VOLUME XXXII, NO. 11
MARCH 14, 1979

THE OPEN PRESENT

MORE than one historian of ideas has called attention to the interval—usually brief—of unconfined intellectual freedom which comes between a revolutionary change of outlook and the new orthodoxy that eventually supervenes. It is a time of the uninhibited play of the imagination and free-ranging intuition, but also of uncontrolled extravagance and irresponsibility in thought. Such a time cannot last for long because the solid citizenry look for certainties which will permit them to go on with life as usual, and it follows that high vision, if such there be, is always trimmed of its daring and made to conform to ordinary capacities and expectations. The practical men, the managers of affairs, want a system of belief that they are able to understand and manipulate. Actual open-mindedness is threatening to conventional members of society, so that the organizers and rationalizers are always more acceptable to public opinion than discoverers and innovators. Yet there are also those—the few—who delight in the space created for freedom by a revolutionary thinker, and who, when they see what the popularizers are doing, turn their efforts toward securing cultural balance.

The great break with the medieval style of thinking, called Scholasticism, was very largely accomplished by Galileo and Descartes. The simplicity of Descartes' demand for clear and distinct ideas came as a welcome relief to the European mind, and the proposition that the world is a big machine to be understood by the application of the principles of mechanics seemed to promise that real knowledge would soon put an end to human problems. But Vico in Italy, while a Cartesian enthusiast in his youth, came to realize that Descartes' idea of knowledge excluded all the forms of inquiry through which self-knowledge is sought and sometimes obtained. And in France, Fontenelle, although a popularizer of Cartesian cosmology, saw where this excess of simplicity might lead. In *Plurality of Worlds* (1686) he wrote:

> "I perceive," said the Countess, "Philosophy is now become very Mechanical." "So mechanical," said I, "that I fear we shall quickly be ashamed of it; they will have the World to be in great, what a watch is in little; which is very regular & depends only upon the just disposing of the several parts of the movement. But pray tell me, Madam, had you not formerly a more sublime Idea of the Universe?"

Along with the Cambridge Platonists, Joseph Glanvill recognized the materialism implicit in a mechanical interpretation of the world, and wrote to defend the reality of psychical phenomena lest, from the scientific attack on all "supernaturalism," both deity and the immortality of the soul be denied. Henry More realized that the Cartesian reduction of the soul to an abstraction would end in indifference to transcendent reality. He, too, used phenomena such as apparitions as evidence of invisible things, contending that coarse-minded individuals who lacked belief in soul or spirit on supposed rational grounds might be "rubbed and awakened with a suspicion, at least, if not assurance, that there are other intelligent beings besides these that are clad in heavy earth and clay." (*Antidote to Atheism,* 1652.) While the Cambridge Platonists thought that Descartes' mathematical physics gave the correct explanation of physical phenomena, they also believed that it would, if broadly applied, abolish the plastic element or soul throughout nature. In his *Myths of Plato* (1905), J. A. Stewart gave their views as affirmed in More's *Immortality of the Soul:*

> The *Spirit of Nature,* according to More and his school, is an incorporeal substance, without sense, diffused through the whole universe, exercising *plastic power,* producing those phenomena which cannot be explained mechanically. This plastic principle in nature explains the "sympathetic cures," the "astral bodies" (the phrase More borrows from the

> Paracelsians) of witches, in which they appear as hares, cats, weasels (so that if the hare or other animal is wounded, the witch is found to be similarly wounded—More was a firm believer in all that, and could give "scientific" reasons for his belief), the growth of plants and embryos, and the instincts of animals, such as the nest-building instinct of birds, the cocoon-spinning instinct of silk-worms. The Soul of man partakes in this plastic principle, and by means of it constructs for herself a body, terrestrial, aerial, or aethereal (*i.e*. celestial), according as the stage of her development has brought her into vital relation with the vehicle of earth, air, or aether. . . . The Soul, by means of her plastic power, moulds the vehicle—earth, air, or aether—to any form she pleases; but having been first habituated to the human shape in the terrestrial body, she naturally moulds the aerial and celestial vehicles to the same shape. That is why ghosts (in whom More is a firm believer), being the Souls of the departed in their aerial bodies, are easily recognized by their features, when they return to the scenes of their terrestrial life.

