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PROJECTS AND TIDES

HOW do you get a worthy project going? The undertaking is different from writing a poem or a book. A work of literature is something you do by yourself. Art is not corporate. You go into yourself, achieve some kind of immaculate conception, and then, by thought, generate the form of an organism of thought. Eventually there comes a moment—it is sometimes difficult to recognize it—when you need to stop thinking about what you are going to do and start doing it. You can think yourself into a straitjacket or a box canyon. There is that moment when thought should transform itself into act, unsullied idea must weigh itself down with bones and flesh and blood. Beginning is a godlike sacrifice to mundane need—a high intention reduced to fallible finite expression. The cells of the organism begin to proliferate. You are on the way.

But a *project* has added complexity. You need to involve other people. You have to fire them into action—your action, not theirs. What immeasurable presumption! How can you know what *they* ought to do? Well, as you say, they're just sitting around. But there is still the question of the legitimacy of involving others in the development of your idea—your project. An answer might be—But it's really their project, too! I just happened to think of it first. Well, if they are able to feel that way about it, involving them is validated. Appropriate collaborations—joint authorship—can be worked out.

We seem to have slipped by the most important question: Why, in the first place, start a project? The question has mostly practical or only derived answers. Projects are the means of social becoming by humans. They are devoted to the improvement of life. You don't need a *reason* for wanting to do that. The reason defines us; it is our nature to do it. But there is endless variety in projects. One man wants to plant trees, another to organize a community theater, another to turn wastes into fertilizer, and so on. We don't really "invent" projects; in a sense we *are* projects, good, bad, indifferent. Here the project is to talk about the good ones.

Part of the talk about it can be identified as describing the way one happens to fall in love. But the talk is mostly about what you think after the fact of the fall. It is rationalization—a good kind of rationalization. Why does the aspiring dramatist want to make a community theater? He doesn't really know but he has to do it. All the reasons seem second rate. So he gives reasons at some meeting with friends, leaving out, because he must, the reality of his amour. Drama, he may explain, focuses mythic wonder in human situations we all go through. The wonder grows, and our understanding grows with it. Drama teaches people two things: Acceptance and enterprise. We mustn't say too much about this. Secrets are profaned by labored explanation. A vulgarized wonder is no longer a wonder; but you can say *something* about it; a freshly framed mystery is a slightly penetrated mystery; you see more of the light through the trees.

What is and what might be—this is the content of drama. Poets compress its splendor. Shelley cried—

> Oh, lift me as a wave, a leaf, a cloud!
> I fall upon the thorns of life! I bleed!
> A heavy weight of hours has chained and bowed
> One too like thee: tameless and swift and proud.

Then he replied to his cry:

> Be thou, Spirit fierce,
> My spirit! Be thou me, impetuous one!
> Drive my dead thoughts over the universe
> Like withered leaves to quicken a new birth!
> And, by the incantation of this verse,
> Scatter as from an unextinguished hearth

Ashes and sparks, my words among mankind!
Be through my lips to unawakened earth
The trumpet of a prophecy! O, Wind
If Winter comes, can Spring be far behind?

The wind scatters leaves, the poet images, and the dramatist deals in confrontations and resolutions.

Why plant trees? Why breathe is a similar question. Planting trees makes the world into a garden, the wilderness a temple, festoons the earth with hospitality to all other forms of life. A long list of biological reasons supplements the impulse to plant trees. If the world is a theater for the human drama, then trees give life to the surrounding silences, add humming vitality to the empty air. A walk in the forest makes each syllable of human response an answer to the question. A cushioned floor bespeaks invitation to wandering. The vistas through the branches teach pleasure to the eye, instructing the visitor in what his senses are for. The child learns the elements of geometry from living forms—triangles and circles, pyramids and globes—and grown people discover that the plenty and purity of the water they drink depend upon trees. The sturdy permanence of dwellings comes from the gift of trees and the warmth of the home derives from last year's arboreal harvest, or that of millions of years ago, now coal or oil. Why plant trees? Our blood knows, before the mind is instructed by the imagination.

These are the more or less unspeakable reasons for planting trees. No one need apologize for making it a project. It's like falling in love. A project in planting trees is the deliberate spread of this natural infection.

Shall we try to say more? What is a lover? He is incomplete. One loves because one lacks. Perfect wholes are self-sufficient, and the lover has longings. The fulfillment of longing is the work of the world. Explaining love is explaining the cosmos. One should not be wordy about it. The best communication of love is by act. So the lover of trees plants trees, talks about it, perhaps incoherently, but does the planting again and again; and so the infection spreads.

