

**D**ECADENCE is a description of a society or an organism whose powers are disharmoniously dissipated, whose energies are irrelevant to its contemporary needs.

In evolutionary or historical perspective, decadence is often associated with exquisite accomplishment in specialized fields. We still admire the baroque or the dinosaur, however much we realize that their exuberance was self-terminating, that the future path of culture and life would have to find a fresh start from principles of higher universality.

Decadence looms as the contemporary corruption of our scientific civilization. But the scientific attitude contains a saving grace: the possibility of objective self-examination and redirection. I propose that the central technological goal of the species is the harmonization of its technical goals. I would call this process EUTECHNICS. Its realization is of course a moral issue, but it will also require a massive redeployment of technological resources.

Eutechnics becomes overwhelmingly more urgent as biological science brings us to the systematic application of technique to the design of human nature. This very issue of TECHNOLOGY WEEK is an element of eutechnical thought, suggesting how pervasive is the concern for harmonizing our technological objectives, but this is still a very feeble engine for the enormous task we face.

### **The Dissipation Proceeds**

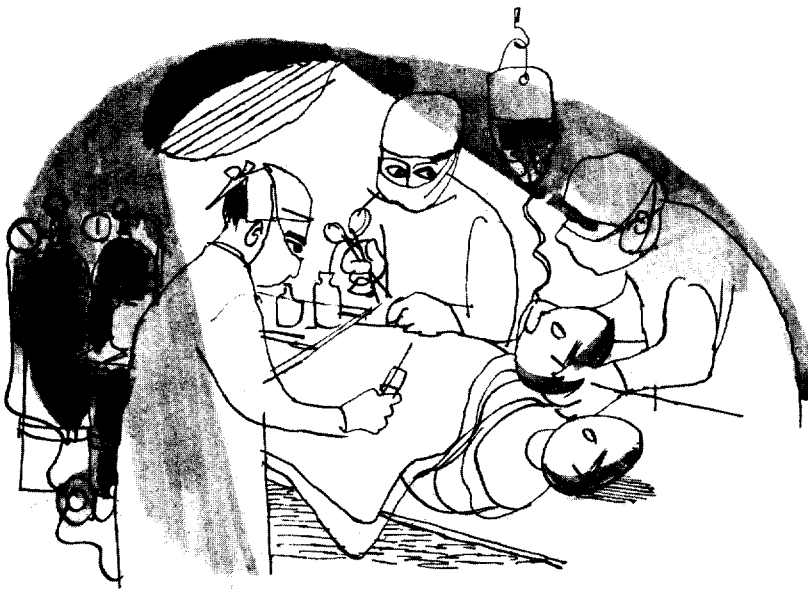
We see too many paradoxes on the contemporary scene to make it easy to refute the label "decadent." Will anyone deny that human compassionate intellect is the most valuable resource on this planet? Is this resource being systematically mined, irrigated, cultivated, conserved anywhere with the sense of purpose that attends a new weapons system? The United States prides itself on technological supremacy, but our infant mortality rate is far worse than that of Sweden—amounting to 40,000 more deaths a year. Beyond this is the matter of how we would have to grade the part of the world we care for against reasonable standards of absolute performance.

technology week, January 23, 1967

# Eutechnics—Motif For New Technology



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We have clear foresight that hunger will ravage the world within the next 20 or 30 years, but devote orders of magnitude more effort to systems analysis of business paperwork than we do to framing solutions to an order of human misery that cannot fail to touch the affluent as well as the starving.

We support the economy of a country whose racial policies we detest, by trading our goods for the gold it mines out of one hole in the ground, so as to let us store it away in another one. Meanwhile, we throw irreplaceable phosphates down our rivers, from which they will be irretrievably diluted in the oceans. We mount a magnificent technological effort for the scientific exploration of the solar system, then dissipate it in a spectator sport—astrobatics—as if Columbus were to organize a water-polo competition among his caravels.

People prefer airplanes in order to travel safely and comfortably from a home or office in one city to another. The aircraft have already far outstripped the ground support system with respect to safety, cost, actual elapsed time, passenger comfort; yet our principal technological initiative is for a superplane that will simply exacerbate these problems, and tax the quiet and composure of the passengers' families and erstwhile friends left on the ground to enjoy the booms.