This theorizing by a seventeenth-century English Platonist—presenting ideas surprisingly like the conclusions of Dr. H. S. Burr, anatomist of Yale University, from experiments with a microvoltmeter in 1936—had little effect on the rising tide of belief in the world machine and the Cartesian claim that animals (and man) develop and live according to mechanistic principles. The Cambridge Platonists tried to balance Cartesian and Newtonian theory with a vital plastic principle throughout nature, and save coming generations from the materialistic dogma, but the world was not ready for this spiritual common sense. So it was that nearly three hundred years later, Alfred North Whitehead explained the intellectual confusion of the twentieth century by saying (in *Nature and Life*, 1934):

> At present the scientific world is suffering from a bad attack of muddle-headed positivism, which arbitrarily applies its doctrine and arbitrarily escapes from it. The whole doctrine of life in Nature has suffered from this positivist taint. We are told that there is the routine described in physical and chemical formulae, and that in the process of Nature there is nothing else.
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> The origin of this persuasion is the dualism which gradually developed in European thought in respect to mind and Nature. At the beginning of the modern period Descartes expressed this dualism with the utmost distinctness. . . . The effect of this sharp division between Nature and Life has poisoned all subsequent philosophy. . . .
>
> Science can find no individual enjoyment in Nature, science can find no aim in Nature; science can find no creativity in Nature; it finds mere rules of succession. These negations are true of natural science. They are inherent in its methodology. The reason for this blindness of physical science lies in the fact that such science only deals with half the evidence provided by human experience.

This was a leading philosopher's verdict on the result of three centuries of ignoring the warnings of the seventeenth-century philosophers—men such as Vico and Henry More and Ralph Cudworth (another Cambridge Platonist).

Today the evidence has become even more impressive. In the *New Yorker* for June 26 of last year, Jeremy Bernstein, a physicist, reviews *The Encyclopædia of Ignorance*, a large book in which distinguished contributors describe, in effect, "the present state of scientific research." The reviewer, himself a scientist, is competent to discuss the matters which are still mysterious—such as the origin of the earth, the moon, and the planets, such as the developmental processes of organisms and the differentiation of species in evolution. Mr. Bernstein concludes:

> These examples give some idea of the richness and diversity both of this remarkable book and of our scientific ignorance. But I have not mentioned the most puzzling mystery of all. Why do we want to know? What is consciousness, intelligence, memory? Can these be described by chemistry and physics? Most scientists probably think so. Yet when Albert Einstein, on a visit to the California Institute of Technology in the nineteen-thirties, was told by the great American geneticist, Thomas Hunt Morgan, of his hope of bringing physics and chemistry to bear on what were then some of the major biological puzzles, Einstein is said to have replied, "No, this trick won't work. . . . How on earth are you ever going to explain in terms of chemistry and physics so important a biological phenomenon as first love?"

The Cartesian doctrines were too well seated in the 1930s for even an Einstein to affect their

authority. The expectation of being able to obtain, as Whitehead put it, "mechanical explanations of all processes of Nature," had been too strong in the late years of the seventeenth century for the Paracelsian conceptions of the Cambridge Platonists to gain recognition, and in the eighteenth century similar efforts by Anton Mesmer met with almost complete failure.

Mesmer came to prominence in Paris at the height of the revolutionary Age of Reason, and while his extraordinary cures attracted wide attention, he was unable to shake the faith of the establishment scientists. The elite members of the French Academy of Sciences who investigated Mesmer's theories of a vital fluid determined to test his ideas and his cures by the laws of physics, and they concluded that the fluid not only did not exist, but that practice based on it would, "in the end, produce harmful results."

There was, however, an extraordinary side-effect of Mesmer's influence in eighteenth-century Paris. In *Mesmerism* (Schocken, 1970), Robert Darnton shows that the followers of Mesmer, who were many and various, far from going underground, turned the antagonism of the French Academy into grounds for claiming that Mesmer's teachings were filled with revolutionary verity. Mesmerism was the means for regenerating mankind, they said, so of course it was regarded as subversive by the authorities. Actually, by 1785, half-understood and diluted Mesmerist doctrines had spread throughout France, developing links with Swedenborgians, followers of Lavater, and numerous self-styled prophets, including the Spiritualists of the day, who held seances. An observer of all this wrote in 1788:

> Never, certainly, were Rosicrucians, alchemists, prophets, and everything related to them so numerous and so influential. Conversation turns almost entirely upon these matters; they fill everyone's thoughts; they strike everyone's imagination. . . . Looking around us, we see only sorcerers, initiates, necromancers, and prophets. Everyone has his own, on whom he counts.

There was much in eighteenth-century science that seemed in harmony with Mesmer's teachings. Darnton says:

> To argue that mesmerism did not seem absurd in the context of eighteenth century science is not to claim that scientific thought from Newton to Lavoisier was a collection of fictions. At the popular level, however, it entangled the ordinary reader in a jungle of exotic *systèmes du monde.* How was he to separate fiction from truth, especially among the monisms that made up the biological sciences? The heirs of the seventeenth-century mathematical and mechanical philosophers failed to give successful explanation of processes like respiration and reproduction. . . . So strong was the popular enthusiasm for science in the 1780s that it almost erased the line (never very clear until the nineteenth century) dividing science from pseudoscience. . . .
>
> The enormous interest in Mesmerism provides some clues to the mentality of literate Frenchmen on the eve of the Revolution. . . . the hottest topics of all, the subjects that provoked debates and aroused passions, the items with "news value" in the eyes of contemporary journalists, were mesmerism, balloon flights, and other marvels of popular science.

