

## GROUNDNS FOR SUSPICION

A SADNESS sometimes approaching despair characterizes many of the personal communications—correspondence between friends—that one happens to see in the present. It is the somber withdrawal of individual decency from the profile of ugly behavior, at home as well as abroad. Greed has become a form of economic righteousness while self-interest is now an ethical principle. Such is also the picture given by journalistic accounts of today's happenings, and the statistical reports of man's inhumanity to man suggest that we are spectators of cold-blooded rivalry between competitors in excess. The portrait of society sketched ten years ago by John Schaar in his essay, "Reflections on Authority" (*New American Review* No. 8, January, 1970), needs no revision:

We hear of riots and rebellions, demonstrations and assassinations. Heads of states in many modern countries cannot safely go among the citizenry. Dignified ceremonies are raucously interrupted by riotous crowds chanting obscenities at the officials. Policemen have been transformed from protectors into pigs. A lot of young people are trying drugs and a lot of older people are buying guns. A few months ago a man entered the employment security building in Olympia, Washington, and tried to murder a computer. He failed, however, because 1401's brains were protected by bulletproof steel plate. Some developers recently announced plans for a "maximum security subdivision" in Maryland at a minimum cost of \$200,000 per house. The subdivision will be ringed by a steel fence and patrolled by armed guards, the shrubbery will hide electronic detectors, and visitors will be checked through a blockhouse. In 1968, American governmental units hired 26,000 additional policemen, an increase of 7 per cent over 1967. 1968 was the second year in a row during which police employment rose more steeply than any other kind of public employment.

After this sampling of the common life, Prof. Schaar says: "It is the thesis of this essay that legitimate authority is declining in the modern states; that in a real sense, 'law and order' is the

basic political question of our day." His comment reflects the way more and more people are now behaving. The nations which are supposed to provide their people with "law and order" are equally bad or worse in their behavior. Speaking of the public temper which began with the cold war of the 1950s, Henry Steele Commager (in the *Christian Science Monitor* for Jan. 2) recounts some of its effects:

It is futile now to allocate responsibility for the disasters that followed: the expansion of the cold war from Europe to Asia, the Korean war, whose heritage is still with us; the collapse of the much-touted Alliance for Progress; the entanglement of the United States in the internal affairs of Southeast Asia; and the greatest tragedy in our history since slavery, the Vietnam war, a tragedy that (unlike slavery) we deliberately embraced. These interventions set a pattern that was shortly reproduced in every quarter of the globe.

The United States, assuming that God and history had imposed upon it an obligation to preserve peace and freedom everywhere, intervened in Cuba, Guatemala, Nicaragua, Brazil, Chile, Portugal, Greece, Iran, and perhaps a dozen other nations in Africa and Asia. Sometimes it was done overtly; for the most part, covertly. . . .

U.S. intervention led to a vast growth of the military; to the burgeoning of the Central Intelligence Agency in 60 countries; to the emergence, for the first time, of the principle that it cost more to be at peace than to be at war to the militarization of the economy, of society, and of politics, of science and of learning; to the creation of what was most feared by the Founding Fathers—the "security state."

This is the sort of thing that was happening while we—or most of us—were going about our personal business during the past twenty-five years. The selective eye of the historian is needed for mirroring what we the people have actually done. Prof. Commager continues:

Chickens finally came home to roost. We had created the atomic weapon and we are, so far, the only nation to detonate it in anger, we discovered that

we had opened a Pandora's box of atomic weapons. Soon the Soviets had the atom bomb—soon half a dozen nations had it—and now we are threatened by its proliferation throughout the globe. We had ousted a Mossadeq from the throne in Iran and now we have an Ayatollah Khomeini to deal with.

We overthrew Salvador Allende in Chile and now are confronted with an intransigent totalitarian government that makes a mockery of our campaign for human rights; we launched a Bay of Pigs assault against Castro and are shocked that he should turn to the Soviets for support.

We built up the largest and most expensive military establishment in history but discover that it is incapable of providing security against the threats presented by the modern world. Instead it has a ruinous impact on our economy.

We constitute 6 per cent of the population of the globe but use 40 per cent of its oil, and are unable to cope with an "energy" problem that is largely of our own making. We have allowed money and special interests to corrupt politics at every level, and are astonished to discover that the majority of our people have no faith in the efficacy of political processes.

What has happened to Americans, and to their country? Prof. Schaar, in the thirty-seven pages of his essay, develops the diagnosis that a breakdown of authority is the underlying cause of the increasing social disintegration. What is authority? It is a source which has the right to say what is right, and what is wrong. Fundamentally, authority is based on trust. Brute power is the only substitute for trust, and may be needed at the margins of even a fairly good society, but when force becomes the major resource of government the affairs of that society are conducted at a sub-human level and its structure is on the verge of collapse.

