potential liberation for every man in the new devices and tools. They anticipated correctly a host of improvements: men would be healthier and would live longer, they said; labor would be more economical for the employer and less exhausting for the employed; the circumstances of ordinary life and travel would be conducive to increased productivity, autonomy, and (of course) happiness.

But the artists, perceiving it differently, presented starker and starker images: the lime-burner's furnace in Hawthorne's "Ethan Brand"; the try-works on the whaling ship in Melville's Moby Dick, and the dreadful factory in the same author's "The Tartarus of Maids." Henry Adams found a private

symbolism for his despair of the modern age when he opposed the Virgin to the Dynamo, or the rich organic orders of time past to the automatism and materialism of the present. Frank Norris symbolized an aspect of technology with an "octopus." Scott Fitzgerald, in The Great Gatsby, rendered the machine and the civilization it had created by means of a dumping ground, a "valley of ashes" where "a line of gray cars crawls along an invisible track, gives out a ghastly creak, and comes to rest, and immediately the ash-gray men swarm up with leaden spades and stir up an impenetrable cloud, which screens their obscure operations from your sight." William Faulkner traced its consequences in the destruction of the wilderness, in the dried paw of a giant bear, in a hunting gun battered into pieces against a tree. John Steinbeck presented it as a depersonalized and depersonalizing monster, raising the dust, destroying human beings along with their land.

The two strands of response are still present, particularly with respect to the schools. We can account for the duality in a number of ways—most simply, perhaps, by saying that it involves a tension between those who find their norms in rationality and objectivity, and those who ascribe priority to personal perspectives, purposiveness, and choice. In the 19th century, this might be described as the inevitable polarity of the factual (or the scientific) and the aesthetic, the objective and subjective, the descriptive and expressive. Today the so-called "disjunction" must be differently perceived.

Floyd Matson, in The Broken Image,5 tends to oppose mechanism to consciousness, behaviorism to psycho-synthesis, positivism to existentialism. Daniel Bell sets "analytic abstraction," "intellectual technology" (or programming, decision theory, simulation), and the "calculus of probabilities" against social reality, today characterized by "immediacy, impact, simultaneity, and sensation."6 There are many other ways of describing the tension between the abstract formulae used in the sciences and the "happenings" of experienced life; but we think the point is clear. We are suggesting that those arguing the case for educational technology are on the side of positivism and behaviorism, and that those opposed are on the side of existential or experiential philosophy, of orientations focussing on will, purpose, choice.

Because our own vantage point happens to be the humanities, we are concerned mainly with humanist perspectives on the advent of technology in the schools. But this is not meant to suggest an either/or. We are convinced that the movement towards educational technology is irreversible and that our obligation as educators is to learn how to deal with it—how, if you like, to live with it as fully conscious human beings working to enable other human beings to become conscious, to become responsible, to learn.

It is because of the focal importance of consciousness that we would place the stress, first of all, on the prevailing fear of "things" (using Emerson's term) being "in the saddle" when our classrooms are dominated by the consoles which indicate that technology has arrived. This fear is partly generated, of course, by the oppressive sense of importance and anonymity which seems to characterize our culture today. Some people rebel against it by living assertively and intensely, presenting themselves as if they were aesthetic objects, opting for visibility above all things—and "style." Others, usually very young people, rebel by dropping out, overcoming anonymity with indiscriminate love, "getting by," as the Beatles put it, "with the help of (their) friends." Most, of course, conform, submerge themselves in routines, try not to think about it; but many of these are vulnerable, and many are afraid. It is only to be expected that such people would doubt their ability to maintain control over computerized machines with so much more ingenuity than even the robots in Capek's R.U.R.

Jacques Ellul, writing in The Technological Society7 about the rise of what he calls "technique," goes into appalling detail about the impact of technology upon daily life. He says that technology will inevitably overthrow everything that stands in the way of the internal logic of its development, and that human processes will in time be subordinated to technological ends, unless

we alter the environment being created by machines. Technique, for him, signifies the totality of methods rationally arrived at and possessing absolute efficiency in every field of human endeavor. The ultimate objective in a society where there is a commitment to technique is perfection of technique. This transforms means into ends, and ends into means. Also, it opens the way, Ellul suggests, for increasing depersonalization, centralized planning, a tendency to treat human beings as objects, as things.

