

LEARNING FROM NATURE

WELL, where should we begin? The only correct beginning, our certified instructors tell us, is with definition of terms. If we are to learn from Nature, what first of all, is it? A proper student might pause here, and after reading (in *Studies in Words*) the fifty pages by C. S. Lewis on what men have declared Nature to be, refuse with becoming modesty to say anything more. But since we *have* to answer the question, we could begin with one definition that has had untold consequences—the idea that atoms alone fill the universal void, and that everything we see is made up of their concourse in varying combinations, all pursuing motions in patterns that we attempt to describe.

Scholars claim that the Greek Atomists were philosophers, not scientists—even though Tyndall listed six principles found in Democritus that lay, he said, at the foundation of nineteenth-century physics—so, to avoid pointless controversy we skip to Galileo, who was advocate, exemplar, and dramatist of learning from Nature; and who, with some assistance from Bacon and Descartes, established practically beyond dispute that the way to learn from Nature is by observation, experiment, and calculation. *How* do we learn from Nature, according to Galileo? He gave an explicit answer. The Book of Nature—the universe around us—is a mathematical treatise, and we have no hope of reading it unless we first learn "the language and grasp the symbols in which it is written." Galileo left no doubt about the necessity of this approach. As E. A. Burtt says in *The Metaphysical Foundations of Modern Physical Science*:

As with Kepler, so with Galileo, this mathematical explanation of nature must be in *exact* terms; it is no vague Pythagorean mysticism that the founder of dynamics has in mind. We might have gathered as much from his obvious achievements, but he tells us so explicitly: "Neither doth this suffice

[knowledge that falling bodies descend with accelerating velocity], but it is requisite to know according to what proportion such acceleration is made; a problem that I believe was never hitherto understood by any philosopher or mathematician, although philosophers, and particularly the peripatetics, have writ great and entire volumes touching motion."

Well, we did it. We learned the language. Who could for long dispute a man of so much common sense as Galileo? We learned the mathematical language of nature and compiled an enormous catalog of the motions we found ways to measure. Other remarkable men took up the work, and in a mere three hundred years or so we (or rather, the experts in the language and dynamics of nature) discovered how to make nuclear weapons and split atoms into quarks (which no one has ever seen and doubtless never will). This is of course simplification and probably unjust, since from Galileo to Hiroshima the scientific mastery of nature has resulted in hundreds and thousands of enormously useful inventions that have been put to the service of human beings, easing their burdens, amplifying their pleasures, and increasing their wealth. The point, however, of speaking here in one breath of both our appalling weapons and such mysteries as "quarks" is that the most distinguished scientists are now declaring that the time has come to learn about nature in some other way.

Needed, therefore, is a new definition of Nature, and perhaps more than one. For definitions will set the mode of the learning we want to do.

Here, then, is an amateur try: Nature is for us a bewildering mixture of clarity and ambiguity. Letting go the question of whether we ourselves, by restricting study to our ingenious abstractions, create the clarity, and neglecting to decide

whether the ambiguity originates in nature or in human heads, what might this definition do for us?

For one thing, it might explain a long series of extravagant mistakes we have made in the reading of Nature's book. Understanding the ground of these mistakes may be the most important thing for us to do, right now, for the obvious reason that we can't afford more serious blunders.

What are some of the recent mistakes—or possible mistakes? Well, consider the conclusions drawn from the doctrine or theory of evolution. Man, we have declared on what seemed firm Darwinian grounds, is basically rough, tough, and acquisitive. A fierce and naked ape caged in our genes is programming the human future. A foreign policy which overlooks this heritage of innate hostility ignores the indisputable facts of life. Nature, however you may feel about it, is ruthless, savage, and unforgiving.

But then come those engaging books about the habits, customs, and inoffensive ways of the great apes who, it seems, have been much maligned by the arguments of the Social Darwinists. We dust off Kropotkin's *Mutual Aid*, learn from Farley Mowat that wolves are of benefit to man and caribou, and recall that Darwin wrote to Wallace his full agreement that the *human* races would survive by reason of their *moral* qualities. Then, much more lately—a year or two ago—Edward Wilson published his *Sociobiology*, proposing the existence of "altruistic genes" which seem at least randomly supplied in certain species of animals.