Prof. Schaar finds that authority begins with the origin of a society:

A nation has a unique birth and is also a continuous rebirth. And birth requires a father or author, the one who whether mythologically or actually, brought the original laws and customs, thereby making a people a people. ("Law" means limit or boundary. In Greek, the words for "law," "boundary line," and "shepherd" had the same root.) The founder of a people is usually either a god or a messenger and mediator between gods and men: the

creative moment in the birth of a nation is the birth of a religion. . . . Even the enlightened American Founding Fathers saw the Constitution as a partial embodiment of that higher order called the Laws of Nature and of Nature's God. . . .

No one needs to be told that these ancient patterns of thought no longer prevail. The old moralities of custom and religion are husks and shells. With the growth of the special modern form of individual self-consciousness as consciousness of separation, men lose sight of the dependence of the group upon morality and of the dependence of morality upon the group.

In separation, without the bond of unity with our fellows, "Each man becomes his own author and oracle, his own boundary setter and truth maker." In older times, the authority which stood above both citizen and ruler was a principle to which both were answerable—a principle embodying justice and right. But today—

The ego recognizes no source of truth and morality external to itself. . . . We have no mainstream political or moral teaching that tells men they must remain bound to each other even one step beyond the point where those bonds are a drag and a burden on one's personal desires. Americans have always been dedicated to "getting ahead"; and getting ahead has always meant leaving others behind. Surely a large part of the zealous repression of radical protest in America yesterday and today has its roots in the fact that millions of men who are apparently "insiders" know how vulnerable the system is because they know how ambiguous their own attachments to it are. The slightest moral challenge exposes the fragile foundations of legitimacy in the modern state.

In an analysis of modern political theory Prof. Schaar shows that government now obtains its legitimacy solely from the capacity to "service" the desires of the people, not from its conformity to over-arching moral law. Despite rhetorical claims to support morality and freedom, modern governments stand or fall by their usefulness to what are conceived to be private and public *interests*. But, looked at carefully, their performance in even this weakens year by year:

The government must now defend national security and enlarge the GNP. But it is increasingly clear that the nation-state can no longer guarantee the first at all, and that in the modern states the second

has been accomplished to the point where it threatens the irreversible degradation of the environment and the species.

We have finally made the engine that can smash all engines, the power that can destroy all power. Security today, bought at the price of billions, means that We shall have fifteen minutes' warning that They intend to annihilate us. The most powerful state today cannot provide security, but only revenge. . . .

The case with abundance comes out about the same way. . . . Societies have always been, in part, organizations for the production of the nutrients of life, but modern civilizations are dominated as no others have ever been by the law of production. . . . Modern production obscures the sun, pollutes the air, and chews up great forests. It drinks whole lakes and rivers or transmutes them into abominations . . . The civilization of production periodically destroys men by heaps and piles in war, and it daily mangles the spirits of others in meaningless labor. . . . The modern state, then, insofar as it is provider and guarantor of increase, and insofar as its success in this task is a source of legitimacy, has succeeded too well: its success has become a threat to survival. The masses have not yet heard this message, though some hints have begun to penetrate the thicket of propaganda and inherited ideas.

So it is that there is creeping psychological depression abroad in the land. How else explain the sudden rush to antiquated forms of fundamentalist religion, and nervous alliances with new sects and cults by the sophisticated? To what can we look for guidance? Is there no "authority" beyond the industrial catering service of modern government? Education is certainly not a source of hope. One recalls that Clark Kerr, once head of the enormous complex of institutions dispensing higher learning in California, defined the multiversity as "a mechanism held together by administrative rules and powered by money." No moral authority there.

Prof. Schaar puts the present mood in sociopolitical terms:

Many of the sons are no longer sure they want the legacy of the fathers. Among young people, the peer group increasingly takes priority as the agency of socialization, and the values it sponsors are new and hostile to those of the adult world. Many people are seeking ways to live in the system without belonging

to it: their hearts are elsewhere. Others, convinced that the organized system will not in the long run permit the escape into private liberty, or feeling that such an escape is ignoble, are acting politically to transform the system. In the eyes of large and growing numbers of people, the social and political landscape of America, the most advanced of the advanced states, is no green and gentle place, where men may long abide. Rather that landscape is a scene of wracked shapes and desert spaces: what we mainly see are the eroded forms of once-authoritative institutions and ideas, what we mainly hear are the hollow winds of once-compelling ideologies and the unnerving gusts of new moods and slogans; and what we mainly feel in our hearts is the granite consolidation of the technological and bureaucratic order, which may bring physical comfort and great collective power, or sterility, but not political liberty and moral autonomy. All the modern states, with the United States in the vanguard, are well advanced toward a crisis of legitimacy.