The English edition of Ellul's The Technological Society communicates a sense of inexorability that may trouble us; but, in a response to Robert Theobald's review in The Nation, the writer explained that his book was intended "as a description of what has happened because man has remained largely unconscious of the many implications of technique and has sought only to profit from it." It seems to us that he is correct in warning us that technique evolves "apart from man's intentions, following its own intrinsic causal processes, independent of external forces or human aims." We believe that what he says holds serious implications for us in education. In fact, we are already beginning to see evidences of a technical environment with its own laws of organization, its own internal impetus. The fear that we will lose control may well be justified.

Buckminster Fuller, who is one of the most enthusiastic and optimistic supporters of automation in our day, addressed the planning committee for the Edwardsville campus of Southern Illinois University on the matter in 1961; and his address has been published under the title, Education Automation. A perusal of that book has made us more aware than we ever were before of the urgent necessity to foster among educators the habit of thinking what they, as individuals, are doing, of taking responsibility for what happens in their classrooms—and for what they, as teachers or administrators, have chosen themselves to be.

"I have talked to you," said Fuller, "about solving problems by design competence instead of by political reform. It is possible to get one-to-one correspondence of action and reaction without political revolution, warfare, and reform." You will admit that it is odd to link reform with revolution and warfare in that fashion. You may also feel, as we do, that the emphasis on "design competence" and "one-to-one correspondence" suggests that only the designer is to take responsibility. Later, after presenting an idea he calls "regenerative investment," Fuller explained: "The cost of education will be funded regeneratively right out of the earnings of the technology, the industrial equation, because we can only afford to reinvest continually in humanity's ability to go back and turn out a better job." The idea is to plant seeds, to give them the opportunity to grow, and be paid back "many fold" by their fruits, which will be the kind of knowledge only attainable in research and development institutes.

It sounds exciting, we grant, when someone says that we are soon going to be unemployed as "muscle-working machines." It sounds fine when he proposes that the population be paid to stay in school in order to become "more familiar with the patterns of the universe" and to get to be "inter-communicative at ever higher levels of literacy." But, as Fuller describes what is going to happen, we see an illustration of precisely what Ellul calls the "independent character" of technique.

Fuller predicts, for example, that the new educational technology will some day offer an invention of his, the Geo-scope, which is a geodesic sphere constructed in such a way that it can hover over a campus like a miniature earth. It will enable man, he says, to communicate phenomena he cannot now conceptualize, to comprehend the cyclic patterning of the earth's cloud-cover, to get instant pictures of demo-logical trends all over the world. "The consequences of various world plans could be computed and projected," he declares. "All world data would be dynamically viewable and picturable and relayable by radio to all the world, so that common consideration in a most educated manner of all world problems by all world people would become a practical event." This is what is called comprehensive design, and Fuller is a comprehensive designer, who says that—when he talks about educational problems—

he tries to organize all the data in such a manner that they may be solved by "inanimate technology" rather than by organizational reforms.

This is a Utopian vision of a sort, related to but somewhat different from the Utopia of joy and leisure Alice Mary Hilton describes when she talks about the age of cyberculture. We submit that its other face is the dystopia described in Brave New World or 1984. We say this because the principles that govern it are not political principles, nor are they what we would understand to be educational principles. They are the engineering principles mentioned by Edward Green in his definition of educational technology. Efficiency, effectiveness, competence—these are the engineer's criteria. When an engineering model is used, instruction is viewed entirely from without. Green talks of an "instruction molecule" as "an event occurring between a learner and his instructional environment. . . ."He then goes on to discuss possibilities of building upon this molecule a system that "should generate experiments that will in turn modify the model toward increased efficiency in its systematization and prediction."