Yet altruism, Prof. Wilson announced discouragingly, may now be recognized as an important survival mechanism. Q.E.D.—biology is all. Commenting, a philosopher—Henryk Skolimowski—says:

Wilson undermines his thesis and his examples by attempting to find "a more conventional biological explanation" for this [altruistic] behavior, that is, the explanation which avoids any use of transcendence. But evolution is a process of transcendence. One does not even begin to understand what "altruistic

behavior" might mean, if one is confined to conventional biological explanation. What may appear as idealism in human terms (altruism) is stark realism in evolution's terms. Evolution without cooperation of its component parts would be null and void. . . . All those theories of aggression which revel in the apparently destructive nature of man and which are purportedly based on evolution, seem to be quite oblivious of the work evolution has done through its altruism. It is not asserted here that aggression is not part of our heritage, but only that altruism has prevailed and will prevail because it is in the nature of evolution. We could not live one single day, even in the meanest societies, without altruistic behavior occurring all the time.

But every time some daring investigator even *hints* at the possibility of something higher in either animals or man than biological mechanisms, another staunch Darwinist enters the lists. From a review by Robert Kirsch in the *Los Angeles Times* (Jan. 14) we learn that Oxford University Press has just put into print *The Selfish Gene* by Richard Dawkins. Mr. Kirsch reports:

Dawkins is an orthodox Darwinian whose contribution is that evolution, natural selection and the behavior cited as altruistic all are explicable in terms of gene selfishness. "I think 'nature red in tooth and claw' sums up our modern understanding of natural selection admirably."

He claims that all creatures, including man, "are survival machines—robot vehicles blindly programmed to preserve selfish molecules known as genes."

Lest you cringe at still another sermon on evolutionary determinism, Dawkins is quick to say that he is not "advocating a morality based on evolution. I am saying how things have evolved. I am not saying how we human beings ought to behave."

Driven by the force of his own arguments, Dawkins finds himself throwing out the gene as "the sole basis of our ideas on evolution. . . . The gene will enter my thesis as analogy, nothing more."

Mr. Kirsch concludes his review:

Finally, Dawkins concedes the possibility that "yet another unique quality of man is a capacity for genuine, disinterested, true altruism." He goes on: "We have the power to defy the selfish genes of our

birth and, if necessary, the selfish 'memes' [cultural tendencies] of our indoctrination. . . . We are built as gene machines and cultured as meme machines, but we have the power to turn against our creators. We, alone on earth, can rebel against the tyranny of the selfish replicators."

The relevance of bringing in this material is shown in the first paragraph of Kirsch's review, in which he says:

One of the fascinating things about ethology, the study of animal behavior, is that it serves as a projective test for man. It is a field filled with metaphors: The altruist will find countless examples of seeming self-sacrifice and cooperation; the realist, examples of nature red in tooth and claw, of the survival of the fittest. Sometimes the same examples will be used by proponents of opposing theories. It is all in the interpretation.

Taking Mr. Dawkins and Mr. Kirsch at their word, this seems a fine example of Nature seen as a mix of clarity and ambiguity. The clarity lies in the clear and distinct conceptual abstractions produced by professional readers of the book of nature, who limit their conclusions in accord with scientific conventions. The ambiguity is evident in the diversity of the readings.

Is man a part of nature? Well, yes. If so, then there must be content about him in Nature's Book. But can we read it? What language is it in? More mathematics? That would stop us right here, since only mathematicians can read and write in mathematics, but in any event the nature of man is too important a subject to be left to experts in a morally neutral discipline. And why, if we need to know about man, do the scientists report on apes? Fortunately, there is another way of studying man that we resort to all the time. We read history.

What is history? We could say that history is past politics, but this doesn't tell us much. More accurately, perhaps, history is the story of what human beings have done as a result of what they think they have learned from nature. Human life is a practical affair of coping—getting the food, shelter, and clothing we need—but it is also an attempt to live according to a *theory* of coping.

Technocracy is a theory of coping. Social Darwinism is a theory of coping. Democracy is a theory of coping. So is Communism.