How is all this to be understood? Schaar suggests that a failure of leadership plays a part. It seems certain that there are very few among the privileged and qualified who set an example to the rest. But leadership itself is not well understood and our impoverished educational institutions are no place to send candidates of apparent promise. We have two modest suggestions: one, to emulate, so far as we can, each one in his own way, the labors that Socrates undertook in behalf of his fellow citizens of Athens (we have just come across a good account of what he set out to do, in the current *American Scholar*); the other, a proposal found in a thoughtful letter by a nun (in *The Ecologist* for last November-December). Since the latter is brief, we quote from it first. The correspondent, Sister Angelina, is commenting on the dismissal by an earlier writer of the importance of the religious scale of values in Amish and Hutterite communities. What is religious and what is not is, he maintained, only a matter of definition, asking: "Could it not be possible that profit-making itself is the religion of materialism?" Sister Angelina replied:

It is scarcely disputable that the race for material goods is a religion-substitute; but that leaves unsolved the problem of what substitute the secular stable economy can find for both religion and money-

grubbing. Mere contentedness to live in peace with one's neighbors is a pleasant idea on paper, but it ignores the actual dynamics of human psychology.

The late Dr. Ananda Coomaraswamy pointed out in many of his works that all traditional pre-industrial societies had or have a complex metaphysical doctrine of their various crafts (including agriculture). Each is seen not only as a means of producing material necessities, but as a paradigm of the cosmogonic act; and consequently also as a meditative path. An individual's craft was a vocation in the true sense; an inseparable part of his or her own being.

The loss of this traditional approach to the crafts is the root cause of all "industrialism," since it is only when the inner meaning of craft has been forgotten that its whole essence can be sacrificed to methods which merely increase its external productive efficiency. . . . I am convinced that a return to a vocational society in the traditional sense is the only workable long-term solution to the psychological and spiritual problems of a post-industrial economy.

Apart from concession to the present-day vocabulary—after all, the "economy" is a subordinate element in a good society—this seems about as fundamental as could be. The way we think about what we do every day accomplishes the shaping of human character. To see it as a paradigm of "a cosmogonic act" is to relate ourselves once more to the wide world of nature and to find a deep and transcendental meaning in what has been called "natural law." One may recognize the beginnings of this restoration in the ecological thinking and practice now going on. The metaphysics may come later, developing quite naturally—with some help from ancient sources—in the course of time.

Political methods accomplish little or nothing so long as the sources of social inspiration in philosophy and philosophical religion are ignored. Politics is entirely derivative in its moral authority. Plato saw this and retired from politics at an early age, turning to the example of Socrates as foundation of a philosophic therapy for the ills of his times. In his *American Scholar* article, Kenneth Seeskin tells how Socrates proceeded:

At his trial, Socrates shocked the jurors by proclaiming his ignorance. Unlike his predecessors

from Asia Minor or southern Italy, he could not justify his life by taking pride in what he had contributed to the sum total of human knowledge, since, by his own admission, he had contributed nothing. His only justification was to compare himself to a gadfly. The city of Athens was like a large horse given to laziness; it was Socrates' job to rouse it from time to time by stinging it into activity. Hence the first great philosopher in the West was known primarily as a troublemaker and a busybody.

Socrates can be viewed as a hero only to the extent that one distinguishes the goals of the philosopher from those of the scientist. The scientist hopes to arrive at conclusions so well established that they become part of the body of accepted beliefs which, from that point on, can be taken for granted. Socrates' mission was just the opposite: to cast suspicion on accepted beliefs and replace the certainty of established fact with the troublesome insecurity of philosophical doubt. . . .

Philosophy tends to thrive during periods of intellectual disorder and heterodoxy. It is no accident, therefore, that many philosophers have rejected straight expository prose as a medium of expression and have chosen aphorisms, autobiographies, dialogues, plays, myths, meditations, or dialectical arguments instead. . . .

In a sense the citizens of Athens were right: the philosopher is a criminal. If the scientist adds to our knowledge of the world, the philosopher, by casting doubt on the foundations which support that knowledge and pointing the way to radically new alternatives, takes away from it. To the charge that what he is doing is scandalous the philosopher has no defense. Thus each time a new discipline severs its connections with philosophy in order to seek definitive answers to its questions, the true philosopher rejoices—here is someone else he can rob of certainty.