And, of course, the mere word "pollution" is a sufficient trigger.

Above all, we have unleashed infinite energy, enough to destroy ourselves many times over, and still devote minuscule efforts to learning how to control it. We may congratulate ourselves that we have somehow survived a generation of nuclear anxiety—but how well have

we survived it? Ask the beat generation what they think of us for this inheritance. And just what are our odds for another 21 years?

#### 'Magnificent Opportunity'

This is a familiar sermon, repeated so often that technologists may not want to hear it again. But the pages of TECHNOLOGY WEEK give little evidence that its message has been assimilated into the day-to-day thinking of the sophisticated do-ers of our society. The problem is perhaps one of compartmentalization, that moral issues are segmented away from technological ones. This may be indispensable to accomplish one day's work, but it also glosses over a magnificent opportunity—to apply technical attitudes to fundamental human problems, to look for the ways in which a morally insoluble dilemma can be mitigated by a technological advance that restores a new balance to our repertory.

Thus, better teaching machines and higher-level programming software could broaden the educational process. The technology for detecting nuclear detonations would be a great help for policing nuclear tranquility. A psychophysical truth-machine somewhat more reliable than present-day lie-detectors could pacify world politics. Technological goals nowadays tend to be framed as the more obvious incremental advances over existing, self-reinforcing, tactical technique, and we reliably expect the demand to follow the availability. Instead we should discover what our real needs are, then strategically harness our technological enterprise to reach them.

The enormous potential of physical

technology is sufficient reason to vitalize eutechnics. We can well proceed as if it were true that no technical goal that can be precisely formulated is beyond human accomplishment: we need merely measure whether we are willing to invest what it will cost. However, even "cost" may be a decadent concept: are we more than a trillion dollars worth of development away from the industrial machinery that could give us virtually infinite productivity, i.e., an economy that needed only design engineers, programmers, scientists and of course executives to operate it? And which of these human categories will indefinitely forestall their own technological displacement?

#### A New Human Design?

A prophetic glance over biology should add more poignancy to these concerns. The root concept of decadence is accented in our confusion about the very definition of human life. This is a sacred value, to be conserved at all costs (except on the battlefield or the circum-military zones of a sovereign adversary). But biology shows how naive we are in defining either "human" or "life." We can, for a while, continue to rely on the traditional heart-beat as a sign of survival, and a pragmatic ethics still supports the physician who may have to admit defeat in his efforts to sustain one patient in order to meet his responsibilities for others. This is not the place to enlarge on these merely ethical problems that are confounded by scientific analysis. For beyond the patchwork of contemporary medicine we have realistic prospects of biological engineering, the kind of design of human beings that Aldous Huxley had anticipated in *Brave New World*.

Some existing techniques play an important part in this branch of eutechnics—we might even call it eumanics, the design of man, hopefully for the better. In fact this science is so far advanced that it is already divided into three historically recognized disciplines: eugenics, euphenics and euthenics. Eugenics is the optimization of man's genetic constitution; euphenics the modification of his biological development; euthenics the amelioration of his environmental opportunity, i.e., his education.

The main technique proposed for eugenics is selective breeding: to encourage the "best" humans to reproduce, or conversely to discourage "defective" humans from doing so. Until recently, this has hardly been a technological issue. However, techniques of

contraception now play a central role in the facts of differential reproduction, and generally have an anomalous distribution. Family limitation tends to reach the poorest people last, just those whose sheer economic survival most desperately needs it to countervail the benefit of infant survival through better public health.

Only the arrogant would say that the poor are also genetically defective; the scientist must insist that we know almost nothing about the biology of affluence or poverty. It is, however, plausible that malpactive genes play some part (but just how much?) in economic failure. The over-breeding of the poor may then be eugenically disadvantageous.

The time-scale of useful effect is, however, so long in comparison to social and technological change that urgent efforts to repress the poor seem not only futile but misdirected by comparison with deeper scientific analysis of the actual factors of physical and psychological development that influence social fitness. It would be technically sound, at least as a subsystem-panacea, to suggest that poverty might be abolished by preventing the poor from reproducing at all, but if so why stop there? Instead, abolish poverty by evaporating the poor altogether, which would be more humane than letting them starve.