On the one hand there is Nature, with all its processes and mysteries, and on the other are the readings we have made of the natural world; and these readings, which change from time to time, make the foundation patterns of history. A reading which seems a fresh and wonderful disclosure—Galileo's is a splendid example—may be so comprehensive as to create an entire epoch. Such an age begins with an impressive demonstration of the power of the reading to produce *results*. Study the motions of matter, Galileo said, and you'll get results. His results seemed to prove all he claimed, and others who followed his instructions, amplifying them as they went along, got more results, so that a vast enthusiasm for physical results swept over the Western world. The means of getting them became the new religion. An elaborate web of techniques for producing and predicting results came finally to shape the common life of Western man, and eventually the life of nearly all mankind. Nature receded from view as a field of experience. The man-made system of technique had taken its place.

During this cycle of what we have called "progress," none of nature's ambiguities were permitted to appear. For reasons that seemed evident and justifiable at the time, they were completely shut out of the scientific reading of nature. After Newton everyone began to read the Book of Nature as a text about a great machine, and the one thing you can't have in a manual on how a machine operates is any mysterious ambiguity. A metaphor instead of a formula would be a monkey wrench in the works, sand in the gears, a ghost in the machine.

Well, we know what happened. To put it briefly: the machine dehumanized its champions, enslaved its tenders, monopolized the energies of life and ate up the resources of nature. The trouble with a machine is that it doesn't know

when to stop. It has no sense of proportion, and humans began to copy machines. The critical literature of the past twenty years is filled with searching analyses of what the worship of technology has done to human beings. And as we know, a great revulsion set in. It began with the young. But now the cry for change is heard from all quarters: We must go back to Nature, we must start all over again. The abstractions of scientists and the systems of technologists have become a mindless, blinding ideology, the credo, not of Prometheus but Faust.

Today, in the place of recognized ambiguities, we have the intrusion of frightful anomalies. "Years may be devoted," as Erich Kahler remarked, "to saving the life of a single child, while, in the field of war technology, rationality juggles the lives of millions of human beings as mere proportional figures." Our knowledge has departed so far from common sense that "it simultaneously serves the most contradictory ends, among them purposes which human reason must regard as monstrous."

Drawing up a bill of particulars takes no effort at all. Pick up a good current magazine say,—the *Progressive* for February—and you find a writer, Harold Freeman, asking:

Why does industrial capitalism not interest itself in public goods and services? Cannot large profit be made in such areas as noise control, recycling, community theaters, libraries parks and swimming pools, public medicine and hospitals vocational training, slum clearance and public housing, garbage and rubbish disposal, adult schools, day care centers, unpolluted air, rural electrification, improvement of ground and surface water?

The answer is no. For several good reasons, capitalists have little enthusiasm for substantial investment in public goods and services. Many public goods are durable; once demand for them is satisfied, need may dry up. Compared to military goods, civilian goods in the public area provide minimal opportunity for profitable cost overruns; the cost of constructing a community swimming pool is readily estimable by many. Exotic production technique over which little surveillance by the buyer is possible is the exception rather than the rule in the

public area. Waste, poor quality, and deception are often visible to many. . . .

It is a wise capitalist principle—within the plant and outside it—not to encourage public goods and services, or open discussion or common protest. Significant cultural, intellectual, or even socio-economic development has no attractiveness to a system which values people for two, and only two, functions—to work in its plants and offices to produce goods, and to leave its plants and offices to consume them.

This is a broad comment on the economic arrangements and theory of a society which has accepted and built upon the unambiguous, "thing" reading of the natural world. What other sort of world *could* such a system create?

Mr. Freeman has a further example of the anomalies of this system of behavior and belief:

In 1973, advertising expenditures in America came to \$26 billion. To produce one commercial promoting a gasoline differing in no important way from any other gasoline, Texaco rented the Rose Bowl and hired a 200-member marching band, a fifty-girl drill team, the UCLA cheer leaders, a dozen professional actors, and a child with a sparkler.

To those who hand-seal appeals to the public for sums from \$1 to \$5 to save Indian school children with rickets, the Texaco appeal to the public may seem strange. But it is not strange: There is money in gasoline; there is no money in Indian school children.