This seems fair enough, save for the fact that Plato and Socrates were never without high certainties of another order—certainties neglected by both the scientists and ordinary folk of our time. It is these which now need attention, along with the disillusionments that are coming, with or without Socratic provocation and accompaniment.

## *REVIEW*

### GANDHI AND THE ENGLISH

THERE are various reasons for reading the books on Gandhi which keep coming out, but the most important one may be that locked in the life and work of this Indian patriot is the secret of human greatness. You do not solve the mystery by reading about Gandhi, but you learn something about the concomitants or ingredients of greatness. His life reveals a high and transcendent purpose within a familiar one. He resolved to free India of British rule. But he saw this goal as superficial in contrast to the goal of freeing human beings from the bondage to personal weakness. How does a man acquire the intensity of purpose that possessed Gandhi?

The importance of this question is suggested by a passage toward the end of James D. Hunt's *Gandhi in London* (published in India by Promilla and distributed in the U.S. by South Asia Books, Box 502, Columbia, Mo. 62501, \$20.00). Recounting the impact of Gandhi on English society when he came to London in 1931 as representative of the Indian National Congress, to attend an official Round Table Conference on a constitution for India, the author tells about a gathering of well-known scholars at Oxford University with whom Gandhi spent an informal evening. Edward Thompson, who was host, described the scene:

I watched him once . . . while for three hours he was sifted and cross-questioned by a group which included the Master of Balliol, Gilbert Murray, Sir Michael Sadler, P. C. Lyon. It was a reasonably exacting ordeal, yet not for one moment was he rattled or at a loss. The conviction came to me, that not since Socrates has the world seen his equal for absolute self-control and composure; and once or twice, putting myself in place of men who had to confront that invincible calm and imperturbability, I thought I understood why the Athenians made "the martyr-sophist" drink the hemlock.

These English scholars—Oxford dons—were superbly civilized individuals but they disagreed with Gandhi's demand for immediate freedom for

India. They were not persuaded that the Indians were "ready" for self-government. When they made this view known, Gandhi said to them:

The long and the short of it is that you will not trust us. Well, give us the liberty to make mistakes. If we cannot handle our affairs today, who is to say when we will be able to do so? I do not want you to determine the pace. Consciously or unconsciously, you adopt the role of divinity. I ask you for a moment to come down from that pedestal. Trust us to ourselves.

Speaking at Cambridge, he said:

My quarrel with you is this. I know that every honest Englishman wants to see India free, but is it not tragic for them to feel that the moment British arms are removed there would be invasions and internecine strife? Well, as against that, my contention is that it is the British presence that is the cause of internal chaos, because you have ruled India according to the principle of divide and rule. Because of your benevolent intentions you feel that the harrow does not hurt the toad.

After these university meetings, Gandhi's secretary, Mahadev Desai, recorded his impression: "I am afraid no one, whether in Oxford or Cambridge, seems to appreciate the truth of Henry Campbell-Bannerman's great maxim: 'Good government is no substitute for self-government'." Gandhi, however, valued the meetings as giving him "an insight into the working of the British mind which I could have got through no other means." In his final chapter Mr. Hunt sums up the importance of Gandhi's stays in London—and therefore the importance of his book—by showing how this insight was turned to the service of Indian freedom:

While enjoying support among the reformers' and critics' society, he was able to marshal an alliance with aristocratic and conservative officials. Further, he had for two decades the advantage of living among the British as a fellow colonist outside of India. He never ceased to study them, to muse on their admirable qualities and their lesser ones, eventually achieving "an astonishing empathetic knowledge of the English way of life."

This knowledge was clearly a source of power. A recent study [by George Woodcock], *Who Killed*

*the British Empire?* (1974), observes, "Undoubtedly, if one had to choose any individual as more responsible than others for the death of the Empire, it would be Gandhi." He is awarded this accolade not only because of his mobilization of the Indian people but also for his capacity to weaken the will of the British to continue as colonial rulers. "One of Gandhi's achievements," it says, "was to show Britons the reality of their own consciences, to reveal to them the gulf between their religious pretensions and political ideals and their actual practice as imperialists."

There is this on the time Gandhi spent in England—amounting to a brief outline of the contents of the book:

Gandhi's years in London—over two and a half years as a student, and then fifty-five weeks in additional visits, the whole spread over a period of forty-three years from the age of eighteen to the age of sixty-two—gave him a unique opportunity to know the British middle class. The Englishmen he came to know and work with most intimately were of this level. Since he did not attend the universities he had little contact with the ruling classes, and by the protection of his family's own resources he did not have to live among the poor. He was most often in the midst of the urban middle classes, and showed a strong affinity for earnest Nonconformist Christians and evangelical reformers such as the vegetarians and Theosophists. Through them, he came to have a living awareness of the power and the weakness of the British middle-class conscience, the sense of idealism and correctness which was so prominent in the consciousness of the proud Victorian era. When it found political expression in the Liberal governments of the Edwardian period, Gandhi was there in an attempt to exercise it by means of the established channels of petition and appeal. Despite the failure of his political efforts, the people he knew best were coming increasingly to dominate British politics in the twentieth century as the franchise was extended. In 1931, when his official work proved once more fruitless, he resisted the temptation to dissipate his energies in Germany or America and concentrated on a many-sided exercise in communication with the people of Britain.

