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A TIME FOR THINKING

FOR long centuries the destiny of human beings seemed to be in the hands of conquerors and explorers. In the West, the decline of the classical world took place according to the patterns left by Alexander and the colonizing exploits of the Romans. After the dark ages the awakening of the European mind was largely provoked by the stimulus of Islamic achievements in philosophy and scientific thinking, brought to Europe by the Moorish conquest of Spain in the eighth century. The Crusades opened channels to a similar influence, and then, a few centuries later, Columbus found the way to the new world. European explorers and adventurers—Spanish, English, and French—settled America, giving scope to the unfolding dreams of the Enlightenment, and English colonizers imposed their power and habits on peoples of the Far East in India and China.

Then, during the closing years of the eighteenth century, a change took place in the determination of the affairs of men. While the wars of soldiers and the enterprises of merchants continued to affect human destiny, the power of *thinking* made itself felt in the Declaration of Independence of the people of the United States. The Declaration is at root a philosophical document. Its contentions are based on explicit statements concerning the nature of man. For some two hundred years, the ideas of the Declaration and the stabilizing influence of the American Constitution supported an undercurrent of serious thinking in the United States. Other motives and concerns remained dominant, but independent thinking sent down roots, grew branches, and helped to create nuclei of culture which nourished and leavened the emerging civilization in which the exploring and conquering purposes continued to expand their energies.

Now, in the closing quarter of the twentieth century, another great change is taking place. The time has apparently come for thinking to take the lead in the shaping of human events. While thinking may seem about the last thing the leaders of this nation are prepared to do, since they obviously prefer the achievement and exercise of power, the fact is that power now produces fewer and fewer desirable results. When statesmen insist that the indispensable means to preserve the peace of the world is by maintaining a balance of terror, power is manifestly turning against itself and against those who rely on it. If to this practical failure we add the imminent exhaustion of the material sources of power, who can deny that thinking is no longer an optional undertaking?

If this is the case, then a new epoch of history is on the way—one that will combine serious efforts at fresh understanding with the pressure of inescapable necessity. The very circumstances of life are now on the side of thinking.

What is thinking—serious thinking? It is inquiry into meaning. Usually, the inquiry has two levels. One level—the higher—is authentically philosophical. Here one seeks self-knowledge, after the example of Arjuna (in the *Bhagavad-Gita*), and of Socrates among the ancient Greeks. The other level—more thickly populated—represents the kind of thinking that results from having pain and feeling fear. It moves on the assumption that we *must* think seriously to avoid greater pain. The strident cries and extremist claims so often heard today are an accompaniment of this sort of thinking. When the two kinds of thinking get together, great historical changes may take place.

We turn here to a good example of some balanced thinking for our time. The "philosophy" is low-key, as perhaps it should be for general

consumption, yet it is implicitly present. The book we have for attention is *Alternatives to Growth—I: A Search for Sustainable Futures* (Ballinger, 1977), edited by Dennis Meadows, who was a principal author of the well-known *Limits to Growth* sponsored by the Club of Rome a few years ago. Many of the contributors will be familiar to MANAS readers. They include Donella Meadows, John Todd, Amory Lovins, Jay Forrester, Edward Goldsmith, Hazel Henderson, Herman Daly, and various others.

Limits to Growth applied scientific measurement to the resources of the planet, then to the consumption habits of modern, industrial man, reaching the explicit conclusion that the resources won't last, are rapidly being exhausted, and that we can't go on living the way we do now. *Alternatives to Growth* considers what may be possible for the lives of human beings in the future. Fundamentally, the book endeavors to set the stage for a deliberate change in human ideals and goals. It repeats the prediction that if we don't change our ways nature will herself put a stop to them. It exposes conventional socio-economic assumptions and the foolish dream of endless material progress in two ways—first, by showing they don't work, and then by showing that the influence of these expectations and motives is degrading to our lives, both as social process and in psychological effects.

Alternatives to Growth should be valuable to both planners and inquiring individuals seeking general understanding of present problems. By nature it is a study written for Bellamy-type readers, but the general reader will easily locate avenues leading to practical conclusions. For example, one broad finding is that national governments seem deliberately laggard in recognizing the nature of the present emergency, and ineffectual in action in behalf of a long-term future. The good signs, in short, are nearly all to be recognized in grass-roots efforts and the enterprise of smaller social units such as towns, counties, and cities. The centers of action for change are not in Washington, D.C., but spread around the country. The contributor of a report on change in local communities, Earl Finkler, has this to say:

> Implicit in my analysis is the assumption that the federal government will not assume leadership in developing new programs to control growth and maldistribution of resources. The failure of past federal social equity programs almost parallels the complete failure of the federal government to take action on growth issues. The federal government and a majority of the states have not passed even elementary land-use legislation. Both these levels of government will probably remain fairly conservative and isolated from local experience. Their greatest contribution can lie in actions that facilitate local initiative.