There are many such projects going today. You can read about them in *Rain* and *New Roots* and *Self-Reliance* and *Co-Evolution Quarterly*. Now is a time for projects born of love—a time of new beginnings. Since talk about love gets monotonous, if not something worse, the project leaders and inspirers speak of other things. The least if inevitable effect of love is survival of the species—held by biologists and others to be desirable—so they talk about that. They talk in terms of the present sudden recognition of the value of ancient virtues—naturalness and simplicity and related qualities. Underneath it is all the same—about how the cosmos works and how getting in tune with it serves the common good. This is the choral cultural intuition of the time and it doesn't need much explanation. When cultural intuitions get old and gray they're called prejudices and superstition, but in their youth they're truth.

How could good things like devotion to naturalness and the simple life become superstitions? Big books could be written about this, but one would have to understand what ancient peoples meant by such things as gods and fairies and magic, in contrast to what Sir James Frazer thought about them—or what his missionary informants said about them. Or you could compare what Tom Paine said to get us into the war for Independence with what Henry Kissinger said about getting our bombs into Cambodia. Both were for war, but there was some naturalness and simplicity in what Paine said.

So projects, being human enterprises, decay. It is well to understand this at the start. At their start, projects are attended by portents of death. Beginnings, after all, are made possible by endings. A man creates a project out of planting trees because the lumber companies and the real estate developers and the motorists (smog kills trees) and the people who need firewood are

doing away with them. Modern civilization, as anyone can see from the voluminous record, is against trees. The very processes of what, quite recently, nearly all of us (there were notable exceptions) admired as civilization have become the enemy of living things. This means that the world we live in—the civilized world—is filled with implicit and sometimes explicit rejections of projects which are on the side of life. Who, for example, can get anywhere by attacking "progress"?—yet the new scientists who study the processes of life, instead of implementing the declared requirements of civilization, are now calling what we mean by "progress" a modern superstition. So projects on the side of life have to get under way by locating openings and neutral areas in a culture which is honeycombed with modern superstitions. It is a conflict between the energies and appeal of a new cultural intuition and the now superstitious habits of an old one—one which has become the established credo of civilized life.

How do projects get old and gray? They do it by becoming institutions in the bad sense. Institutions are both good and bad. The good institutions are tools which remain responsive to good human intentions. The good institutions are self-regenerating, which means that they do not become havens for incompetent and timid people in flight from the tests of life. Or, as we sometimes put it, they resist corruption. Good institutions are not places to get away to but places for calculated and necessary encounter. They are social foci for human intelligence and we have to have them. Bad institutions turn meanings into formulas, words into slogans, and vision into mindless bureaucratic tyranny. A study of public institutions—their birth, vigor, decline and death—they usually have to be executed since few of them ever fade away—is a study of human nature as expressed in projects.

In addition to this quite "normal" destiny of development and decline, institutions have other built-in limitations. Because they employ persons with various notions of their jobs, they must adopt policies, which are interpretations of what is good to do and how to accomplish it. One measure of a good institution would be in its capacity to keep its policies up to date—that is, its ability to change or abandon a policy that no longer applies or has results that are harmful to man or nature. This gets down to the question of the integrity of those who run the institution. Do they insist on clarity of purpose or efficiency in practice? What if the practice no longer reflects the purpose? Do the administrators ask this question or do they avoid it? Sometimes administrators are bound by rules they are unable to change. Then, as Thoreau said, it is time to quit their jobs. Will they do so? Or, *can* they do so, if they have mortgages and large families?

Any project which needs organization to carry out its purposes is subject to these vicissitudes. The ideal of course is in the rule of behavior of a determined individual, well illustrated by Gandhi. The following was recently quoted from him in an article (MANAS, Jan. 16) on what he said about his policies. When asked about his "inconsistencies," he replied:

> At the time of writing, I never think of what I have said before. My aim is not to be consistent with my previous statements on a given question, but to be consistent with truth, as it may present itself at a given moment. The result has been that I have grown from truth to truth; I have saved my memory from undue strain; and what is more, whenever I have been obliged to compare my writing even of fifty years ago with the latest, I have discovered no inconsistency between the two.

Lucky man! Yet it was not luck, but the practice of wholeheartedness in day-to-day conviction. Gandhi had learned to make his thinking keep pace with life, and his life to conform to his thinking—no matter what. As a result he had problems of public relations: What he said yesterday was different from what he is saying today: How about that? This didn't worry him. He would try to get his friends or critics "to see if there is not an underlying and abiding consistency between the two seeming

inconsistencies." Gandhi was an example to all the world in this. He discovered how to put an end to cultural lag in himself. This put him out of key with lag, but, you could say, in key with truth.