Should all this be blamed on Galileo? Not really. Galileo was something of a hero in his time; but we might have given closer attention to another, greater hero who lived a few years earlier—Giordano Bruno, whose interpretation of the Copernican hypothesis, if widely adopted, would have led to very different cultural results.

Meanwhile, it is no wonder that people are wanting to go back to nature. During these early years of the new enthusiasm—which can do nothing but grow stronger—it seems a good idea to remind ourselves that the ambiguity is still there. As our instructor, nature has never been, and will never be, more than a collection of magnificent analogues. Nature has secrets to reveal, but they are not distinctively *our* secrets.

While nature's secrets may be part of our secrets, the keys lie somewhere else. Our own secrets are in some kind of code.

Yet there is unquestionable value in going back to nature, since experiencing once again the rhythms and necessities of natural processes at first hand requires simplicity of understanding and a self-reliant life. People who live this way may have a better chance at the discovery of human secrets. Going back to simple ways of coping—learning Schumacher's meaning of intermediate technology to make our coping both frugal and less frenzied—should have another effect: a life of interdependent relationships may teach us how to hammer our disordered and rebellious psyches into decent shape. Prolonged encounter with nature teaches discipline and self-restraint. See Thoreau.

What does this mean? Well, when you live according to some set of abstractions—doctrinal or technological—a great body of theory elaborates on how people *ought* to behave. Often these mandates are neither natural nor good. The *Great Didactic* of Comenius is one example of the vast presumption which may be in such theory: Comenius was the initial inventor of mass production techniques in education. John B. Watson's claim that he could make a child into whatever sort of person he chose is another example. The books of John Holt and Ivan Illich provide enough further illustrations of presumption to put us all in a rage.

The habits of young people who grow up close to nature, in families having "just enough," are not shaped by conventions and theory half so much as by the seasons, the sun and the rain. What may happen when, instead, people rear their children according to learned theory, eager to apply scientific knowledge to the young? Trigant Burrow gave an answer in general terms:

Anxious young mothers are running about looking for texts which will serve them as guides in the love of their children. They are diligently searching for the latest approved theory of maternal

love. And in response to the demand the popular literature is supplying them with full details. But there are no librettos of the nursery. Baedekers to motherhood are not to be had. The motherhood that is true is a subjective relationship, and it is only subjectively that it can be felt and understood.

A lesson which parents have yet to learn is that the child is closer to the heart of things than the grown-up—that the consciousness of childhood stands in a far more truthful relationship to the actuality of life, as it is, than the consciousness of the conventionalized and sophisticated adult.

The simple life may reveal no secrets, but it at least removes: the barriers of convention and the barriers of convention and sophistication standing in the way of spontaneous discovery. It does not hide with artificial filters and isolating barriers the ambiguities of nature and life. And meanwhile the everyday necessities of coping directly with nature create a natural discipline which brooks no argument, relaxes from no complaint. Nature is not in the least "permissive" when it comes to the demands of the order she presents. Here, for parents and educators, is a model which, while it cannot be copied, is available for use.

REVIEW

THE PATHS OF REASON

BENEDICT SPINOZA was a liberating force for the mind of the Western world. He broke the mold of orthodoxy for many of his contemporaries, and he is still an inspiration to those who read him. Yet to be sure of what Spinoza actually means in certain important respects seems difficult, and indeed, trained thinkers have reached opposite conclusions about them. What, for example, did Spinoza believe about human freedom, and did he say what he believed, or only imply it?

A case can be made for claiming that Spinoza left no room for moral decision in his philosophy. But a counter case can be made on the ground that Spinoza held that virtue and goodness are, so to speak, concomitants of the life of the free individual, the one who completely fulfils his possibilities.

What then shall we say about Spinoza? We can at least say this: He gave the world a magnificent example of the use of reason. But did he reach the *truth*? Perhaps, or perhaps not. But it must be admitted that he deserves the close attention of those who seriously look for truth.

We have been reading in *Studies in Spinoza*, a collection of critical and interpretive essays edited by Paul Kashap, and published by the University of California Press (1972, \$12.00), finding them both demanding and intensely interesting. The difficult part is not only in the contrasting opinions of what Spinoza meant, but also in the sweeping effect of his judgments.