It seems clear that the present movement toward change and a decentralized order has deep roots, having come to the surface long before the intellectual community discerned the urgent need it represented. The revolt of the young in the 60s—involving both inner and outer migrations—led to heroic enterprises on the land and in community living, making a considerable dent in the awareness of the older generation. The motive for this largely emotional protest combined angry rejection of the Vietnam war with comprehensive disgust for both the means and the morality of modern acquisitive society. One could say that the ground was broken for far-reaching change by this adolescent adventure, and that today the full logic behind the necessity for change is coming to the fore.

The central question *Alternatives to Growth* seeks to answer is:

> *How might a modern society be organized to provide a good life for its citizens without requiring ever-increasing population growth, energy resources use, and physical output?*

The book sets no utopian goals, exhibits no futurist blueprints. Its purpose is to propose forms of action that will be of immediate value, during "a societal transition from growth of population, materials use, and energy consumption to steady state." What is "steady

state"? This is an expression used by economists to describe a society adapted to limiting its habits and consumption to the resources at hand, without basing future development on continual increase in the amount of goods consumed. It guides its practical life by the long-term rules learned from nature instead of the theories of economists. This outlook calls for a fundamental redefinition of human progress. Mr. Meadows writes in his Introduction:

> It has been suggested that man's basic psychological processes require material growth and change. Of course, for most of man's existence on earth he has lived in steady-state societies. Today's dependence on material growth springs not from within the individual human psyche, but from the operations of current political and economic institutions. A sense of progress is probably essential to man's intrinsic wellbeing, but there are many dimensions of progress perfectly consistent with a material steady state. Indeed, it is these activities—music, art, learning, athletics, and spiritual development, for example—that most distinguish man from other species.
>
> Finally, attainment of a steady-state system would not imply a loss of variety. To be sustainable over long periods, any social system must be consistent with local environmental conditions and with the ethics, norms, and institutions of its members. The challenge is not to conceive of the steady-state society, but of many steady-state options. It is unlikely and undesirable that all societies would choose the same goals or the same timing to guide their transition policies. There is no fundamental reason why an individual, family, corporation, community, or region could not begin shifting to a steady-state existence while it remains interdependent in important ways with others that continue to pursue growth.

Not the least of the advantages of locally determined patterns of existence, willingly dependent on local resources—with the focus of human interest beyond economics—is the broadening field which develops for expression of the higher faculties. Such a life would bring human beings closer to nature, introducing them, once more, to timeless harmonies. There is increasing recognition, today, of the deprivations humans have imposed on themselves by adjusting their lives almost entirely to mechanical cycles and the imperatives of technological efficiency. As Dennis Meadows says:

> The progressive centralization of economic power, political influence, and scientific expertise is detrimental to the global system's long-term viability. These trends deprive the individual of more and more power over the vital functions required to ensure his own humane and secure existence. They also rob the total society of its innovative potential and resilience. Smaller communities should resume more control over local norms and services and should strive for greater self-reliance. Technological development should be directed toward the production of machines and procedures that are diverse and matched to the needs of small communities rather than international markets.

While, as suggested, this book seems mainly addressed to planners and decision-makers, there is an important sense in which it should be very widely read. This is made clear by Mr. Meadows:

> A sustainable state can only be attained by individual initiative and change. A large number of personal decisions, each influenced by shared, feasible images of the long-term future, though individually insignificant, can begin a process of change that will reinforce itself, gather momentum, and gradually produce a sustainable system that meets mankind's basic needs.

There may be those who will argue that simple rural life has in the past produced narrow-minded bigots who endured lives of wearing toil with little to look forward to. But there is a great difference between people who *choose* a more natural life and those who feel confined by it. The decentralized society of tomorrow will be a much richer society than the agricultural societies of the past, provided its members have chosen simplicity as a natural good, instead of being reduced to its circumstances.