Finally, as Darnton says, by 1789, as a result of the exploitation of Mesmer's ideas by so many enthusiasts, his teachings "had escaped his control and had run wildly through supernatural regions where he believed they had no business." They would emerge in the nineteenth century in other places—in America, for example, where they came to life in barely recognizable form in the doctrines of Mary Baker Eddy.

There are both striking parallels and striking differences between the time of the French Revolution—so filled with intellectual and moral ferment—and the closing years of the twentieth century. Now, as then, there are continual flurries of psychic excitement. Hardly a week goes by without publication of a new book hailing some "great discovery" of the secrets of nature or the psychological resources of man. Instead of magnetic machines intended to cure all ills, we have devices which tell us how well we are doing when we try to "meditate." Unorthodox healers, now as then, multiply by geometrical progression.

Today we have innumerable gurus, at least a dozen or so in every large city, and some residing in ashrams near mountain peaks. While, in the eighteenth century, hundreds of amateur scientists were discovering the wonders of nature, following, as they thought, in the footsteps of Galileo and Newton, today an even larger number of enthusiasts are revealing "lost secrets" of the East, and a few years ago two Harvard psychologists declared they had found in LSD the means of penetrating the arcane of the *Tibetan Book of the Dead*, providing charts of "out-of-the-body" states of consciousness.

These are some of the parallels. The differences, however, are equally noticeable. In the first place, no one would have thought of publishing an *Encyclopædia of Ignorance* in the eighteenth century. A full program of the development of "normal science" awaited both physics and chemistry, and the enormous impact of Darwinism on the popular mind was yet to be felt. The Newtonian World Machine would remain the model of all scientific thinking until the early years of the twentieth century, and Einstein's more inclusive system meant little to biologists, except for those whose researches had led them to believe that a "field theory" was required for the explanation of vital phenomena. The high confidence of the Enlightenment, in full swing in the eighteenth century, would continue into the middle years of the twentieth, when its momentum was finally exhausted.

That is the real difference between the time of the French Revolution and the present. The eager visionary feelings which attended the great scientific revolution have now nearly all died away. The wars of the twentieth century, armed by scientific technology, were incalculably disillusioning. Even research specialists have become aware of this and recognize its causes. Speaking of the horror of nuclear bombs, one of their designers, Theodore Taylor, said recently, "I sometimes can't blame people if they wish all scientists were lined up and shot." But most important of all in the rejection of the scientistic outlook has been the refusal of human beings to continue to regard themselves as merely the passive objects of circumstances and events.

The articulate revolt began in the 1950s, with Erich Fromm's epoch-making article in the *Saturday Review* (March 16, 1957), "Man Is Not a Thing." A few years later (1962) A. H. Maslow published *Toward a Psychology of Being.* (Rachel Carson's *Silent Spring* appeared in the same year.) A full-dress challenge to the mechanistic outlook came in 1967 with the first volume of Lewis Mumford's *The Myth of the Machine,* and Theodore Roszak called into question the basic assumption of scientific method by examining "The Myth of Objective Consciousness" in *The Making of a Counter Culture* (1969). Then, with his second volume of *The Myth of the Machine,* titled The *Pentagon of Power,* Mumford attacked the "Mechanized World Picture," detailing the flaws in Galileo's assumptions, clinching his argument by detailing the evident technological, social, and cultural effects of the scientific philosophy. Today there is hardly a distinguished figure on the scientific scene who speaks authoritatively for the establishment outlook—the positivist science inherited from eighteenth, nineteenth, and early twentieth century thinkers. The intellectual leaders of today are all on the other side, calling for a remodelling of the scientific outlook.

This is a way of saying that a unified scientific establishment no longer exists, that already the leaders in scientific philosophy are calling for a new inspiration—as in the case of Werner Heisenberg, who before he died declared to his colleagues: "Just as Copernicus and Galileo in their method abandoned the descriptive science of Aristotle and turned to the structural science of Plato, so we are probably forced in our concepts to abandon the atomic materialism of Democritos and to turn to the ideas of symmetry in the philosophy of Plato." Recently, on the plea of Margaret Mead, parapsychology or psychic

research was conceded to have scientific standing and admitted to the American Association for the Advancement of Science, and meanwhile acupuncture has penetrated some of the leading medical schools where Chinese specialists are teaching its methods to medical students. In short, materialism—old-fashioned, nineteenth-century materialism—no longer has taken-for-granted standing in the modern world.