Reading Green and Fuller, we are reminded of what is called the "technological fix," which occurs when, as Alvin M. Weinberg has written in the Bulletin of the Atomic Scientists8 there is available "a crisp and beautiful technological solution" which "often helps focus on the problem to which the new technology is the solution." The trouble with the "fix," in spite of its practicality and short-term effectiveness (as in the building of nuclear reactors), is that it "doesn't wait around trying to change people's minds: If people want more water, one gets them more water rather than requiring them to reduce their use of water; if people insist on driving autos while they are drunk, one provides safer autos that prevent injuries even in a severe accident." Understandably, the ultimate "fix," as Alvin Weinberg says, is the soma pill used in Brave New World. Its function was, you recall, to do away with unhappiness without improving human relations in any ordinary sense.

Our point is that, if we permit the initiative to pass to the designers or purveyors of technology, we are all too likely to find teaching and learning being treated merely as problems to which there are technological solutions. We are likely to find "fixes" being made available when, say, a school system finds itself with a predominantly disadvantaged population which somehow cannot learn to read—or when China suddenly sends a Maoist Geoscope to the moon, and we find out once again that we urgently need engineers. This is why we are putting so much stress upon being conscious of ourselves as teachers and administrators, as persons who have freely chosen to do the jobs of work that enable young people to learn.

Conceptual clarity is essential, we think, if we are truly to know who we are. Israel Scheffler and Gilbert Ryle (both of whom happen to be analytic philosophers) do much to promote the cause of clarity when they speak of teaching as an intentional activity, a business of trying, involving—always—"giving honest reasons and welcoming radical questions." Teaching, says Ryle, is opening gates, introducing youngsters to ways of doing things, enabling them to make independent moves on their own initiative. "The person engaged in teaching," Scheffler writes, "does not merely want to bring about belief, but to bring it about through the exercise of free rational judgment by the student."9

When teaching is talked of in that fashion, it does not seem to pose a problem susceptible to technological solution. Returning for a moment to Aldous Huxley's soma pill, we might consider the student's learning how to exercise rational judgment to be analogous to the improvement in human relationships which might have been attempted in a not so brave new world. It is entirely possible that some "contrived sequence of instruction" provided by a teaching machine would be analogous to the pill. It would be efficient, yes; in the short range it would "work." But it would be equivalent to a "fix."

For Ryle and Scheffler, as for those philosophers who take a less rigorous, more subjectively oriented view, engineering principles simply do not apply. In the present case, the guiding principles have to do with

the nature of rationality and with what are conceived to be "good reasons" where judgment is concerned. Interestingly enough, these are precisely the principles a successful teacher will hope to communicate to his students as he tries to enable them to think and act rationally, reflectively,—in, we might as well say, a principled fashion. To do otherwise would be to indoctrinate, to mold, to train, but not to teach. To do otherwise would be to make an effort to control.

Although we are entirely aware that machines and television sets and overhead projectors are neutral, we worry nonetheless about the dangers of control. "Techniques as such lend themselves equally well to good or bad purposes," writes Bruno Bettelheim in The Informed Heart.10 He goes on to say:

Therefore, it is often felt that control for desirable ends (the rule of the philosopher kings) is good, or at least not so bad. But this is a dangerous belief. It neglects the complex and often serious effects of any external control of man; also the fact that when the area for free decisions grows too restricted, it reduces the scope of man's personal responsibility and thus his autonomy. It assumes that all else counts for little, as long as "right" decisions are arrived at, and it makes no difference how you reach them.

This is relevant, we think, not only in our considerations of the student but in our considerations of the teacher as well. Like Bettelheim, we believe that the well-being of an individual person depends a great deal upon his emotional life. We believe that it depends as well upon his ability to be subjectively aware, upon his perception of his own freedom, upon his willingness to choose himself over and over, in response to the changing situations of a fluid world. Where learning is concerned, we think it is quite possible to pursue the rationality prized by Scheffler and Ryle while enabling young people freely to choose to order their experience by means of the concepts made available to them. We also are interested in principled thinking and in honest reasons and in putting oneself on the line with respect to meaning and truth. But we believe that the pursuit of authenticity and autonomy are necessary accompaniments of the striving for reflectiveness.