Steady-state simplicity is not a life without subtlety and awareness. On the contrary, the acquisitive, growth-dependent society creates patterns which shut out awareness. As Robert Allen says in a discussion of lifestyles:

> If and when the increase of material wealth becomes more difficult, its quality is sacrificed seemingly without qualm so long as the quantity is maintained. Should quantity be threatened, then at once the range of moral concern is reduced; first other countries are excluded, then "different" communities within the nation are excluded, and finally all but families and crucial individuals are excluded.
>
> This unhappy process is occurring because technologism the driving force of the industrial way of life, is an unusually expensive way of satisfying human needs. Its propellant is consumerism, a form of economic addiction whereby luxuries are turned into essentials. . . . The growth and maintenance of an industrial economy demands that luxuries become essentials, but each transformation of a luxury into an essential requires the commitment of that much more energy, capital, and effort for essentially the same return (in terms of the satisfaction of human needs). . . . By virtue of the fact that luxuries become essentials and "needs" proliferate, all that is achieved by growth of GNP is the provision of progressively inferior compensations for progressively more serious deprivations.

Who could possibly think clearly if caught in this spiral of self-defeat? Only by hard thinking have those who write such books as *Alternatives to Growth* freed themselves from past habits and become able to describe the psychological and economic circumstances where general freedom may be a likely possibility. Present limitations on thinking are described by Mr. Allen:

> The large-scale, quasi-centralized societies of Europe and America have not yet developed satisfactory systems for justly and harmoniously determining their objectives, for which reason there remains a general absence of clearly stated and accepted goals. Normally, this would not matter, because most societies are, or used to be, sufficiently homogeneous for their goals to be understood. Now, however, especially in industrial countries, they are agglomerations of minorities, some ethnic, some religious, some class, some occupational. Often the majority is an artificial one, emerging only at elections, the product of an illusory consensus. Hence the dangerous uncertainty to which many Western nations are prey. They no longer consist of functioning communities but are rag-bags of competing interest groups . . . [impelling] themselves along the line of least resistance and there is a new concept in political mobility: headlong drift.

From this account of what remains of the sources for determining the "national will," we can see plainly enough that there is no longer any national will worth talking about. Nations, as entities, have never "thought" well, and under the present circumstances it is doubtful if they can think at all. Decisions, in other words, must come from individuals who are able to generate informed community opinion—producing a local determination that will eventually create its own freedom to act.

A theme of E. F. Schumacher's was that the good society is a society which gives scope to the moral impulses and longings of human beings. This can only be a society evolved with moral purposes in view. The small society, using modest means, Schumacher contended, has opportunity to make the moral qualities of the citizens felt. In the mass society, moral qualities become almost impotent. John Todd, in his discussion of the work and objectives of the New Alchemists, develops a similar theme. He argues that the influence of past science has been in many ways demoralizing because it had no roots in moral ideas. The New Alchemists are developing another kind of science to provide the technology appropriate to a changed society:

> A science of steady states seems ever more needed to prepare us for the future. This new science, having been created within a framework of ethical and moral considerations, will be different from modern science. A widespread interest in building a future in which the majority of people are participants rather than spectators is emerging. If so, the work of New Alchemy and others like us may come to be considered central to the questions and problems of our time.

The project of the New Alchemists, including a solar-heated greenhouse and fish farm—the basis for the food of a family, using wind and sun power—"belies the stereotype that decentralized, small-scale technologies must be unsophisticated, inefficient, or laborious to operate." The program

at the New Alchemy headquarters, Woods Hole, Mass., is intended to show a way to solve what promise to be the basic problems of the future. Mr. Todd says:

> We decided to emphasize participatory solutions capable of involving large segments of society. When the petroleum era wanes, the traditional condition in which the great majority of humanity is engaged in food raising, is likely to reassert itself. Only with the oil- and gas-based agriculture of the twentieth century has it been possible for a majority to shift to urban living. Since at some future date much of the population will probably have to return to cultivating most of their own foods, we decided to research family-level methods of food culture which would be ecologically benign and relatively inexpensive. Small-scale farming could require only part-time tending and be suitable for siting in such small spaces as suburban backyards. Further, the food-raising ecosystems would have to be designed so they could be tended by people without special training.

All the contributors to *Alternatives to Growth* have valuable things to say; we have quoted those whose observations indicate the new fields for thinking which will come into being if we begin to adopt some of the alternatives here suggested. Even at our present distance from the ideal, it is possible to recognize the outlines of a human community in which education for practical life will also be education for working with nature. Human beings have not had an environment of this sort for a long time.