Where, then, shall we look for balance? The difference between the time of uninhibited freedom in the eighteenth century and the wildly speculative present is, quite plainly, that in the eighteenth century the orthodox scientific establishment was in formation and on the way to an unchallenged authority that would last for almost two hundred years. Its word was already law in the academies and for official government, and pioneers who dared to question had at least an articulate and conventionally confident opposition against which to sharpen their arguments and try their strength. Today the situation is radically changed. The establishment is a mushy, uncertain affair—not the commercial, industrial, political establishment, but the intellectual establishment which purports to tell what sort of world we live in and how best to understand it and go about solving our problems.

Actually, those who today advocate caution and balance are not so much establishment people, but rather intelligent individuals who have digested the implications of the work of thinkers such as Kurt Gödel and Thomas S. Kuhn (*The Structure of Scientific Revolutions*), and who recognize that the door of science is wide open to intelligent innovation. As the physicist, Jeremy Bernstein wrote recently:

> In modern physics we have learned to doubt nearly everything our predecessors believed only a few decades ago. It is not that they deliberately set out to mislead us, but rather that they simply did not know what we know now. In this respect the one thing I am sure of beyond any doubt, is that the science of the present will look as antiquated to our successors as much of nineteenth-century science looks to us now. To hitch a religious philosophy to contemporary science is a sure route to its obsolescence.

This means in effect that the scientific enterprise has lost its conceit and much of its methodological arrogance; it also means that the pioneers and innovators in thought and philosophy must begin to rely on themselves for intelligent restraint, and on something besides apparent parallels, here and there, with physical or biological theory as measures of the validity of what they have to say.

What, then, is the test of a modern writer on serious matters? Well, what does he do when he takes leave of some declining orthodoxy and begins to reason on his own? Does he hint that physics or biology or some other branch of science lends peculiar authority to his guesses or intuitions? If so, this is probably no more than a sophisticated means of pulling rank on the reader. Are there some modern writers who explore serious questions without doing this? We think of at least one—Loren Eiseley, whose flights of imagination stir the reader to undertake similar expeditions of his own. Eiseley, who unfortunately is no longer with us, was never concerned with collecting followers. His work is filled with generous invitation to exercise the freedom he practiced for himself.

REVIEW

WANTED: SEEDS, AND PICKS AND SHOVELS

TWENTY years ago an Englishwoman, Wendy Campbell-Purdy, having heard Richard St. Barbe Baker say that the spread of deserts could be stopped by a green wall of trees, bought a one-way ticket to North Africa and set to work planting trees. On forty-five acres of desert in Morocco (Tiznit), she planted 2,000 trees, and four years later they were twelve feet high. She proved that this manmade strip of oasis would change the climate (increase the surface humidity) by growing wheat and barley in the shelter the trees provided. Then she went to Algeria, where a reluctant Government gave her a 260-acre dump. The seedlings she set out there did so well that the astonished Algerian officials promised her help. She went home to England to raise some money, and eventually she formed the Bou Saada Trust to wage biological warfare against the Sahara. A few years later the 130,000 trees she had planted at Bou Saada (in Algeria) were flourishing and the fertile area they created was growing vegetables, citrus, and grain. Plans were then made to invade the great desert with the green things growing.

How urgent is this campaign against deserts? In 1977 a UN Conference on Desertification reported that the world's desert areas are rapidly spreading. One third of the land surface of the earth is now desert, and every year the Sahara gains 250,000 acres of once-productive land. The lives of some 630 million people are threatened in the regions of the world now turning into desert wasteland. Wendy Campbell-Purdy has recently formed a registered trust called Tree of Life to continue this project and undertake similar ones. The idea is to save "the vulnerable communities on the fringe of the Sahara and other world deserts by working with them to stop the deadly process of desertification, restore life to the land and protect the livelihood of the people." An explanatory booklet, *Tree of Life* (C/o Coutts & Co., Duncannon Branch, 440 Strand, London WC~R OQS, U.K.), describes the program:

> The Tree of Life evolved directly from the work of the Bou Saada Trust in Algeria. This successful pilot reafforestation scheme has now been incorporated in one of the world's most ambitious tree-planting programs—the thousand-mile protective "green wall" right across Algeria. The first task of the Tree of Life is to set up similar pilot projects, in cooperation with the Governments concerned, to continue the green wall along the entire northern edge of the Sahara desert.