Gandhi's loving victory over the British is of great interest in itself, as the study of what may prove to have been the most significant historical process of the twentieth century, but this book, so carefully put together, is still more valuable as a

study of the formation of human character—a psycho-moral process in which Gandhi was deliberately engaged for the whole of his life. Stephen Hay, who writes the preface to *Gandhi in London*, remarks this by concluding: "May this work serve as a model for those who would follow this difficult path (this *sadhana*) of perfecting our minds' grasp of the most complicated of all realities: the activities and experiences of individual human persons."

Gandhi was aroused to his career of self-sacrificing service by the acts of extreme injustice to Indians that he experienced and witnessed in South Africa. The central purpose that would guide him took possession at that time (1893). The rest of his thinking was the increasingly perceptive and effective articulation of that purpose in the grain of current events. What sort of human development was desirable and what sort of freedom would make it possible? These were the questions for which he found answers, over a period of fifteen years, giving them in forceful summary in *Hind Swaraj*, the small book he wrote on board ship on the way back to South Africa in 1908. *Hind Swaraj*—Indian Home Rule—sounded the keynote of Gandhi's life: his discovery and declaration that human beings enslave themselves and must free themselves. It is both affirmation and denunciation. He affirmed the innate capacity of all human beings to be free and denounced submission to those aspects of Western life by which men give up their freedom. Mr. Hunt repeats the gist of Gandhi's small but epoch-making book:

The core of the message lay in the statement: "India is being ground down, not under the English heel, but under that of modern civilization." Since the prime threat to India is cultural and not political, true self-rule will not be obtained by politics or violence, but by personal regeneration through nonviolence. He took the term Home Rule out of its political context and imbued it with a cultural and religious significance: "Real home-rule is self-rule or self-control." By this he placed the levers of power into Indian hands; it did not matter if the British stayed or went; what Indians must liberate themselves

from is their infatuation with Western civilization, including all forms of machinery.

...

*Hind Swaraj* was a profound challenge, and an extreme one. His closest supporters were baffled by it and embarrassed, but Gandhi never repudiated it. In later years, however, he would state that it stood as a statement of his ultimate goals though his practical work must be directed to more immediate issues which required the use of machinery and Parliamentary forms for the time being.

What gave Gandhi his power and extraordinary influence? Most answers to this question only reformulate it. But one thing that might help is recognition of the fact that here was a man who, when he came across a truth, felt compelled to act on it. This is a capacity which all have but seldom use; people sense its use by Gandhi and feel the resulting power—the power of truth in action.

## *COMMENTARY*

### "A WAY OF CREATING SOMETHING"

WHAT we hear today, John Schaar wrote ten years ago, are mainly "the hollow winds of once-compelling ideologies and the unnerving gusts of new moods and slogans; and what we mainly feel in our hearts is the granite consolidation of the technological and bureaucratic order, which may bring physical comfort and great collective power, or sterility, but not political liberty and moral autonomy."

This concisely accurate verdict recalls the movement begun in France during the German occupation, which achieved vigorous life after liberation. In *All Things Common* (Harper, 1950) Claire Huchet Bishop tells the story of Boimondau, a community of industrial workers who joined with Marcel Barbu to evolve a mode of production in which the "distinction between employer and employee would be abolished." She also reports on other European groups formed with similar purposes. Her work is an immeasurably valuable account of what can be accomplished by a combination of vision and resolution in a world where the attitudes and activities described by John Schaar prevail. Barbu's watch case factory became a model of community-building, and so did the thinking of the workers who continued the community after the Germans sent their founder to Buchenwald.

Early in their association together the Boimondau workers decided that they needed an expression of common commitment, of which they said:

We will put down in writing what is our ideal for living and acting. We will strive to conform our lives to it. We will reread it frequently.

We pledge ourselves to belong to a spiritual group [which might be of Materialists]. The responsibility of the spiritual group is to see that all members observe the common ethical minimum, and each member his own particular ethics.

Each week we will devote at least one hour to the collective study of spiritual, philosophical and religious problems.

The failure of any one of us in observing the Rule will contribute to the education of all.