REVIEW
AN INDISPUTABLE CONCLUSION

IF we had our way, copies of *Food First* (Houghton Mifflin, 1977, $10.95) by Frances Moore Lappé and Joseph Collins would be in all the school and university libraries in the country, and become the basis for a substantial course in human geography in all the high schools. In short, this is a book everyone should read. First, it dispels a great many superficially plausible misconceptions about world food supply. Second, it illustrates what John Todd of the New Alchemists has called for as a new kind of science—a science which is rooted in moral thinking and obligation. By reason of the shocking disclosures which result from the research of the authors, some ardor for change may be produced in all serious readers. The book itself is ardent, yet never seems unbalanced in its contentions. All the crucial or definitive statements are backed by documentation in scientific literature—the applied *sci*ence of agricultural and sociological research. The book brings to the surface the truth about world food supply, gathering the facts and conclusions of dozens of researchers whose voices, until now, have been only dimly heard.

A key statement in the first chapter tells the story of why this book came to be written and gives a clear idea of the contents. The authors say:

> Why *Food First?* We [the authors] met each other on the first national Food Day in the spring of 1975 at Ann Arbor, Michigan. Frances had been invited as the author of *Diet for a Small Planet* and Joe, because of his work on *Global Reach*, a book on the impact of multinational corporations in underdeveloped countries, and his coauthorship of *World Hunger: Causes and Remedies*, a work countering the official United Nations world food assessment for the 1974 World Food Conference. Following our talks, the students asked us the same urgent questions we each had been asked many times before, and we tried to answer them. Yes, we did have some answers. But we were not satisfied. So afterward we talked and talked. Finally, we concluded that together we would throw all our energy into a search for answers to all the toughest questions that we ourselves had ever asked or that we had ever been asked by others about the causes of hunger. We would then put those answers together in a way we could share with other Americans.
>
> As you read this book you will find that our title *Food First* takes on more than one meaning. In the first place it means that obviously food *must* come first. Until all the people of this earth are able to eat adequately, all other problems pale into insignificance. More concretely it means that no country can afford to think of its food resources as a *means* toward some other end—such as income from exports—until its people have fed themselves. This applies to the United States as much as it does to any other country in the world. Nor can anyone afford to look to a few countries as suppliers of food for the world. Every country can and must mobilize its own food resources to meet its own needs. Only then can trade serve to expand choices rather than to deprive people of their rightful resources.

The heart of the book is described in the following paragraphs:

> As we studied, read, traveled, and interviewed people we found that the media-repeated themes of scarcity, guilt, and fear are all based on myths. In fact, we had to learn that:
>
> - There is no such thing today as absolute scarcity. *Every country in the world has the capacity to feed itself.*
> - The malnourished abroad are *not* hungry because of the individual greed of the average American.
> - The hungry are *not* our enemies.
>
> Hunger, in fact, is not the problem at all. Hunger is the symptom of a disease, and we are its victims in much the same way as are the nomads in Mali or peasants in India.
>
> Moreover, we came to see that no society setting out to put Food First can tolerate the concentration of wealth and power that characterizes most nations today. The heaviest constraint on food production and distribution turns out to be the inequality generated by our type of economic system—the system now being exported to the underdeveloped countries as the supposed answer to their food problems. We are *not* saying merely that the solution to hunger lies in better distribution—getting food to

> the hungry instead of the well-fed. We are saying something else: that food distribution only reflects the more fundamental issue of who controls and who participates in the production process.

It is a terrible irony that the qualities of American civilization, of which we have been so proud—efficiency, bigness, production—have in recent years turned into instruments of destruction in their effect on the lives of unnumbered people in other parts of the world, and on the lives of some of the people at home. The facts recited in *Food First* make this result of American enterprise unmistakably clear. Other modern nations, of course, are also involved, but they are using methods learned from us. In agriculture, the drive for bigness and efficiency and profit has so effectively displaced the old idea of raising food for people to eat, there has been little understanding of the warnings we have heard. We have not known about the havoc being wrought by industrial techniques, methods, and motives. Carey McWilliams' book, *Factories in the Field*, gave warning to Americans, years ago, and the misdeeds there described have now reached worldwide proportions. We have space for only one representative illustration, but it should prove to the hilt the central point of *Food First:*