But Gandhi's truth was precocious. For a long time, people in the West made fun of him. Winston Churchill declared in 1931:

> It is alarming and also nauseating to see Mr. Gandhi, a seditious Middle Temple lawyer, now posing as a *fakir* of a type well-known in the East, striding half-naked up the steps of the vice-regal palace, while he is still organizing and conducting a defiant campaign of civil disobedience, to parley on equal terms with the representative of the King-Emperor.

Why did the British parley with him? What will explain the fact that some sixteen years later they gave India her freedom more or less on the terms that Gandhi had demanded? There must have been something about the man's project that had opened the eyes of millions. He had an idea whose time had come. That is, the time for one of its applications in history had come.

That time, you could say, became a brief interlude. After India achieved independence the Gandhian movement shrank. The collaboration of history with his vision had stopped. The masses who had supported him thought their goal was achieved. This is the price one always pays for collaboration from history.

Gandhi, who knew what was happening and even expected it, believed that the extraordinary chance to spread his ideas—afforded by India's struggle for political freedom—was worth the price of a partial dissolution of his project afterward. There would be, he thought, a net gain. He would keep working, and so would some others. But an assassin took his life, leaving the others to work on alone. They are still working and some day history may give them another opportunity to surface. But meanwhile the project is reduced.

The best projects are conceived in this way—as mortal enterprises that may have to die in order to preserve their meaning. Projects are creatures of the tides in human affairs. A rising tide leads on to fortune, and to death. Projects, in short, are tools. You pick them up and you lay them down. You get the most out of them by recognizing their mortality, and at the same time learning how to keep them usefully alive for as long as you can. It takes hardheadedness to do both.

What sort of tides are now available as carriers of worthwhile projects? As we said, read *Self-Reliance, Rain, New Roots,* and the *Co-Evolution Quarterly.* Look up the back issues of *North Country Anvil,* get on John Holt's mailing list. Read the last chapter of Aldo Leopold's *A Sand County Almanac* for confirmation of the idea that to be worth while, a project must begin as a love affair.

But there are other tides and tendencies The project will have to begin in a world where there are Vietnams, Watergates, and Ayatollahs, and all the things that make the Ayatollahs of the world wrathful, and even mad. Then there are the oil companies and the multinationals and the nuclear power financiers and engineers. And so on. You can read the *Nation* and the *Progressive* about them. The project will have to get going in the interstices left by such monstrous enterprises. It will have to find nourishment in spite of all the energies drained into much larger and older projects moving in the opposite direction. But there are wheels within wheels. People who work for those big companies—some of them—are feeling uneasy. They begin to see the distance between what they are doing and the dream of a free life. They are reading books and magazines, listening to lectures, and noticing the oddball innovations undertaken by a handful of pioneers around the country. Now and then one of these people shakes himself loose and makes new alliances. This is indeed the way good projects get under way. The problem is to relate the invitation and opportunity of the project with the freedom that people still have, not with the forms of their confinement. This may prove very

difficult. Integrity in practice may be impossible, so that only the integrity of underlying purpose can survive. For example, in 1914 Gandhi, the man of nonviolence, recruited for an ambulance corps with the sanction of the British War Office. This was regarded as a military venture by his friends, and some of them cabled him from South Africa, asking *what* was he doing? He replied:

> All of you may want to know why I have undertaken even nursing of the wounded. Recently, I used to say, in South Africa, that, as satyagrahis we cannot help in this way either, for such help also amounted to supporting a war. One who would not help a slaughter-house should not help in cleaning the butcher's house either. But I found that, living in England, I was in a way participating in the War. London owes the food it gets in wartime to the protection of the Navy. Thus to take this food was also a wrong thing. There was only one right course left, which was to go away to live in some mountain or cave in England itself and subsist there on whatever food or shelter Nature might provide, without seeking assistance from any human being. I do not yet possess the spiritual strength necessary for this. It seemed to me a base thing, therefore, to accept food tainted by war without working for it. When thousands have come forward to lay down their lives only because they thought it their duty to do so, how could I sit still? A rifle this hand will never fire. And so there only remained nursing the wounded and I took it up. This is how I communed with myself.

Why choose Gandhi for an example? Why not some more ordinary fellow who nonetheless started a project and accomplished some good? Well, Gandhi is a *heroic* example, and this has the virtue of throwing into high relief the qualities and problems which all projects embody and confront. Gandhi's integrity, moreover, was joined with an intensely practical turn of mind. And how many worthy projects, it should be asked, have obtained both inspiration and nourishment from the ineffaceable mark Gandhi left on history? E. F. Schumacher became a participant in Gandhi's movement, and found that this outlook gave his own project a deep consistency and enrichment of historic meaning.