Soil cannot be renewed without trees, and only trees will protect already established soil. The booklet explains:

> Contrary to popular imagination, TREES DO GROW IN THE DESERT.
>
> Trees, given adequate protection against goats, camels and the desperate need for cooking and heating fuels, will flourish without expensive irrigation or any high-cost technology. By using low-cost, labor-intensive techniques of tree establishment developed at Bou Saada and by judicious selection of deep-rooted, salt-tolerant and drought-resistant trees, the moving sands can be stabilized, sandstorms stopped and the atmosphere cooled to seven times the height of the trees. Indigenous shrubs and grasses are then able to re-establish themselves and continue the soil-binding process.
>
> But this is only the beginning—as trees grow, countless other benefits follow. Surface humidity increases as moisture is brought up by the tree roots; grain, vegetables and fodder crops for livestock can be grown and poultry and bee-keeping introduced. The planting and maintenance of the trees provide a new source of employment for the local population.
>
> Finally, as the fringes of the afforested areas settle, the planting can begin to move outwards, gradually pushing back the desert and restoring life and productivity.

In some areas, the green wall is planned to be seven and a half miles wide. When complete it will establish a broad and continuous belt of trees along the northern fringe of the Sahara, following the "desert trail" of World War II from Cairo and Alexandria to Tunis.

> The immense wall of trees will eventually link up with the desert reafforestation programme

currently being carried out in Algeria, incorporating the pilot project established at Bou Saada in the 1960s by the Director of the Trust, Wendy Campbell-Purdy.

What this means in ongoing benefits, not only to the local population but also to the whole of mankind, is incalculable. Money is needed for the setting up of tree nurseries, the purchase of seeds, picks and shovels, vehicles, fencing equipment and training of local people.

Defending the deliberately simple technology of this effort, the pamphlet describes the comparative failure of enormously expensive dams in India and in Syria, where nobody thought of planting trees in order to bind the surface soil of these regions in order to prevent silting. In the Tree of Life program, people, much more than money, will be involved:

The main principle of the Tree of Life is that all "on site" functions should be carried out by local people after an initial period of working together using our methods. The people themselves will derive all the benefits from the increasing fertility of the land.

Readers may remember that E. F. Schumacher's final dream for England was a great tree-planting program, on which he was working in the year he died.

We now come to the book we have for review—*Basic Needs: A Framework for Action* (Transaction Books, New Brunswick, N.J.) by John McHale and Magda Cordell McHale. In the concluding chapter on resources and technologies, after attention to non-renewable fuels and hydroelectric and geothermal sources of power, the writers say:

So far we have been discussing large-scale, relatively centralized, energy supply at the overall society level, whilst poorer societies have large rural sectors which may be least helped by such directions in the shorter term. The basic question, therefore, is: "What kind of energy supply and delivery systems are feasible and economic for widely dispersed populations such as usually characterize rural areas?" Even fractional amounts of increased energy may provide enormous leverage in poorer regions, supplying energy for increasing food yield, for individual purposes and community utilities.

If, as seems likely, the expansion of mechanical or biochemical energy converters is slow, then firewood will continue to be an important source of domestic heating and cooking fuel. This suggests priority consideration should be given to the reduction of waste in such uses by more efficient cheap stove design, better housing insulation at low cost, and by methods for converting wood supply as a more renewable resource. Attention should then be directed towards,

Large scale reforestation programs.

Organizing fuel wood supply for entire villages so that cutting can be done with minimum drainage to the soil and accompanied by replanting efforts.

After some discussion of small-scale sources of energy, Mr. and Mrs. McHale continue:

This suggests a much wider spectrum of energy source options which are, in many cases, environmentally benign and well-suited to local indigenous development. Many of those now under consideration are not wholly new but have been used in different forms for a long time.

The rapid development of solar energy collectors, mainly—ironically enough—in the affluent countries, is considered, also the use of plants to produce a substitute for gasoline. A paper on the practicability of methane production for use by entire villages is quoted, bringing this conclusion:

Emphasizing the ecological soundness and development appropriateness of this method, the author of the above notes that it not only reduces fossil fuel and wood use but renders disease-carrying wastes harmless, has low environmental impact, and that cooperative manufacture and maintenance can stimulate local self-development.

Interestingly enough, these kinds of "big-directions" in alternative technologies coincide with many of the more sophisticated interests in industrial microbiology and advanced scientific development. The large amounts of human, animal and agricultural wastes are a relatively vast source not only for energy supply and its fertilizer by-products but of other ranges of usable by-product materials. The scientific and technological potential of this area goes far beyond a more immediate provision of rural low-cost fuel.

Small-scale hydro-power and geothermal energy sources may be more widely used where conditions are appropriate. Though these are usually thought of as being for larger scale energy generation, their local use, e.g. in water mills, have been tradition in many areas and traditional utility can be augmented with more modern technics.

This study deals with the basic needs of all the world, covering food, shelter, clothing, health, and education. It is called "a mass of primary data for use by those who will propose standards, set targets, and make decisions about meeting basic needs." It was prepared for the United Nations Environment Programme at the Center for Integrative Studies at the University of Houston, Texas. While John McHale died suddenly of a heart attack last November, Mrs. McHale will carry on the work of the Center. The interesting thing about *Basic Human Needs* is its confirmation in impartial scientific terms of the ardent labors undertaken by people like Wendy Campbell-Purdy.