> How do those who blame drought and an encroaching desert for famine in the Sahel explain the vast amounts of agricultural goods sent out of the region, even during the worst years of drought? Ships in the Dakar port bringing in "relief" food departed with stores of peanuts, cotton, vegetables, and meat. Of the hundreds of millions of dollars worth of agricultural goods the Sahel exported during the drought, over 60 per cent went to consumers in Europe and North America and the rest to the elites of other African countries, principally in the Ivory Coast and Nigeria. Marketing control—and profits—are still by and large in the hands of foreign, primarily French, corporations.
>
> During the drought many exports from the Sahel actually increased, some attaining record levels. Cattle exports from the Sahel during 1971, the first year of full drought, totaled over 200 million pounds, up 41 per cent compared to 1968. The annual export of chilled or frozen beef tripled compared with a typical year before the drought. In addition, 56 million pounds of fish and 32 million pounds of vegetables were exported from the famine-stricken Sahel in 1971 alone.
>
> Mali was one of the countries most affected by the drought and a principal recipient of emergency shipments of food. During the early 1970s production of food crops for local consumption dropped sharply. Corn production, for example, fell by more than one third between 1969 and 1971, and millet, the basic staple needed to take up the slack, showed no increases. During the same period, Mali's export crops reached new highs. During the year 1971-1972, cottonseed production hit 68,000 metric tons, more than a 400 per cent increase over the six years previous with a normal rainfall. Peanut production totaled more than 150,000 tons, an increase of nearly 70 per cent over a four-year period. More than one third of Mali's cropped area was planted with peanuts. Rice production, also largely for export, reached a record high in 1972 of 174,000 tons.

In the days before industrial and cash crop agriculture, numerous small Sahelian farmers grew food for Sahelians to eat. They understood the conditions of their arid country and knew that droughts would come and must be provided for. They maintained small granaries where they stored enough millet to carry them through even years of drought. But when these farmers were displaced by agribusiness, the policy was changed. What agribusiness grew was for export, to get the high prices for specialty crops, and there was no point in storing goods that would not ever be used for food by the Sahelians. So, when drought comes, followed by famine, Sahelians now starve. Western observers, not knowing this history, or not caring about it, declare that the Sahel is "over-populated." It has too many people for the carrying capacity of the land. Of course. The land is being exhausted to produce for the prosperous buyers of Europe and America. The original peasant farmers used to practice crop rotation to conserve their soil, but now the soil is being mined:

> Continual cultivation rapidly depletes the soil, necessitating still further expansion of export cropping at the expense of food crops and pasture land. Chemical fertilizers that once raised yields of

> some export crops, making the expansion of cultivation less pressing, are now so costly that the peasants in the end are obliged to bring still more land under cash cropping.

The method is not new—colonial exploiters have practiced it for centuries. It began with the great plantations of rich colonists who, with the cooperation of the colonial governments, reduced the people of the invaded country to a source of cheap labor by driving them off their own land.

> Colonial administrations thus devised a variety of tactics, all to undercut self-provisioning agriculture and thus to make rural populations dependent upon plantation wages. Government services and even the most minimal infrastructure (access to water, roads, seeds, credit, pest and disease control information, and so on) were systematically denied. Plantations usurped most of the good land, either making much of the rural population landless or pushing them into marginal soils. (Yet the plantations have often held much of their land idle simply to prevent the peasants from using it—even to this day. Del Monte owns 57,000 acres of Guatemala but plants only 9,000. The rest lies idle except for a few thousand head of grazing cattle.)

To travel around the world with these writers becomes an endurance contest in shock and perhaps shame—we didn't know about these things, or knew of them only vaguely. The conclusion reached by Frances Lappé and Joseph Collins—that the people could feed themselves if permitted to do so—seems indisputable.

COMMENTARY
"WHAT WE CAN DO"

THE chief critical contention of Frances Lappé and Joseph Collins in *Food First is* that the people who do not have enough food to eat have no access to the means of growing it. In their last chapter they say:

> The real obstacle in the way of people feeding themselves is that the majority of citizens in every market economy are increasingly cut off from control over productive sources. Thus the real lessons for us are these:
>
> First: We cannot solve the problem of world hunger for other people. They must do that for themselves. We can, however, work to remove the obstacles that make it increasingly difficult for people everywhere to take control of food production and feed themselves.
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> Second: We should focus on removing these obstacles that are being reinforced today by forces originating in our country, often in our name and with our tax money.
>
> Third: We must support people everywhere already resisting forced food dependency and now building new self-reliant societies in which the majority of people directly control food-producing resources. Direct financial assistance is important as is communicating their very existence to Americans still believing that "people are too oppressed ever to change."
>
> Fourth: Working for self-reliance, both on a personal and national level, benefits everyone. Making America less dependent on importing its food and less dependent on pushing our food on others will be a step toward making America "safe for the world." Local self-reliance will make it more difficult for elites, both in the industrial countries and the underdeveloped countries, to manipulate prices, wages, and people for their own profit. Self-reliance for America means wholesome food available to *all*, supplied by a healthy domestic agriculture of widely dispersed control.
>
> The forms that our energies will take in acting on these four lessons will of course be the outgrowth of our labors together in the coming years.