According to Stuart Hampshire's essay, on the question of freedom, Spinoza nearly abolished the "moral ought." Interpreting, Mr. Hampshire says:

Of the ideally free man one can say that he will necessarily have certain virtues—for instance the virtues of liberality and benevolence. In this sense there is indeed a standard or norm of conduct: that we can specify the dispositions that are inseparable from

freedom of mind, and therefore we can specify the essential public and private virtues. Spinoza clearly explains in the Preface to Part IV of the *Ethics*: although the words "good" and "bad" indicate nothing positive in the things to which they are applied, we do indeed need to retain them in use, because (I quote) "we want to form for ourselves an idea of man upon which we may look as a model of human nature." This is part of the technique of self-improvement, a preparation for the life of reason. And he explains again in Part V that reflection on maxims of virtue and wise conduct is a useful starting-point for the life of reason. But it is, strictly speaking, a misstatement, a philosophical error of the kind that occurs only in speaking to the unenlightened, to represent the virtues of the free, rational man as duties imposed upon us, or as appropriate matter for unconditional moral imperatives. . . . Most of the duties recognized in conventional morality are in fact irrational foreshadowings of behaviour that would be the natural and unconstrained behaviour of a free man. . . . Spinoza says that the attitude of the severe moralist which issues in denunciations of the vices and vanities of man, and of the common condition of human life, is always the mark of a diseased mind. Pathos and virtue are opposed to each other, because, for Spinoza, virtue is energy—in a rather more precise sense than Blake intended.

Here Spinoza sounds practically Nietzschean, as though "morality" were for children only, yet there may be a clue in what he says to certain paradoxes we all come across in experience. For a really great and good man, the virtues—or what we identify as virtues, not knowing how else to speak of them—are quite plainly not "acquisitions." Nor are the resources of genius "skills" that have been laboriously learned. Genius is something above all that, beyond imitation or even definition. The definable qualities of excellence, we could say, are results, not goals to be achieved. Spinoza is saying that the pursuit of the virtues, as desirable "possessions," is futile. He is saying that you have to achieve something else of which what men call virtue is an incidental flowering.

Whatever this implies for ethics, it is certainly a psychological truth. The image of goodness is not the good. The capacity of the great writer is

not what his admirers and imitators think it is. What he writes is an off-print of his being, not something he "learned" how to do.

Concerning Spinoza, then, we must say that he is a philosopher who writes from the heights. If you write on the plain, or in some slough of despond, you peer about and look upward, then make your definitions about the heights according to what you think you see from down below. But if you write at a high elevation, there will be no longing in what you say. You will use no hungering language. The definitions shaped by longing are always flawed with misconceptions; they are devices of the deprived—incompletion and illusion. Spinoza has some patience with this lowly predicament, but not much. He did not make himself at home in kindergartens of the mind.

Why study Spinoza? Because from trying to understand him one gains some grasp of both the capacities and the limitations of the mind, and of both the creative and the delusive power of abstract ideas. At the beginning of his essay, Stuart Hampshire says:

When the study of Spinoza is reviewed historically, one sees that each commentator, unconsciously faithful to his own age and to his own philosophical culture, has seized upon some one element in Spinoza's thought; he then proceeds to develop the whole of the philosophy from this single centre. Spinoza as the critic of Cartesianism: Spinoza as the free-thinker and destroyer of Judaeo-Christian theology: Spinoza as the pure deductive metaphysician: Spinoza as the near-mystic, who imagines a level of intuitive understanding beyond discursive reason: lastly, Spinoza as the scientific determinist, who anticipates the more crude materialists, and the more crude secular moralists of the nineteenth century: as the precursor of George Henry Lewes. All these masks have been fitted on him and each of them does to some extent fit. But they remain masks, and not the living face. They do not show the moving tensions and unresolved conflicts in Spinoza's *Ethics*.