So with most if not all of the worthy projects undertaken these days. They participate in the great flow of change now going on. They select some current and ride it as a source of attractive power for doing one constructive thing. They give a perhaps luminous interpretation of the meaning of that current and flow, and people begin to see the point. The project grows. Together the people involved learn how to cope with the backwash of yesterday's now receding tides.

REVIEW
EXCELLENCE-TO-LIVE-WITH

THERE are works which, when they are discovered, displace all other intentions of the reviewer. One such book (which deserves this honorable title despite its few pages and pamphlet binding) is the catalog of an exhibition of ceramics by Tom Marsh—very nearly the most charming example of the printer's craft that we have seen in years. This latter virtue, of course, simply reflects the excellence of the contents—color reproductions of pots of such diverse beauty that the distinction between fine art and artisanship is abolished. If it is ever abolished for good our culture may have reached some kind of plateau in both achievement and appreciation.

The potter says in a foreword:

> While I am indeed honored by the invitation to exhibit and by the printing of this catalog, I would remind the viewer that a gallery and a book are unnatural environments for these pots. Their natural habitat is the hearth and hand. Hopefully, work from recent years speaks of the serenity of Gibson Hollow. Finally, however, if pots are strong and healthy they will stand on their own and speak of the love, the joy and the serenity of their making and of their maker.

Gibson Hollow, in Indiana, is where Tom Marsh lives, and the exhibition was at the University of Louisville, in Kentucky, where he teaches.

We quoted from the potter in order to agree with the idea that "a gallery and a book are unnatural environments for these pots," and then to disagree. Museums and galleries are contrived and second class frameworks for the experience of beauty. The place where beauty is generated or occurs is the scene of everyday life. That's where it ought to be seen and to collect examples of it elsewhere is "unnatural." This was André Malraux's view, expressed in *The Voices of Silence*. Among the Chinese, he said, "A painting was not exhibited, but unfurled before an art-lover in a fitting state of grace; its function was to deepen and enhance his communion with the universe." So also with the beauty of objects made to be used. Their state of grace is in their use, from which their loveliness should never be isolated.

But then, we have *reasons* for doing just that. Take for example the uses of history and biography. The best justification of this sort of reading was given by Arthur Morgan years ago. Most people, he pointed out, encounter only mediocrity throughout their whole lives. It will be natural for them to suppose that nothing better is available in experience or from their own activity. But then a book tells them that individuals like Leonardo, like Tom Paine, like Simone Weil, have lived and accomplished unforgettable things during a few short years of earthly existence. In biography these excellences have been carefully abstracted from the framework of their lives and "exhibited," however artfully. This service to the reader is not negligible, and who will call it unnatural?

Is it unnatural to "think"? Just thinking removes what we think about from the context of experience. Every generalization we make does something like that. So thinking courts deception. To think one thing is to ignore a host of other often related things which the thought leaves behind. But, we say, thinking is none the less worth doing because by thinking we give order to experience. Order stirs delight and leads to understanding. Of course, it may turn out to be the wrong order, and therefore some kind of seduction, but that's the chance we take in being human, in thinking. It is also the case that there is a kind of beauty which overcomes this hazard by the breadth of feeling it produces, which gives the experiencer of it an immunity to error—*if*, indeed, he does experience it, and not just amble by its presence.

What we are trying to get at is the importance of another kind of environment—one that is created in the mind—one for which we can pick and choose and give an ideal symmetry. The making of that environment is the art of life—self-

justifying and self-authenticating. So our human institutions and customs are attempts to give external representation to that self-made environment of the mind. Most of the time they are only poor approximations. This failure, you could say, is built into the structure of institutions, which does not prevent them from being useful foci of the common human enterprise so long as you know that eventually they are bound to fail. Imperfection is written into the nature of things—*things*, that is. And the mind has the power to leave that imperfection behind. So there are exhibitions worth going to, concerts worth listening to, and history and biography worth reading—but only if one knows that the imperfections are always there and what it takes to leave them behind.

Plato set the example for this. He denounced books and then wrote fifty-six of them. It is a distinction of the mind that it has the power to create a form of the transcendently natural within the framework of the unnatural. We have in us a nature which makes this possible—risky, but possible.