COMMENTARY
SOME COMMON SENSE

STIRRED by pending legislation in several large states that would provide free preschool education (for children of from three to five), David Elkind, a psychologist and educational theorist, writes in the *Harvard Educational Review* reprint (see "Children") to object to parental pressure for beginning academic instruction at this early age. Parents have the impression, he says, "that the preschool period is critical for intellectual growth and that if we leave this period devoted to fun and games, we are lowering the individual's ultimate level of intellectual attainment."

"What," he asks, "is the evidence that preschool instruction has lasting effects upon mental growth and development?" The answer is, he says, "that there is none." Mr Elkind discusses various claims, showing that the evidence is as much against as for preschool training. Actually, data gathered by Piaget and others suggest—

> that *the longer we delay formal instruction, up to certain limits, the greater the period of plasticity and the higher the ultimate level of achievement.* There is at least as much evidence and theory in support of this hypothesis as there is in favor of the early-instruction proposition. . . .
>
> Please understand, I am not arguing against the benefits of preschool enrichment for children. . . . What I am arguing is that there is no evidence for the *long term effects* of either preschool instruction or enrichment. Nursery school experience most assuredly has immediate value for the child to the extent that it helps him to appreciate and enjoy his immediate world to the full and to better prepare him for future social and intellectual activities. Everyone, for example recognizes the value of a vacation without expecting that it will produce any permanent alterations. Isn't it enough that we lighten the burdens of childhood for even a brief period without demanding at the same time that we produce permanent results?

Turning to the elementary school years, Mr. Elkind speaks of children who lose their motivation for learning by the third or fourth grade because of the failure of teachers (or the system) to recognize that *interest* depends on the child, and not on curriculum or clever methods of teaching:

> He [the child] refuses to become totally involved in intellectual activities because the repeated frustration of being interrupted in the middle is just too much to bear. Our curriculum, thirty minutes for this and an hour for that, have the consequence, I suspect, of producing children who shun the fire of intense mental involvement.

He concludes:

> Accordingly, the educational practice which would best foster intrinsically motivated children in the Piagetian and Montessori sense would be the provision of "interest areas" where children could go on their own and for long periods of time. Only when a child can choose an activity and persist at it until he is satiated can we speak of true intrinsically motivated behavior.

Here educational theory is confirmed by common sense or should we put it the other way around?

CHILDREN
. . . and Ourselves
PIAGET'S POINT

A BOOK of reprints from the *Harvard Educational Review*, devoted to analysis and application of the ideas of Jean Piaget and Lawrence Kohlberg, *Stage Theories of Cognitive and Moral Development: Criticisms and Application* ($4.95), proves of interest in several ways. It becomes evident to the reader that modern educational theory lacks a coherent conception of the goal of teaching, and that the work of these two, Piaget and Kohlberg, has made the beginnings of a reform in this direction. While the language and style of the contributions to this book are academic and formal, and may prove formidable for the general reader, there is wonderful relief provided, here and there, by writers who base what they say on work with children. Meanwhile, the criticisms show how teachers who believe that children are endowed with unique potentialities of their own are put on the defensive by hardheaded theorists.

First, the opening passage of "Development as the Aim of Education," by Lawrence Kohlberg and Rochelle Mayer:

> The most important issue confronting educators and educational theorists is the choice of ends for the educational process. Without clear and rational educational goals, it becomes impossible to decide which educational programs achieve objectives of general import and which teach incidental facts and attitudes of dubious worth. While there has been a vast amount of research comparing the effects of various educational methods and programs on various outcome measures, there has been very little empirical research designed to clarify the worth of these outcome measures themselves. After a deluge of studies in the sixties examining the effects of programs on I.Q. and achievement tests, and drawing policy conclusions, researchers finally began to ask the question, "What is the justification for using I.Q. tests or achievement tests to evaluate programs in the first place?"

Speaking critically, these writers say:

1. The current prevalent definition of the aims of education, in terms of academic achievement supplemented by a concern for mental health, cannot be justified empirically or logically.
2. The overwhelming emphasis of educational psychology on methods of instruction and tests and measurements which presuppose a "value-neutral" psychology is misplaced.
3. An alternative notion that the aim of schools should be the stimulation of human development is scientifically, ethically, and practically a viable conception which provides the framework for a new kind of educational psychology.