The Community is not a selection of the best. It accepts every man as is, and asks of him only to turn, with good will and energy, toward the proposed ideal.

Is the communitarian movement, an inquirer asked, a way of "avoiding Communism?" The reply was: "It is not the way of avoiding anything. It is the way of creating something." Following the example of Boimondau, other communities of work pledged themselves to a common ethical minimum, not as a dogma, but a guide. They thought of it in this way:

We start from the idea that human laws cannot really compel men unless resting on an ethic accepted by those very men.

It is always possible to regret that all men have not attained the same high level of moral perfection. It is useless to fool oneself by making laws based on an ethic that no one would recognize.

So, facing truth, we do not attempt to correct men by making more exacting laws, but by educating them and bringing them to become conscious of their failures, in codifying this failure, and in giving to all the legal right to do what nowadays only the smart and powerful ones can do.

This is the best way to unmask error.

Error should not be dressed up, nor made bearable.

Error should be left to bear its natural fruit: disorder, suffering. Ethics, we believe, are a rule of life and action for men living in society.

The necessities of Community life will show gradually, as progress goes on, in what sense the common ethical minimum has to be revised and replaced by a more exacting one.

It will take a lot of this sort of intelligence to overcome the conditions of the modern world. Yet it is astonishing to discover how much of it already exists, in reading Claire Bishop's book. Despite opposition and failure, the spirit of community keeps building up, taking many forms.

## CHILDREN

### . . . and Ourselves

#### DIRECT EXPERIENCE OF ALTERNATIVES

Too much of anything works backwards. Too much technology works backwards, costing us more than it's worth. Too much condemnation of technology works backwards, closing the mind to how things work. A friendly enemy once asked David Brower back in his Sierra Club days, "Tell me, Dave, do you wear skins and live in a cave?"

In this time of resentment toward technicians we are likely to forget that Prometheus, the Greek Saviour, in addition to bringing them fire, taught humans how to make things. He did this while realizing that they would make mostly messes, as Eschylus has him admit in *Prometheus Bound*. For Prometheus, who believed in thinking, a calculated risk was preferable to having people wander around like perambulating vegetables.

Who are the best critics of technology? They are former or continuing technicians. They know where the benefits of scientific method stop, and how, therefore, to get the most out of technique by understanding its limitations. This, of course, is not technique but art. The artist makes a servant of technique.

All this is preface to an article by Bernard Zubrowski, "Teaching Technology to Children" in *Technology Review* for October, 1979. Why do this? Because there is a time in every child's life when learning how to do things is more important than anything else. How many of the virtues we celebrate are founded on knowing how to do things—make things—well? When people don't learn how to make things, they are lining up for membership in some Cargo Cult religion involving blind adoration of Things that have been Created by some far-off, all-powerful god.

Mr. Zubrowski begins:

As a museum educator interested in designing science programs for children, I find this history [of early technology] a very rich area for children to

explore. Many of the actions of older tools and processes are immediate, visible, and comprehensible at a concrete level. The weight of water falling on a water wheel can be seen and felt, and the resulting conversion of energy into work by way of gears is easily followed. The operation of simple tools is readily understood; their movements are directly visible and easily controlled.

The older technologies have another appealing aspect especially suited for children: their close relationship to the arts. The movement of wind mills or escapements in old mechanical clocks have an aesthetic dimension often ignored. Some of these devices and machines could rightly be called first kinetic sculptures. Cyril Stanley Smith, professor of the history of technology and science at M.I.T., has pointed out that practitioners of technology, until recently, were more closely akin to artists than scientists in how they approached materials.

This seems a good way to distinguish between tools and complex machines. Artists need tools; machines require tenders. For the artist, the tool is an instrument responsive to his will. For the machine, the tender services its needs. Were you playing the violin? is not the same question as, Were you minding the machine?

Telling about his summer program, Zubrowski relates:

During each session children had opportunity to make tools or to operate them. They worked at breaking and chipping rocks to make primitive scrapers and knives, forged drill bits by heating up nails in charcoal fires and flattening them with primitive hammers. They operated pump drills and pole lathes to make small wooden beads.

As we recall, this is the way physics is taught to students of St. John's College at Annapolis—by *doing* some of the experiments Galileo and Newton performed. And this, you could say, is the most obvious difference between science and religion (as commonly understood). Religion is based on Revelation, and Revelation is something that always happens to somebody else. You are not a scientist, however, unless you do it yourself. There are other meanings of science and religion, but this comparison is essential to understanding how science and religion work in the world.

Science won the big argument between the two because science is a do-it-yourself discipline. Interestingly, now that religion is becoming a do-it-yourself thing, the churches are falling apart.