Practical suggestions follow.

One suggestion is for reform at home:

> Get behind a network to link directly farmers to consumers in your area. . . . Work for regional food self-reliance policies within the United States that will carry with it a message for all Americans: We do not have to import food from hungry countries or waste our fossil fuel transporting food thousands of miles. Energy use for food transportation *tripled* in the last thirty years.

CHILDREN
. . . and Ourselves
NUMBERS ARE LIKE MAPS

PAWING through the stack of material set aside for possible use here, we came across two articles which, while they seemed of some importance, we didn't know what to do with. One is an article in the (May 21, 1977) *Nation* by Gregor Pinney, "Counterrevolution in Math," describing the country-wide reaction against teaching the New Math in the schools; the other, in *Technology Review* for last May, is by Robert Cowen, who writes about another argument: Should children be allowed to use hand-operated calculators? Will this interfere with learning how to think in terms of numbers, since the computer does all the work?

To be candid, we don't know enough about math to have a firm opinion on these subjects, must less to attempt to settle such arguments. One has hunches, of course, such as the feeling that the New Math may be mysteriously better than the old way of learning arithmetic—more *philosophical*, perhaps—but it may also seem some kind of learned fraud for most of us who don't know how to use it. The idea of using simple computers to do school arithmetic also excites old-fashioned suspicion. If a child should lose his calculator, he might be helpless, and education ought to establish self-reliance first. The admirers of hand calculators all seem to be mathematical experts, and like all good craftsmen they have a fondness for exceptionally useful tools. What's good for them may not be good for children.

So we asked for help, and got a letter from John Holt which dealt properly with the question of the New Math by ignoring it. He said:

> In the first place, the kids *never* learn the basics. I would bet almost everything I own that there is not a town or city in the country in which more than a third of any randomly selected group of people, in any age group whatever, could do 4th grade arithmetic on a surprise test, and less than that could do 5th grade. In my lifetime I have met literally dozens of adults, otherwise competent and even extremely successful, who could not even add and subtract.
>
> On the other hand, as a Nobel prize-winning physicist, I think Richard Feynmann, once pointed out, the New Math was mostly hokum from the beginning—just old-fashioned Arithmetic dressed up in fancy names.
>
> In short, we were doing one set of unnecessary and stupid things in school, got a little tired of that, began doing a rather different but equally unnecessary set of stupid things for a while, and then, having grown tired of that, went back to the first. Frankly, the argument between the old math and the New Math is not one I can get excited about either way. On the whole, I stick pretty closely to what I said about numbers in *What Do I Do Monday"*?—that in the big world we *use* numbers to measure and compare things, and that if we introduce children from the very beginning to these ways of measuring things and thinking about what we measure, the problem of "skills" would take care of itself.

Well, if you take John Holt as a guide, it isn't really necessary to settle arguments about the New Math and hand-held computers. The idea is to help people become competent enough in using numbers so that they can answer their own questions about such matters. For this, if you go to *What Do I Do Monday?* you develop a healthy respect for a certain kind of thinking—thinking about how people, children and adults, learn. John Holt seems to have learned this art of thinking by studying himself and how *he* learned, and trying out the lessons of his own experience on others. There probably isn't any other way of really helping a child who is backward in arithmetic and getting behind in school. Knowing how to do something fairly well helps a child to feel confident in himself and eliminates the need for all those devious defenses against trying at which children are so skillful and which fond parents find so frustrating. So, *What Do I Do Monday?* is not a book to read once and put away, but to go back to again and again.

In it there is this basic introduction to teaching children arithmetic, concerned with the idea that numbers are "abstract":