It seems to us, therefore, that when we think about curriculum-making in a time of advancing technology, we need to look on occasion through what is called by some a "person-centered" perspective. The machine model will be used with increasing frequency to define behavior; and we recognize that the two perspectives are incommensurable. Nevertheless, we ought to be able to perceive a complementarity of the two. When we speak of complementarity, we have in mind Niels Bohr's principle, defined when the world of physics was trying to come to terms with two conflicting theories of the ultimate nature of matter. Bohr's principle permitted physicists to accept both theories as valid, not simultaneously, but alternately. Where our situation is concerned, this would mean that, from an educator's vantage point, both perspectives are required for a sufficient explanation of teaching and learning, although they are mutually exclusive if applied at the same time.

If we think of learning, then, from the point of view of the ego, the self, or what we should prefer to call the person, we will be able to think of the curriculum in terms of open encounters between persons and the subject matters they may consciously appropriate in the course of their initiation into the existing public world. We will be able to take intentions into account and purposes; we will be able to confront the significance of selective perception, of the sense in which each person forms his own world.

Now it is clear that, when we take this perspective—and the stance it requires of us—we cannot objectify our subject matter; nor can we quantify or validate or even effectively test. Our ability to predict will be limited; there will be all sorts of disturbances and distractions standing in the way of a properly scientific approach. But the principle of complementarity permits an alternation of approach; and there is no reason why, when the perspective of the behavioral sciences is required, we cannot change the lenses we are using. We ought

to do this, however, to attain very speckle ends, ends we consciously define ourselves.

We have heard from experts in the field, and we are informed about the procedures of the behavioral sciences and the application of some of their ideas in educational technology. We are neither desirous nor capable of refuting what has been said about the advantages of programed learning, responsive environments, data-link systems, information-retrieval systems, cathode rays, television teaching, and the rest. We do not even want to challenge the claim that the end result of technologizing will be the individualizing of instruction and setting the teacher free to stimulate questioning and discovery.

We simply want the teacher to continue to assume responsibility, to continue choosing, to remain in charge. And we do not think it will be easy, given the internal dynamic of technique and the blandishments of the comprehensive designers. Norbert Wiener, the originator of cybernetics, gave one of the clearest warnings against the dangers we have in mind. In God and Golem, Inc.,11 he writes about "motives to automatization that go beyond a legitimate curiosity and are sinful in themselves." Saying that, he evokes memories of Hawthorne's Ethan Brand, who forgot he was a "brother-man" and committed the unpardonable sin—memories of many other heroes and anti-heroes in literature who were insatiable and blind, who over-reached themselves. The over-reacher Wiener has in mind is one he calles the "gadget worshipper," a kind of sorcerer who admires machines particularly for their freedom from human fallibility. But there is more. "It is the desire to avoid the personal responsibility for a dangerous and disastrous decision by placing the responsibility elsewhere: on chance, on human superiors and their policies which one cannot question, or on a mechanical device which one cannot fully understand but which has a presumed objectivity." Wiener, too, knew that technique could become a law unto itself, that "as engineering technique becomes more and more able to achieve human purposes, it must become more and more able to formulate human purposes." More and more human ingenuity, mindful-ness, and self-consciousness will be required to prevent this from happening. And surely, we would think, a heightened sense of responsibility, particularly where teaching and learning are concerned.

For the teacher confronted with technology in his classroom or his school, this ought to mean an insistence on the freedom to evaluate the changed environment, if not the right to participate in the decisions made to alter it. No one can prevent a teacher from evaluating and appraising, if he chooses to; no one can prevent him from approving inwardly—or resisting inwardly, from taking a stand. One mode of resistence to technological domination is by acting on the principle of complementarity—by seeing persons in the classroom, not simply human organisms engaged in measurable behaviors, being reinforced and rewarded, jumping in reflex delight when the talking tutor says "hello!".

To see others continually as objects, as organisms, as functioning or behaving creatures, is to make of oneself what Wiener calls a "mastermind" or a "sorcerer,"—or what Jean-Paul Sartre calls "being what I am not," in bad faith, in "shame." He may become, in fact, like Sartre's anti-Semite, who chooses "the permanence and impenetrability of stone, the total irresponsibility of the warrior who obeys his leaders…."12 This sounds extreme, we know; but the withdrawal from students, the inner withdrawal accompanying the "look" of objectivity, of calculation, erodes a teacher's subjective sense of himself and makes him, in time, a "stone." This is why it seems so important to take the perspective of the fellow-creature, of the person encountering persons, and to decide freely upon the alternate perspective, only for the sake of the teacher's own purposes, consciously and clearly defined.