Don't all who write have "unresolved conflicts"? They do indeed, but Spinoza's conflicts are worth getting at. One great difficulty

is made manifest by contrasting statements in Ralph Demos' essay with the thesis of Stuart Hampshire's paper. Mr. Demos says:

The more divine we become, the more we remove ourselves from ethical conceptions. Spinoza asserts that the statement in the third chapter of Genesis is correct: the fall of man came about through the knowledge of good and evil. . . . Spinoza's relentless logic carries him to certain curious, even tragic paradoxes. His self-confessed aim in launching into philosophy is to discover man's highest good, the ideal of life, yet the result of his philosophy is to teach him that the conception of an ideal, of values, is a confused and inadequate idea. So strong is the moral motive in him that to his great metaphysical opus he gives the name "Ethics"; yet the conclusion of his book on Ethics is that, logically speaking, there is no ethical standpoint. However, Spinoza does not maintain that we human beings, situated as we are in time and circumstance, should abandon the moral attitude of aspiration after ideals. . . . We are human, all too human, therefore provincial in outlook; consequently, we are obliged to govern our lives by conceptions which are confused; we set up ideals, we conceive of a possible pattern of life which we pursue. Not only do we do so, but we are constrained to do so; limitation is in our nature, and we cannot help expressing our nature and therefore proceeding according to the inadequate ideas of the moral sense. . . . On the one hand, we have the sublimities: the ideas of necessity, eternity, universal law, infinite substance, but the world of ethics is a lowly, somewhat vulgar world; the world of action is time and space and matter.

Prof. Demos is of course finding fault with Spinoza, but we ought to give Spinoza his due: Is his account of our behavior so very far off base? No doubt Spinoza has left important matters out, but he refuses to suggest any ground for hoping that we shall have an easy time, and he is certainly right in this. Meanwhile, there are those great peaks of insight in his philosophy.

Stuart Hampshire finds that freedom is not merely implied as the goal in human life: freedom, for Spinoza, is the measure of the good:

Spinoza provides a criterion by which the approach in perfection of an individual *qua* individual is to be judged: the criterion is the degree to which the individual is active and self-determining.

Anything that is identifiable as a particular thing can be judged by this single criterion, irrespective of the kind to which it is allotted within conventional classifications. One may review the scale of the increasing activity and self-determination of particular things, and therefore of their increasing individuality, from physical objects of various orders of complexity, to living organisms, to human beings. Human beings, at the top of the scale, can be completely self-determining when their activity is continuous thought, with each idea following its predecessor in the intellectual sense of "follow" as well as the temporal sense. At such moments—and the moments cannot be indefinitely prolonged—men rise above their normal human condition as finite modes.

There is a clear connection between Spinoza and Plato in these ideas. For Plato, the ideal being or soul is self-moving, while the least developed is moved by outside forces. In Spinoza, the man ruled by the fully realized activity of mind fulfills his true nature and is thereby free. The knowledge of this higher aspect of reason—the *Nous*—is clear and certain because it is subject to no contingencies. Empirical knowledge, being concerned with the world of "becoming," involves infinite detail, is always in flux, and is therefore always incomplete or imperfect.

Human thought, obviously, is a mix of the two kinds of knowledge—the noetic and the empirical—and the task of the individual is to distinguish for himself what sort of knowledge he possesses, relies upon, and is living by. One who applies himself to this task will eventually learn to make himself free. There are no options that could change the goal of this fulfillment, which is the nature and necessity of our being, according to Spinoza. Our freedom exists through the human capacity to pursue this destiny consciously and deliberately.

COMMENTARY SPINOZA'S PRINCIPLE

THE value of studying Spinoza (see Review) becomes evident in the work of those who *use* his ideas to illuminate the course of human action. In what may be his most philosophical paper, "Fusions of Facts and Values" (in *Farther Reaches of Human Nature*), A. H. Maslow proposes that the "facts" of life are not morally neutral, but have implicit instruction in the way things ought to be and what one ought to do. As he puts it:

Because healthier, more perceptive people are less ought-blind—because they can let themselves perceive what the facts wish, what they call for, what they demand or beg for—because they can therefore permit themselves to be Taoistically guided by the facts—they will therefore have less trouble with all value decisions that rest in the nature of reality, or that are part of the nature of reality. . . .