Of course numbers are abstract, but like any and all other abstractions, they are an abstraction of something. Men invented them to help them memorize, record, certain properties of reality—number of animals, boundaries of an annually flooded field, observations of stars, moon, tides, etc. These numbers did not get their properties from men's imaginations, but from the things they were designed to represent. A map of the United States is an abstraction, but it looks the way it does, not because the map maker thought it would be pretty that way, but because of the way the United States looks. Of course, the map maker can and must make certain choices, just as did the inventor of numbers. He can decide that what he wants to show on his map are contours, or climate, or temperature, or rainfall, or roads, or air routes, or the historical growth of the country. Having decided that, he can decide to color, say, the Louisiana Purchase blue, or red or yellow—whatever looks nice to him. But once he has decided what he wants to map, and how he will represent it, by colors, or lines, or shading, or whatever, reality then dictates what his map will look like. So with numbers. The time may come when it is useful to consider numbers and the science of working with them without any reference to what they stand for, just as it might be useful to study the general science of mapping without mapping any one place in particular. But it is *illogical, confusing and absurd* to start there with young children. The only way they can become familiar with the ideas of maps, symbol systems, abstractions of reality, is to move from known realities to the maps or symbols of them. Indeed, we all work this way. I know how contour maps are made—in that sense I understand them; but I cannot do what my brother-in-law, who among other things plans and lays out ski areas, can do. He can look at a contour map and instantly, in his mind's eye, feel the look and shape of the area. The reason he can do this while I can't is that he has walked over dozens of mountains and later looked at and studied and worked on the contour maps of areas where he was walking. No amount of explanations will enable any of us to turn an unfamiliar symbol system into the reality it stands for. We must go the other way first.

What Do I Do Monday? is filled with illustrations of how to go the other way first with children. Interestingly, a beginning lesson in arithmetic by Grace Muente (described in the *Christian Science Monitor* for last Nov. 21) seems a good illustration of starting out:

I use 12-by-18-inch unlined news sheet. First I ask each child to draw a picture of himself on one side of the sheet. I say:

"That picture is like you. And that is one. Make the numeral one (1) on the back of your picture."

I ask each child to line up holding his picture. First I count all the pictures. As I count, I touch shoulders. Then I ask a child to count all the pictures. Then I ask a boy to count all the boys' pictures. Then I ask a girl to count all the girls' pictures. Then we add them. I ask:

"How many more boys than girls?" Later before recess I "match" boys to girls to show what matching means. Next I ask all the girls to sit down. "How many boys are left?" We count to be sure.

The second day, I pass out 12-by-18-inch newsprint. I tell the class, "Fold your paper in half, or fold your paper up—matching corners." I explain:

"You have two boxes. Write the numeral one (1) in the first box, and the numeral two (2) in the second box.

"Turn your paper over and make a set of two. Two things that are the same. One in each box." I encourage everyone to make a different set.

After everyone is finished (everyone is not finished at the same time) I take one child's paper to the front of the room and ask him, "How many in your set?" (It might be trees.)

The child answers, "Two."

"What do you want to do with the two trees?"

"I can give one tree to Susan."

"Then how many trees will be left?" I fold one tree under the box boundary. The child can see that he would have one tree left.

"And one tree for you," or "one tree and one tree make how many trees?"

"Two."

I follow this method for about half the class, using their individual sets. The class begins to get the idea that they are subtracting.

And so on.

FRONTIERS

David and Goliath

THERE are two main tendencies in American life today, one of them big, powerful, and doomed to failure, and the other small, brave, and on the side of life. The Goliath of this comparison is industrial agriculture, nowhere as "progressive" as in California, the major food-producing state of the country. From the review draft of *Urban Development Strategy for California* (issued last year by the State of California Office of Planning and Research) we take this account of what is happening to California land where food is grown:

> The California Department of Water Resources estimates that 865,800 acres of prime and potentially prime agricultural land in areas near incorporated cities will be developed for non-agricultural uses by 1985. California loses an average of 15,000 to 22,000 acres of highly productive agricultural land to urban uses each year. During the rapid growth years of the 1950s, the rate of loss was even higher.
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> It is true that between 1960 and 1972 additional land was brought into production through irrigation at a rate which produced a net increase of agricultural acreage of 56,000 acres per year. But land suitable for agriculture is a finite resource; this trend cannot continue indefinitely.
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> Agriculture in California tends to be more capital- and energy-intensive than elsewhere. The remarkably high productivity of California agriculture is achieved at a high dollar and resource cost. It is dependent on soil conditioners, fertilizers and water that is often pumped from distant places. All these ingredients are becoming increasingly more expensive.
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> Development of new cropland occurs first in optional locations and then moves progressively to less desirable sites. If we continue to use the most desirable farmland for urban uses, we will escalate the increases in the relative cost of new agricultural development. The continuing cycle of agricultural land conversion and new agricultural development will be too costly for the farmer, for the consumer and for the environment.