We are continually reminded that the words "cybernetics" and "cyber-culture" derive from a root which is the Greek word, "helmsman." The word evokes for us an ode in Sophocles' tragedy, Antigone, later echoed in the tragedy written some years afterward—Oedipus Rex. The ode tells about the wonder of man, who has conquered the sea, the land, the elements,

and—"through knowledge and technique"—all things living upon earth. At the beginning of Oedipus Rex, the king appears as tyrannos, self-made ruler, the exemplar of those who believe their calculating minds can give them mastery over all things. The plague-stricken state is compared with a ship; Oedipus, with the helmsman. Where is he steering the ship? The seer, Teiresias, answers: "into a nameless anchorage."

You know the play, and you know the anchorage. You recall that the vision of the Oedipus who was tyrannos, the clearsighted, technological vision, becomes incommensurable with the vision of the blinded Oedipus who discovers he is rex, the true king after all. It is when he is blind that he discovers his identity as a person, that he attains his fullest dignity.

As teachers, we may—we should—be able to see both ways. The sense of doubleness may be essential; the disjunction in our culture may be ineradicable; but we must live, and we must teach. We cannot ward off technology. We cannot act as latter-day Luddites and destroy the machines. But we can affirm responsibility as full persons with respect to them if we choose to do so. We can render technique a means to our own ends if we are brave and clear-headed enough, if we continue to create ourselves as persons in good faith, if we are determined to see both ways, if we dare to be. MG

1 Scheduled to appear in the Proceedings of the 1961 Biennial Curriculum Conference, to be edited by Paul Witt and published by Teachers College Press.
2 In Helen F. Robison, Ed., Precedents and Promise in the Curriculum Field. Teachers College Press, 1966.
3 "The Business Interest in Education," January, 1967.
4 Perry Miller, The Life of the Mind in America. Harcourt, Brace, and World, 1965.
5 George Braziller, 1964.
6 "The Disjunction of Culture and Social Structure," Daedalus, Winter, 1965.
7 Alfred Knopf, 1964.

8 "Can Technology Replace Social Engineering?," December, 1966.
9 Conditions of Knowledge. Scott, Foresman and Co., 1965.
10 The Free Press, 1960.
11 The M.I.T. Press, 1964.
12 Anti-Semite and Jew. Schocken Books, 1948.

Given the widespread use of facial recognition, our findings have critical implications for the protection of privacy and civil liberties.Â Accuracy was similar across countries (the U.S., Canada, and the UK), environments (Facebook and dating websites), and when comparing faces across samples. Accuracy remained high (69%) even when controlling for age, gender, and ethnicity. Given the widespread use of facial recognition, our findings have critical implications for the protection of privacy and civil liberties. Download PDF. Introduction. The arsenal of electromagnetic and informational weapons, used to manipulate the human mind of targeted individuals or populations, is an integral part of the weapons system of the New World Order. The US military possesses a sophisticated arsenal of psychotronic weapons which could be used both domestically and internationally. Electromagnetic and informational Weapons could be used in conventional wars theatres, without the knowledge of the enemy. It is therefore essential that we not only take cognizance of these findings, but we mobilize nationally and internationally against the use of br Humanâ€“computer interaction (HCI) studies the design and use of computer technology, focused on the interfaces between people (users) and computers. Researchers in the field of HCI observe the ways in which humans interact with computers and design technologies that let humans interact with computers in novel ways. As a field of research, human-computer interaction is situated at the intersection of computer science, behavioural sciences, design, media studies, and several other fields of study. The Surpassing humans would mean replicating, reaching and exceeding key distinctive properties of human beings, for example, high-level cognition associated with conscious perception. However, can computers be compared with humans? Can computers become conscious? Can computers outstrip human capabilities? These are paradoxical and controversial questions, particularly because there are many hidden assumptions and misconceptions about the understanding of the brain. In this sense, it is necessary to first explore these assumptions and then suggest how the specific information processing of brains