Writing about Tom Marsh's work, Wendell Berry quotes from Synge's account of a visit (1898-1902) to the Aran islands. The Irish dramatist said:

> Every article on these islands has an almost personal character, which gives this simple life, where all art is unknown something of the artistic beauty of medieval life. The curaghs and spinning wheels, the tiny wooden barrels that are still much used in the place of earthenware, the home-made cradles, churns, and baskets, are all full of individuality, and being made from materials that are common here, yet to some extent peculiar to the island, they seem to exist as a natural link between the people and the world that is about them.

Wasn't it completely natural for Synge to write this? The sight through his eyes both natural and unnatural?

He finds a transcendence hidden in the natural—for him displayed—and suggests another order of the natural, to which the spectator must himself contribute. In turn, Berry says, in order to warn:

> Visitors to an anthropological exhibit in a museum must, unavoidably, gain a similar impression of the individuality of workmanship, the fineness of quality, often the beauty of ordinary utensils and tools of peasants or primitive people. Or the same manner of thinking may be suggested by contact with some sort of folk art. But the condescension that is implicit, for us, in the terms "primitive," "peasant," and "folk" is both dangerously misleading and a measure of our alienation from such a possibility.
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> The knowledge so hard for us to realize and understand is that there have been times when there existed a workmanship at once ordinary and masterful. There have been times when the daily lives of ordinary people were touched everywhere by things excellently made. And so Synge could write of an Aran peasant's kitchen as "full of beauty and distinction."
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> One of the peculiar accomplishments of our own civilization is that it has made this idea of ordinary excellence seem paradoxical. We become aware of the need for a distinction which is unnatural and tragic; excellence-to-live-with as opposed to excellence-to-visit. American industrial society has been built upon the assumption that one lives with shoddy, goes (occasionally) to excellence. We generally feel that the beauty and distinction that Synge found in a peasant's kitchen can now be found only beyond the reach of ordinary life—in a museum or concert hall or library or, more pitiably and improbably, on TV.
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> Because he is, in such a time, a master potter, Tom Marsh's work is extraordinary. But I think his extraordinariness is not, in the usual sense, a part of his ambition. It is the result, simply, of devotion to his discipline and materials, not of the results of any heat in the Artistic Immortality Sweepstakes. By practicing a potentially usable art and by insisting on its usability, and the commonness and local peculiarity of its materials, he points it toward the older, finer, healthier sort of artistic success: that such excellent workmanship, such beauty and distinction, might again become ordinary.
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> These pots and cups and bowls are not busy calling attention to themselves as "art objects." Their preferred habitat is a kitchen, not a museum. They invite use. They are, indeed, beautiful. But theirs is a beauty associated with use, and to be used, not just

> viewed. Viewing, by itself, will misunderstand them—just as, by itself, it will misunderstand food.

It would be pleasant, now, to say: That's enough of thinking about the pots; turn the page and have a look at them. And there, in succeeding space, would be the pots—bowls, vases, plates, and pitchers—done in color by lithography, which seems by some magic to capture perfectly the patina, the restrained glow, the shapely wonder of objects made of clay and fired and glazed. But we can't say that. The narrow framework of an eight-page weekly won't permit it. We can't do here what *Fortune* magazine has done so well for many years. *Fortune* is prosperous, and papers like MANAS are not. We like to dream about the time to come when it will be possible to use the finest technology of the printer's craft to honor the beautiful for its own sake and not as an ingenious means of moving merchandise off someone's shelves.

But this may be a mere conceit. After all, some of our imperfect institutions—like the University of Louisville—are already doing this. Why not leave such celebrations to them?

A salutary text which may have bearing on these considerations is by Lao tse, who said:

> In ancient times those who knew how to practice Tao did not use it to enlighten the people, but rather to keep them ignorant. The difficulty of governing the people arises from their having too much knowledge.

Does he mean too much technology? An obscure moral for reviewers may be here.

COMMENTARY
WHERE "WITHERING" TAKES PLACE

PROPOSALS for including Gandhian ideas in India's national program of education led A. K. Saran, a teacher at Jodpur University, to ask: "Do we want to save and nourish the radical, deeply human, and in relation to the *status quo,* highly subversive spirit of Gandhian thinking?" Writing in *Gandhi Marg* for last October, Prof. Saran warns against the consequences of diluting and containing Gandhi for academic purposes. He says:

> This false support to Gandhian thinking is a most powerful force against it because it comes from the Establishment itself and the struggle against it is unusually difficult; for, it is embarrassing to fight against friends. This sort of false support constitutes, in fact, an almost irresistible internal temptation. Those who are concerned about nourishing and strengthening the Gandhian spirit in all its elemental force, have, therefore, to be ever vigilant to detect the danger of false support in its myriad forms, some subtle and others not so, but together constituting a formidable force.
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> One of the forms that this kind of promotional drive takes is the intellectual need many of us feel—sometimes explicit often disguised of making Gandhian thinking academically "respectable." This feeling is often expressed in the form of a demand made on Gandhian scholars to "modernise" Gandhian thought and make it "social-scientific." . . .
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> However, if we want to nourish and strengthen Gandhian thinking (and the Gandhian way) as a radical and living human force, if we want to foster its growth as a new elan the most sophisticated danger from which it has to be preserved is—the University. A sure, smooth, and "non-violent" way to kill the spirit of Gandhian thinking is to introduce it into university syllabi. If I am serious about Gandhian thinking, I would save it from the deadly hands of our universities: maybe there are some exceptions, but most of our universities are dead and deadly places—stricken areas from which all living things have to be kept at a safe distance. I would therefore strongly urge that all efforts of the Establishment to introduce Gandhian thinking into university teaching and research should be stoutly opposed. Once Gandhian thinking becomes part of university thinking and research, it is sure to wither away: the mighty, indomitable forces of co-option and suction will slowly and steadily maim and undermine the spirit, the meaning, and the potential elan of the Gandhian way.

This seems a way of saying that the place for strengthening Gandhian thinking is the village, where it is put to work, not the academy, where it is talked about.

CHILDREN
. . . and Ourselves
A RANGE OF CHALLENGES

P. D. DUNN, who teaches engineering at Reading University in England, was an early collaborator with the Intermediate Technology Development Group founded in London in 1965 by E. F. Schumacher, George McRobie, and Julia Porter. In his foreword to Prof. Dunn's *Appropriate Technology: Technology with a Human Face* (Schocken, 1979, $5.95) George McRobie says:

> One of the pioneers in the work of developing Appropriate Technologies, and helping others to do so, is the author of this book. Professor Dunn was one of the first distinguished scholars and academics to become an active supporter of the Intermediate Technology Development Group. As Chairman of the Group's Power Panel he has systematically built up a work programme on small-scale energy sources; and he has also assisted several universities in developing countries on the launching of their own research and development work on Appropriate Technologies based on renewable energy sources, and he has advised on the setting up of small industry. His work—and this book—demonstrate beyond all question that the discovery of low-cost, small-scale sustainable technologies offers a whole new range of challenges and opportunities to scientists and engineers—and especially to the new generation of technologists coming up in the developing countries.

This book is an over-all view of Appropriate Technology as conceived, advocated, and applied in the field by E. F. Schumacher and his associates. It is perhaps the best introduction one could have to this work since it is written for the general reader, giving the thinking which makes the work important, with numerous clarifying examples of intermediate or appropriate technology put into operation in various developing countries around the world. It becomes apparent that the role of education is paramount in spreading around both the information and spirit of resourcefulness on which the success of this humanitarian and cultural movement depends.

Schumacher was an economist by training, but his lifework involved going behind economic theory to investigation of the best way to meet actual human need. This becomes clear from a passage early in Prof. Dunn's book:

> Opinions differ on where the development effort should be placed within a country, some suggesting that the major effort should be the predominantly agricultural rural areas, others that the build up of industry should have highest priority. There is also disagreement over the manner in which development should occur. Economists such as Kaldor assert that capital intensive solutions should be adopted as the most effective way of raising G.N.P. and hence the general development level, whereas Schumacher believes in concentrating on the problem of increased employment by the creation of more low-cost work places, this latter view representing the Appropriate Technology Approach to development.
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> There does not seem to be any consensus of opinion on policies for development amongst the economists, some believing in the virtues of centralised planning and others in the capitalist system, and with further differences of opinion on actions within the two systems. That there should be these divergences of opinion is not surprising; the developing world is not a homogeneous mass, but contains great differences in state of development, political systems and social groupings. What is good for one country may not be right for another. Also it is difficult to separate the political from the economic questions, and in some of the writings the two are inextricably mixed.
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> There seems to be general agreement on the importance of the rural, predominantly agricultural, sector and some authors recommend the placing of more emphasis on job creation in these areas. Low capital investment is also identified as a major cause of slow development. How then does Appropriate Technology fit into the world of the development economists? Appropriate Technology is not an overall economic plan but, in the words of Dr. Schumacher, a mechanism "to go places, starting from where you are." It is particularly concerned with the dualism within developing countries, which is manifested by the small islands of technological development in the general sea of stagnation and accompanied by a drift of population from the rural to the urban areas, to join the already large numbers of unemployed. Appropriate Technology is a methodology of development which takes account of social benefits and costs in addition to purely economic factors, it offers a package of techniques and can be applied in all development situations. In particular, the emphasis on the creation of work

> places where the people now live provides a solution to what is probably the major development problem. The product of these newly employed people will help to build up the capital resources of the country, and hence promote further development.