### Propagation and Surgery

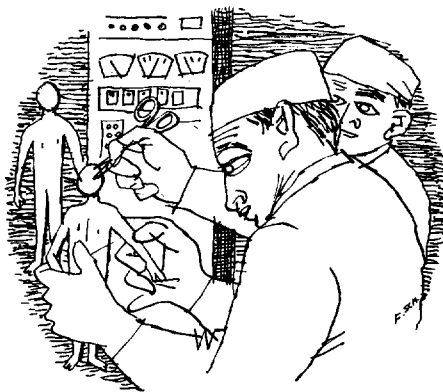
Social eugenics by differential reproduction may be supplanted by experimental eugenics, which is merely the application to man of techniques of genetic design already well authenticated for simpler organisms. The most telling of these may be clonal propagation, the formation of genetically identical twins of an existing individual, by a process analogous to taking cuttings from a rosebush.

If some humans now seek immortality through their children, how much more impelling that neurotic motive will be for a clonal child! This would be design by horticultural selection; but if nothing else it would provide crops of similar infants for experiments on the effects of different environmental treatments, like diets or educational regimes. The process need be no more (or less) authoritarian than sexual propagation is now within the bounds of family life. Indeed, the exercise of individual choice is one reason to expect this kind of eugenics to be implemented more effectively, sooner, than many other proposals for eumanics. But then, who are

the best families?

Once clonal propagation—in effect making an egg from the genetic information in a skin or a liver cell—is tested and calibrated, we can consider more calculated modifications of the genetic makeup of an individual—genetic surgery. Many schemes for this have been suggested, but they appeared impossibly cumbersome until recently. It has just become evident, however, that certain viruses can be tamed so that, on the one hand, they produce no perceptible disease; on the other, they carry interesting genetic information to add to that already in the cells of the host organism. Therefore, innovations for new enzymes can first be bred (or chemically grafted) into a virus strain. Then this virus can be used to infect babies—for example, those suffering from a genetic defect like phenylketonuria. A virus so bred as to code for the enzyme phenylalanine hydroxylase should cure the child infected with it.

With time, we can see the development of viruses bred to convey any number of other specific traits, ranging from the cure of diabetes to sterilization or changes in intellectual or emotional development. Here the chances of authoritarian control are the most alarming, for the viruses could be spread against the will of the populace, or by accident, or as military weapons. There are many wild viruses that may be expected to have rather subtler effects on personality than we now label as infectious disease, but this is a completely uncharted scientific territory. Nor is the constructive use of a virus completely futuristic: at an abstract level, the use of cowpox or of the live attenuated polioviruses for mass-immunization depends on the identical biological principle. Only, different molecules are designed as the beneficial



product: in these cases, antigens that will provoke immunity against the specified diseases.

Euphenics is the betterment of a man by changing his development—for example feeding him better or supplementing his hormones. In these terms, it is a familiar byproduct of nutrition and medicine: observe how stature has gone up steadily in Western society and girls have matured earlier. More recently, we see the calculated use of hormones not only to cure disease, but to influence muscular development or the sexual characteristics of an individual.

When we learn just a trifle more about the hormonal control of brain development, these phenomena will peak out in human interest. Since the effects will be manifest in the treated individual, euphenics is more immediately manageable than eugenics. The various techniques obviously interact: the best gene-set, achievable by eugenics, is the one most manageably responsive to the developmental controls input as euphenic chemicals.

Euthenics is also a kind of developmental modification, but the inputs are informational rather than material.

### Guarding Man's Humanity

The point of this essay is not to pinpoint specific hazards or opportunities. It is rather to suggest that there are no limitations to technology, whether we think of the outer universe or the inner man as its domain. Hence we need a technology of decision, to know better what to do. The ultimate judgments are moral ones, but before we can act morally, we need technical information: the consequences of our actions. Then we need better predictive models of the future, better simulations to give us a realistic cost-benefit analysis of the whole human enterprise, better alarm systems to tell us of specific technological gaps which must be filled, and better communications and information to support democratic decision.

In the eutechnical society, the penultimate crime may become to introduce any technological innovation as a subsystem benefit without analyzing its impact on the whole future of man. The ultimate one would be to deny man his humanity by denying him the chance to think, to know himself.

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