Meanwhile, what is happening on the California farmlands which are now in such fruitful production? The same thing that has happened throughout American industry over the years—the replacement of labor with machines. An article in the *Progressive* for last December tells about the new electronic sorter which is able to tell the difference between a green and a ripe tomato. A farmworker who for years gained his major income from sorting tomatoes said: "We have worked hard for these growers all our lives. When they brought tractors to pull plows, they cut the horses' necks and ate horsemeat. That might be a kinder end than the future they are preparing for us."

Where are these mechanistic methods developed? Mainly in the universities. The *Progressive* writer, Paul Barnett, says:

> In the heart of the Sacramento Valley tomato-processing district is the nation's largest center for agricultural research, the Davis campus of the University of California. University scientists say their $50 million annual research budget pays for a cornucopia of technology that benefits consumer, farmer and farmworker alike. The mechanization of the tomato harvest is cited as one of their greatest accomplishments.
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> "Mechanization is one of the chief research missions of the University of California," Information Officer Ray Coppock reported to the California legislature in 1966. There are now twenty-two mechanization projects in progress at Davis, while an additional seven projects are under way at the University's Riverside campus.
>
> Public funds pay 93 per cent of the $1.8 million annual cost of these projects, which are aimed at eliminating most of the 176,000 harvest-time jobs in California. . . . William Friedland, a rural sociologist at the Santa Cruz campus, calls the University's approach "social sleepwalking." He wants to study the effects of a new lettuce harvester. The University administration, however, feels that no study of the impact of mechanization is needed, and so will not fund Friedland's work.

Tomatoes are harvested mechanically in California. Because the machines bruised the fruit, a Davis professor developed a tough-skinned breed of rubbery, less juicy tomato called "more square than round." The tomato harvesting equipment costs $85,000, which requires triple the

usual tomato acreage to absorb this cost, but mechanical harvesting has been so successful that four concerns now control more than 80 per cent of the California tomato industry, their economic advantage having forced 85 per cent of the state's cannery tomato farmers out of business. This is "logical." The harvesting machines work well only on large tracts of land.

Although the machines cut production costs for the big tomato farmers, the retail price of canned tomatoes has gone up more than 100 per cent since the harvesters have been in use. Barnett says:

> Consumers were not only stuck with high prices and a tough tomato, but as taxpayers they paid for the research that made it all possible. . . . Mechanizing the tomato harvest eliminated 32,000 picking jobs in California, and thousands of cannery and farm jobs in Ohio, Indiana, and New Jersey. Tens of thousands more California farmworkers have been displaced in the mechanization of the prune, nut, sugar beet, and wine grape harvests.
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> Increased social welfare payments, the migration of jobless farmworkers to the ghettos and barrios of American cities, and the decline of small farms and rural communities must be included in the "hidden costs" of mechanization.

These are the processes that are doomed to come to an end—how soon, no one knows.

Other processes, happily, are beginning to surface in various parts of the country. One hears more about vacant urban lots being used for truck gardening. In fashionable Brentwood, a young man has leased two-and-a-half acres of such land where he raises enough vegetables to supply from fifty to a hundred families who pay $20 a month for the privilege of harvesting from his garden what they need. He grows spinach, tomatoes, green beans, beets, cauliflower, carrots and corn. Spinach, especially, grows well, with a crop every forty-five days. (*Los Angeles Times,* Dec. 21, 1977.)

This is more than an oddity of the Los Angeles region. In Berkeley (Calif.) Bill and Helen Olkowski operate the "Integral Urban House," the urban center of the Farallones Institute, where they teach backyard gardening to city-dwellers. In a report in the *Berkeley Co-op News,* Heidi Seney says:

> It is on Saturday afternoons that the urban dweller, torn between his love of city lights and his awareness that time is running out for the world's resources, can have an exhilarating tour of Integral Urban House. One emerges at the end of the tour convinced that all one has been shown can be duplicated in one's own backyard. The Olkowskis and a flock of dedicated young graduate students graciously guide scores of visitors through their backyard, crammed with flourishing vegetables, herbs and alfalfa (for rabbit feed); past their compost mulching systems and their hutches of rabbits and chickens; around the tarp-bottomed pond that in summer abounds with crayfish which are harvested and eaten, soft shell and all for dinner, alongside their two beehives, which gave 70 pounds of honey last year, and by their compact greenhouse.

There are a few other show places of similar origin and intent around the country, operated mostly by people who have determined to become educators of Americans who long to live in a natural and sensible way. As yet this "movement" is still a very immature David in contrast to the Goliath of agribusiness, but it is turning people's minds in the direction of self-reliant food production and health. The pioneers are doing this voluntarily and eagerly. More and more will follow them, as the need becomes evident and the times compel.