As those who have read substantially in Schumacher know, he cared a great deal about the full development of human beings. He regarded the idea of economics as an independent scientific discipline as essentially ridiculous. It is an instrumental discipline which must take its assumptions and direction from moral and social insight. His "Buddhist Economics" makes this clear, as does, of course, the entirety of *Small Is Beautiful.* He had no interest in politics, being convinced that politics can never rise higher than the moral quality of the humans involved. He had no "theories" about what other people ought to do, but found himself able to help them when they explained what they needed. He went where he was invited to go, and focused the remarkable resources of the panels of ITDG on the economic problems besetting those who asked for help.

Schumacher showed what intelligent engineering could do, once actual needs were understood, but he was really teaching people self-reliance. The modern world is full of powerless people. By reason of Schumacher's help, some of them are now less powerless.

One of the first examples of the value of intermediate technology provided by Prof. Dunn is the development of rainwater catchment tanks for the backward areas of Botswana (formerly Bechuanaland, which includes the Kalahari Desert). Since rainfall is seasonal in Botswana, water storage is needed for all purposes—drinking, cooking, washing, irrigation and watering livestock. Tanks were developed with 10,000-gallon capacity at a material cost for plastic materials of twenty-five or thirty dollars.

> The design of the water tank was developed by I.T.D.G. who, having produced a prototype, were faced with the problem of disseminating information amongst the villages. The solution adopted is interesting and could be more widely used. A school in Botswana was hired for two weeks during the holiday period. Some forty teachers from outlying villages were invited to join a course for which no fee was charged. The course consisted of constructing a tank and an associated school kitchen garden. At the end of the course the teachers were given a pack of plastic material for making a new tank. It was hoped that on their return to their own school they would construct a school tank using the children as labour. In this way not only was there a local example of a tank for villagers to see but the know-how had also been transferred through the children. Some eleven tanks were actually constructed in primary schools and kitchen gardens of about 200 square yards irrigated throughout the dry season. These gardens produced sufficient green vegetables to provide ninety children with vegetables for two meals a week. In this example the development of a new material has been used to give a new solution, and a useful method of spreading the information has been identified.

The tanks are installed in excavations made waterproof by alternating layers of mud and thin plastic sheets (polythene), and finally lined with sausage-like tubes of the plastic (three inches in diameter) filled with sand and cement (requiring only a quarter of the cement used in concrete for block construction).

For conclusion we give a passage by Prof. Dunn on inventiveness:

> We are taught that there is a correct way to do things and are not encouraged to question established practice. . . . A bullock-drawn plough is infinitely superior to a tractor-drawn implement if the tractor does not work due to faulty maintenance or lack of spares. A hand pump is better than a wind-powered pump if the windmill has blown down owing to failure to replace the oil in the gearbox. The introduction of the tractor and the windmill in these circumstances would be serious design errors, showing a failure to appreciate the full requirements of the job.
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> The main impediment to invention is that of getting rid of the inhibitions which have built up during formal education and training, and the more advanced the training the more difficult this becomes. This is not an attack on professional training, it is obviously essential to have the discipline and knowledge of such courses in order to work properly at a professional level. It is instead a plea for us to be alive to new circumstances and to be sufficiently flexible to adapt to them. In particular we must resist the temptation to force conventional solutions onto unsuitable environments.

FRONTIERS

Science Reconsidered

IN an article in the new magazine, *Science 80*, Lynn White Jr., historian of science and medievalist, discusses the growing antipathy toward science in the present and recalls the rise and fall of scientific enterprise in past periods of history in other parts of the world. His article represents a now achieved stance of cultural maturity. A generation ago, science was *the* authority, which took the measure and established the merit of other human undertakings. Today there is critical objectivity toward the scientific enterprise, on the basis of independent humanist thinking which has philosophical, religious, and social grounds—a kind of intuitive consensus without exactly defined agreement. What will be the *popular* simplification of this stance is hard to say—the question is itself upsetting; meanwhile there is an evident vacuum in the cultural formations to which people used to turn for practical guidance. The changes we are undergoing are still in their initially critical phase, with the exception, noted by Lynn White, of the strongly affirmative quality of ecological science.