Mr. Zubrowski continues:

What becomes apparent in watching children in this type of activity and program is that they are fully involved and learning. The type of learning is not easy to characterize because it is different in nature from that usually associated with school. For instance, it takes more than a verbal explanation to get across to children how to operate a pump drill. If the paddle on the drill is not pushed up and down with the right rhythm, the drill will either stop or the bit will get stuck in the hole. The child has to operate the drill, experimenting with the right kind of pressure and rhythm in order to understand how it works. What comes into play in this situation, as in others during the program, is a nonverbal type of thinking: a continued imaging of possible arrangements based on the immediate situation is needed to achieve the right kind of result. Children become involved in a direct dialogue with materials or model where the action itself is the communication rather than the words.

In *Personal Knowledge* Michael Polanyi attributes the continuous achievement in scientific discovery at certain European centers of learning to this nonverbal sort of communication. Students work side by side with practicing scientists of great eminence, learning things incommunicable by any other means. Learning by doing, in association with teachers who are part of a great tradition, is a special case in education. A unique sort of "transmission" takes place, and it cannot be explained.

In Zubrowski's summer classes—

Children were encouraged to design sailboats and wind mills. The boats were made from half-gallon milk cartons, and the hulls, sails, and rudders were fabricated from different parts of the carton. The test tank was a long trough made from scraps of wood, lined with a plastic drop cloth to hold water. Wind power was provided by a large window fan.

A great variety of boats were constructed, from catamarans to double-masted schooners. Each child came up with his or her own special design;

practically all were different from each other, although all did have some kind of main sail in the middle of the boat. The essential test in each case was whether the boat could make it from one end of the tank to the other without tipping over. This particular activity was probably the most popular.

The ideal curriculum is one that provides its own motivation. If the teacher has to do this, something is wrong or missing. Listing the advantages of the program he worked out, Zubrowski says:

First, water has a universal appeal, children of all ages and temperament just can't resist playing with it. The various machines and devices used in the program also have an intrinsic appeal. Thus, the motivation is built into the materials and the program leader doesn't have to provide it. Basic physical principles are dealt with in a concrete fashion and are repeated several times throughout the course of the program. By comparing rates of water delivery among the different models some mathematics are introduced. Depending on the level and interest of the group, a little of the history of technology can be conveyed. Finally, but not least of all, the movement of water through tubes and the movement of the machines themselves have aesthetic dimensions that can be exploited for the making of kinetic sculptures or as a take-off point for a theatrical skit.

His final comment suggests the balance acquired:

Overall, these activities develop more than an understanding of the history of technology and of some basic scientific principles. The kind of materials chosen and the way each was introduced imparted a philosophy of how one lives in the world and some hints for solving today's problems. . . . by playing with working models of water machines and wind machines, children can have the direct experience of knowing that alternative sources of energy are possible. Thus, by delving into ancient technology children can play at being artist, inventor, or scientist while at the same time gaining knowledge relevant to contemporary society.

## *FRONTIERS* Species of Dreams

A GREAT deal of human energy is devoted to developing dreams and trying to realize them; and then, after a while, still more energy is needed to cope with the shambles of their failure. In *Smithsonian* for last November, Sam Love recalled the numerous predictions of the "effortless world" that spokesmen for technology once declared was just around the corner. Starting in 1915, the brilliant inventor, Charles Steinmetz, told readers of the *Ladies' Home Journal* that the time would come when electricity would be so cheap that it would not pay to install meters. There'd just be a little tax, as for water in some cities. Generating electricity never became so easy, but in the 1940s a uranium expert at Cal Tech, R. M. Langer, declared in *Popular Mechanics* that "a power plant the size of a typewriter would become available," adding: "We can look forward to universal comfort, practically free transportation, and unlimited supplies of materials." The fantasies went on and on. An engineer announced that atomic auto engines would be as small as a man's fist, and in 1954 the president of the American Chemical Society described a "battery he said would produce electricity directly from radioactive substances without need for shielding."

Well, we know better now. No one today looks forward to a utopia powered by cheap, abundant energy, and Sam Love reminds his readers of another sort of dream—one never sponsored by well financed advertising campaigns but which has survived to the present and is now very much alive: Many envisioned an entirely different type of future community, one built around human-scale settlements

Many envisioned an entirely different type of future community, one built around human-scale settlements harmoniously integrated into nature. Seeds were shown for this vision by Peter Kropotkin, the Russian anarchist philosopher, in his classic 1898 work, *Fields, Factories, and Workshops*. His book

weaves an idyllic vision of people living in virtually self-reliant communities, balancing manual and intellectual labors. Food would be grown in the neighborhoods or nearby on small farms. Such a society, in Kropotkin's opinion, would require a minimum of government.