Arguing that there is not and cannot be a "value-free" theory of education, Kohlberg and Mayer show what happens on Behaviorist assumptions, which claim to be value-free:

> Advice about means and methods involves value considerations and cannot be made purely on a basis of "facts." Concrete, positive reinforcement is not an ethically neutral means. To advise the use of concrete positive reinforcement is to advise that a certain kind of character, motivated by concrete reinforcement, is the end of education. Not only can advice about means not be separated from choice of ends, but there is no way for an educational consultant to avoid harboring his own criteria for choosing ends. The "value-neutral" consulting model equates value-neutrality with acceptance of value-relativity, i.e., acceptance of whatever the values of the client are. But the educator or educational psychologist cannot be neutral in this sense either.

Statements of this sort are bound to produce anxiety in those who would be "scientific thinkers" about education. For example, two writers critical of the "stage" theories of Piaget and Kohlberg conclude their discussion with a quotation from William Kessen, who says:

> The defining problem of cognitive development is to comprehend how an organism of a particular kind, in encounters with phenomena defined in a particular way, constructs the world. For a task of this range, it is not possible to duck the specification of philosophical—particularly epistemological—underpinnings for a psychological theory. The danger that our conclusions about the development of human knowledge may derive in large measure from the preconceptions of the nature of man and the nature of reality that we stuffed or worse, let slip into

> our initial construction of the psychological task (a danger that I believe to be clear and present in all current attempts to understand cognitive development) requires that we take a long uncomfortable look at our governing presuppositions.

The discomfort potential in a required philosophical inquiry is evident in this quotation, but all that is actually insisted upon here is that the metaphysical content of "preconceptions of the nature of man" be openly admitted, instead of being smuggled in and taken for granted. "Empiricism" in education theory is not enough.

"The Having of Wonderful Ideas" is the contribution of Eleanor Duckworth, who tells how Piaget's thinking, while it may not seem directly applicable, may serve the classroom teacher. This paper is about children who have wonderful ideas, illustrating what the writer calls "the essence of intellectual development." She tells this story:

> Hank was an energetic and not very scholarly fifth-grader. His class had been learning about electric circuits with flashlight batteries, bulbs, and various wires. After the children had developed considerable familiarity with these materials and what they do, the teacher made a number of mystery boxes. Two wires came from each box, but inside, unseen, each box had a different way of making contact between the wires. In one box the wires were attached to a battery; in another box they were attached to a bulb, in another box they were attached to a certain length of resistance wire; in another box they were not attached at all. By trying to complete the circuit on the outside of a box, the children were able to figure out what made the connection inside the box. Like many other children, Hank attached a battery and a bulb to the wire outside the box. Since the bulb lit, he knew at least that the wires inside the box were not connected by another piece of ordinary copper wire. Along with many other children, he knew that the degree of dimness of this bulb meant that the wires inside were connected either by another bulb of the same kind or by a certain kind of resistance wire.

And that, in the teacher's view, was all he could find out. But Hank wanted to find out more:

> He undid the battery and bulb that he had already attached on the outside of the box. In their place, and using additional copper wire, he attached six batteries in a series. He had already experimented enough to know that six batteries would burn out a bulb, if it was a bulb inside the box. And he knew that once a bulb is burned out, it no longer keeps the circuit complete. So he then attached the original batter, and bulb again. This time he found that the bulb on the outside did not light. So he reasoned, with justice, that there had been a bulb inside the box, and now it was burnt out. If there had been a wire inside, it would not have burned through, and the bulb on the outside would still light.

Actually, the boy had an idea that had not occurred to the teacher. He sacrificed a bulb in order to show that the dimness of his outside bulb was due to a bulb inside, and not to a piece of resistance wire. There was a cost in following through on his idea, but an acceptable cost. Eleanor Duckworth adds:

> Without these kinds of acceptance, Hank would not have been able to pursue his idea. Think of how many times this acceptance is not forthcoming in the life of any child.
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> But the other important point to be made here is that in order to have that wonderful idea, Hank had to know a lot about batteries, bulbs, and wires. A good deal of previous work and familiarity with those materials were a necessary aspect of this occasion.
>
> David Hawkins has said of curriculum development, "You don't want to cover a subject; you want to uncover it." That, it seems to me, is what schools should be about. They can help to uncover parts of the world which children would not otherwise know how to tackle. Wonderful ideas build on other wonderful ideas.

That is Piaget's point.

FRONTIERS

Questions without Answers

IN *Environment* for last November, Kurt Hohenemser reports on the contents of a not yet translated book by "a former top manager of nuclear power developments in the Federal Republic of Germany." This writer, K. Traube, tells how he was converted from "a high technology enthusiast" to a severe critic of its unmanageable complexity. Interestingly, Traube points out that the development of our present technology is largely due to war. The *Environment* writer summarizes:

> Much of the present high technology is a spin-off from the military effort. Civil aviation and commercial nuclear power are directly derived from military origins. Microelectronics, which are about to influence society even more strongly than aviation or nuclear power has, are also of military origin. Even pesticides have their origin in chemical warfare agents. But according to Traube, rational arguments and economic or military needs are not the only reasons for high technology projects. Rather, technological self-determination (what *can* be done *will* be done), prestige, and visionary ideas (man on the moon) are often the driving forces—with little thought given to social consequences. For example, nuclear weapons are autonomous and irrational from the point of view of national or global security. The motivation is now the creation of "larger, faster, more precise, no matter how detrimental such a development may be for the establishment of a safe world.