Prof. White's perspective is essentially critical. He points out that the science of one age becomes the superstition of the next, and that "scientists are particularly vulnerable to the sin of finding superstition in other people and only truth in themselves." The general public, he believes, is *sensing* this, though hardly understanding it. Some scientists believe that the public should have more education in science. Prof. White comments:

> I suspect that simply enlarging the amount, or improving the quality, of scientific information available to the large public is not going to do much to increase the support of American science. The problem is not public ignorance but public alienation. Moreover, the chief reason for this alienation is the reluctance of most professional scientists to be as objective about themselves, their values, their goals, and their intellectual methods as they claim to be about interpreting specific data. For a variety of reasons—a litany of grievances that is so commonplace it need not be repeated here—a significant part of the general public has become distrustful of those goals, values, and methods. If they are valid today, they need new validation and not simply reassertion. If they are superstitions, i.e., obsolete assumptions left over from the recent past of science, they need rejection or revision. And the discussion of all this must be public, else it will carry no conviction to the disenchanted laity who provide the ultimate support for science.

Exactly this sort of public discussion was begun by Michael Polanyi in his *Personal Knowledge* (1958), and carried further by A. H. Maslow in *The Psychology of Science* (1966). And now a number of others are taking part in this great critical discussion. Here, instead of citing such works, we introduce the criticism of science offered by Albert Einstein on the occasion of the birthday of Max Planck in 1918, as provided by Hyman Hartman in the December 1979 *Bulletin of the Atomic Scientists.* Einstein thought that science is best understood by considering the motives of scientists:

> In the temple of science are many mansions, and various indeed are they that dwell therein and the motives that have led them thither. Many take to science out of a joyful sense of superior intellectual power: science is their own special sport to which they look for vivid experience and satisfaction of ambition; many others are to be found in the temple who have offered the products of their brains on this altar for purely utilitarian purposes. Were an angel of the Lord to come and drive all the people belonging to these two categories out of the temple, the assemblage would be seriously depleted, but there would still be some men, of both present and past times left inside.
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> I am quite aware that we have just now light-heartedly expelled in imagination many excellent men who are largely, perhaps chiefly, responsible for the building of the temple of science; and in many cases our angel would find it a pretty ticklish job to decide. But of one thing I feel sure: if the types we have expelled were the only types there were, the temple would never have come to be, any more than a forest can grow which consists of nothing but creepers. For these people any sphere of activity will do, if it comes to a point, whether they become engineers, officers, tradesmen, or scientists depends

> on circumstances. Now let us have another look at those who have found favor with the angel. Most of them are somewhat odd, uncommunicative, solitary fellows, really less like each other, in spite of these characteristics, than the hosts of the rejected. What has brought them to the temple?

His answer to this question explains both the enormous respect, even reverence, which science once enjoyed, and also the extreme decline in the prestige of science during recent years. At issue is the quality of human beings. Einstein said:

> The state of mind which enables a man to do work of this kind is akin to that of the religious worshiper or lover; the daily effort comes from no deliberate intention or program, but straight from the heart.

In short, the apex of the cultural pyramid must have individuals of this sort, or civilization is bound to decay. The high discipline and authority achieved by science was a consequence of this ennobling quality, and a new kind of science must so declare if its practice is to acquire renewed respect.

Prof. Hartman concludes:

> I have seen a dramatic decay in pure science over the last ten years: the poetry and the philosophy are missing; the young are apathetic; budgets and profits have priority; the technical mediocrities spawned in the 1960s now dominate; and government funding is mission oriented. It is ironical that as we celebrate Einstein's birthday we are burying his legacy of play and passion.

Prof. White's final observation makes an encouraging contrast:

> The most hopeful fact about the current criticism of science is that so many of the most vocal critics are ecology buffs. Modern science has been produced chiefly by two instruments: mathematics and the laboratory. Mathematics plays a part in ecological research, but conclusions rest on an almost aesthetic perception of the counterpoint among a vast array of qualitatively different quantities of both organic and inorganic beings. Ever since Galileo rolled balls down inclined planes, laboratories have been turning out some splendid results. But, whereas the laboratory method's power lies precisely in its isolation of the phenomenon to be studied, ecological science is, on principle, anti-isolationist. It is the science of totalities. As such it is antiscientific, as science at present is usually conceived and practiced. That is why enthusiasm for ecological insight is the emotional center of our counter culture. . . . Ecological science is indeed an heretical science, but at least it is widely thought to be a science, even in conservative circles. Scientists might well consider the problems of their own cultural ecology and the possibility of modifying their thought patterns somewhat to help the long-run survival of their threatened species.