Today Kropotkin's vision has far wider appeal, having in effect obtained champions such as Lewis Mumford, E. F. Schumacher, and Murray Bookchin—all, as Sam Love says, "strongly advocating small-scale communities and technology." "Their idea of an ideal future is one of neighborhoods and communities using solar energy, trading via small businesses, growing some of their own food organically and celebrating humanistic values."

Are such dreams as vulnerable to failure as the high technology fantasies of fifty and twenty-five years ago? The answer may be yes if they are romanticized into "total" solutions. In the *Bulletin of the Atomic Scientists* for last December Vaclav Smil surveys the amount of sunshine in various parts of the world, pointing out that in some areas, such as the Sichuan Basin in China, there is only a little over a thousand hours per year of sunshine, while in other regions—such as Bangladesh it rains 25 days a month for four or five months. As for wind as a source of energy: "Throughout large parts of Southeast Asia faster winds blow only for a few months during the pre-monsoon period and a windmill may be idle for 10 months in the year." Wood as a fuel is equally problematic in many large areas:

While solar radiation and wind and water flows are clearly dynamic phenomena with pronounced temporal fluctuations, vegetation to be harnessed by soft technologies fits less obviously into the same category: it seems to be "always there," yet it is not. Virtually all of the most densely populated regions of the developing world—Henan, Shandong, Jiansu and Sichuan in China, Uttar Pradesh, Bihar and West Bengal in India; southern Bangladesh, the delta of the Nile—have been deforested for centuries and large areas have been stripped of their primary growth in *all* large developing nations. Tropical moist forests, the world's most important storehouse of biomass,

have already receded more than 40 per cent from their climax area.

This writer, who is editing a forthcoming book, *Energy in the Developing World*, concludes:

Most currently available technologies based on renewable resources provide energy at a rate that might be very helpful to a rural household but cannot support modern, energy-efficient basic industries, especially iron and steel, fertilizers and cement. They are also insufficient to provide reliable power for farming modernization. Developing nations need it all: two hot meals a day, widespread industrialization, higher crop yields. Today's 3.1 billion living in the poor world will become, even with moderate growth, nearly five billion within a generation. Anything that can be done to increase their available energy is worth doing, but no one design can succeed: Bangladesh cannot copy Gabon and Nigeria cannot imitate China. The enormous heterogeneity of natural endowment, environmental and economic conditions and available human skills determine a wide variety of options from which no one resource and no scale should be excluded. There is no single, infallible precept. There is no best strategy.

It follows that dreaming about uniform practical solutions for all the world's problems is almost certainly folly. The people on the land will have to solve their own problems. We may be able to help them, but not tell them from afar what to do. Yet there is one sort of dreaming it is possible to be completely optimistic about: The dreams one carries out oneself. That is the essential difference between the extravagant technological imagery of the first half of this century and the conceptions set afloat by Kropotkin and others. Local, small-scale effort will not solve other people's problems, but local, small-scale effort, if exemplified and encouraged, can be spread around by demonstration and education. This was and is the social meaning of Schumacher's Intermediate Technology Development Group, and it is the meaning of the work going on at the New Alchemy Institute in Falmouth, Mass., on the southeastern edge of Cape Cod. The symbol of its achievement during the past ten years is the New Alchemist Ark—a

sun- and wind-powered dwelling incorporating a greenhouse for year-round growing and a fish pond for protein food. One of the founders, John Todd, says (in quotation by *New Roots*):

The news is in bioshelters. We have the information now. What we are seeing is the combination of ecology and economics. What we will do is recreate the small farm so it's not dependent on large amounts of petroleum and imported energy. Not dependent on the infusion of materials, so that the costs are only in establishing it and in the human effort to sustain it. The bioshelter of the post-petroleum era will be an analogue to the barn that for generations has stored the summer sun and its bounty.

These solar barns will grow and sustain life cycles in winter in concentrated form. The solar-algae ponds are its living furnace, paying for itself in heat even before the first fish are grown. Windmills can be our compressors and can run the electric pumps. It's going to change the way we farm in New England during the next fifty years. More than a mechanical system, it's an epistemology, a system of thought we've developed here.

Toward the end of his article in *New Roots* for November-December 1979, Michael Gery says:

New Alchemy's direction for the 1980s is being charted. There is a strong flow towards education. While the early work was exploration and observation, patiently and scientifically turning knowledge and tools into new forms for existing with the earth, the flow is now into the community. Designing a solar village makes sense now.

At the New Alchemy Institute they are demonstrating a science of self-reliance. Education in this will help all the world.