In short, a "military" sort of thinking pervades the decision-making of the advocates and managers of high technology. (In *Dams and Other Disasters* Arthur Morgan devotes several chapters to the stubborn bull-headedness of the Army Engineers.) The built-in confusions of big organization everywhere dominate:

> Important decisions are not made at the working level but within the management hierarchy—with those on top, with the least factual knowledge, making the most important decisions. Since the main interest of the managers is not the utility of the project but rather the smooth operation of the huge managerial machine, a high technology project, once started, is very hard to terminate even if it has become obvious to many that the project is a dud from a technical or economic or military point of view. Clever rationalizations are invented in favor of continuing the project, and ad-hoc committees of experts are established to evaluate the project. Initially these "experts" know even less about the intricacies of the project than top management but, in the course of familiarizing themselves with the project, may become so fascinated by it that they accept the proffered rationalizations.

Other effects become evident in time:

> . . . high technology, as a result of the enormous effort involved in any given project, creates monopolies, discourages the diversity from which an optimum solution could emerge, and breeds conservatism. High technology products do not respond to market needs but rather define the market.

Mr. Hohenemser concludes with a basic question: "Does a government in a democratic society have the right to force upon its citizens a high technology system which is feared and abhorred by a sizeable minority?"

There are other forms of big-organization thinking, often put into effect with the best of intentions, but with equally disastrous results. In a paper presented in Washington, D.C., at a seminar on the Responsibility of Multinational Corporations, held last spring, Luther Gerlach, who teaches anthropology at the University of Minnesota, describes the efforts of the World Health Organization and other groups to do something about infant malnutrition in the coastal area of Kenya near Mombasa. The experts of these groups neglected to find out about traditional milk-using patterns among the people there; they were ignorant of the fact that some enterprising traders (Kenyans) were beginning to deliver fresh milk to the villages on bicycles. So the Western health and aid officials came with powdered milk to save the babies of Kenya. They didn't know that, among the Kenyans, malnutrition was taken as evidence that a mother had stopped nursing her child because another baby had come—*too soon.* So, the powdered milk meant to them that they could have all the babies they

wanted—"medicine" from America would make it all right. Thus traditional conceptions of family planning waned in influence. Prof. Gerlach relates:

> Digo women had some of the same problems with this "give-away" powdered milk that some women in developing lands have with formula [milk for babies]. Using it did not lead them away from nursing. They considered it an additional source of strength. But to the extent that it gave the idea that *chirwa* [evidence of malnutrition] was an illness, not a result of a broken taboo, it indirectly encouraged women to have one child after another and to wean children at a much earlier age. Using powdered milk did bring illness however, since Digo mixed it with unboiled and usually polluted water. . . . Shell Oil Co. urged them to make kerosene cookers from large tin cans, but seldom do they buy food in such a container, kerosene is expensive, and anyway their traditional clay cook pots are round to fit between three stones, not to stand on the flat top of a kerosene cooker. Further, in the country, it is smoke from the cooking fire which fumigates and preserves grain stored in high racks over the fire. . . .
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> The various health officials did not really stay to see the results. . . . Anyway, problems could be blamed on the continuing ignorance of the poor Africans. Anthropologists could say all they wished about the need to consider consequences through the system of changes anywhere in the system. But change agents had to get out and help people. They had not time to look into traditional social and cultural patterns. As they said, "When you see someone starving and dying of malnutrition there is no time to conduct a study." . . . change agents, especially those concerned about health, have to act. So, bring on the powdered milk and the milk-processing plants.

This tale of philanthropic blunders, so harmful to the Africans, makes Prof. Gerlach speculate about the hope of reforming the multinationals:

> I wonder . . . when I learn how multinationals are asking how they can indeed be more socially responsible, what will happen when they hire skilled and motivated specialists to improve the health and welfare of their customers as well as simply to pursue economic gain. Perhaps these specialists will be like so many other agents of change connected with churches arid agencies and not really know enough about the systems they are changing. This will be too bad. But perhaps they will understand much more about how social cultural systems work and really try to make integrated change. Will they then have such broad responsibility that their power will greatly increase and attract even more hostility and criticism?

This is only the beginning of a long series of questions the writer asks. As we presently look at the world and its problems, they seem mostly questions without answers.