"Pure" value-free description is, among other things, simply *sloppy* description. . . . One finds what is right for oneself by listening carefully and Taoistically to one's inner voices, by listening in order to let oneself be molded, guided, directed. The good psychotherapist helps his patient in the same way—by helping the patient hear his drowned-out inner voices, the weak commands of his own nature on the Spinozistic principle that true freedom consists of accepting and loving the inevitable, the nature of reality.

This also is modern phrasing of the old Socratic doctrine that no man with full knowledge could ever do evil. While we cannot go that far since we now know of sources of evil behavior other than ignorance, still we can agree with Socrates that ignorance of the facts is a major source of evil behavior. This is the same as saying that the facts themselves carry, within their own nature, suggestions about what *ought* to be done with them.

Maslow is saying that an actual grasp of the nature of things makes right or harmonious action the natural thing to do. Spinoza's free human being is Maslow's self-actualizing human being, and Socrates' man of philosophical understanding. Good decisions are for him part of the natural flow of his life—no big "moral struggle."

Spinoza's point is that the truly free man simply *knows* what to do. As various philosophers have said, Freedom is knowledge of necessity, and the ideal of what we call morality is the spontaneous behavior of the individual who has this knowledge and accepts and loves "the inevitable."

CHILDREN ... and Ourselves LOOKING

WHEN Louis Agassiz, at forty already a well-known naturalist, came to the United States (in 1847) to teach zoology and geology at Harvard, he was not impressed by its some four hundred students or by the professors who, as Charles Francis Adams said, "drudged along in a dreary humdrum way." Himself a great teacher, Agassiz found Harvard no more than "a respectable high school where they teach the dregs of education." He proceeded to break all the rules. He wouldn't wear black and he went about the Yard with a cigar in his mouth. He required no entrance exam for his courses and prepared no syllabus. He picked his students on the basis of what he personally thought of them, and then began teaching them as no one, in those days, taught at Harvard.

In an account of Agassiz's life and work in *Audubon* for January, David McCullough relates that if the student was ready to go to work, Agassiz gave him a dead fish "to look at." He could handle it, but not cut it up. Agassiz then left, perhaps not to return that day. One of these students, Samuel Scudder, who later became a famous entomologist, described his impressions of the "look at the fish" ordeal:

In ten minutes I had seen all that could be seen in that fish. . . . Half an hour passed—an hour—another hour the fish began to look loathsome. I turned it over and around; looked it in the face—ghastly; from behind, beneath, above, sideways, at three-quarters view—just as ghastly. I was in despair.

I might not use a magnifying glass; instruments of all kinds were interdicted. My two hands, my two eyes, and the fish: it seemed a most limited field. I pushed my finger down its throat to feel how sharp the teeth were. I began to count the scales in different rows, until I was convinced that that was nonsense. At last a happy thought struck me—I would draw the fish, and now with surprise I began to discover new features in the creature.

Agassiz finally came back and listened to the young man's report. "Look some more," he said, and departed. So Scudder looked some more, and when Agassiz again appeared was able to tell him that the fish was symmetrical and had paired organs. This seemed to please the professor, but the looking went on for three days. Years after Scudder said that the "Look, look, look" rule was the best lesson he ever had. Looking was the foundation of Agassiz's teaching. Mr. McCullough writes:

The way to all learning, "the backbone of education," was to know something well. "A smattering of everything is worth little," he [Agassiz] would insist in the heavy French accent that he was never to lose. "Facts are stupid things, until brought into conjunction with some general law." It was a great and common fallacy to suppose that an encyclopedic mind is desirable. The mind was made strong not through much learning but by "the thorough possession of something." (Look at your fish, in other words.)

Most important, one must become capable of hard, continuous work without the support of the teacher. A year or two of natural history, studied as he understood it, would be the best kind of training for any serious career.

A list of the individuals who learned from Agassiz would be a fine start in compiling a who's who of eminent nineteenth-century scientists. David McCullough has this paragraph on men who studied with him:

Nathaniel Southgate Shaler became a popular professor of geology at Harvard (an inspiration to Theodore Roosevelt, among many others). Samuel Scudder became the country's outstanding authority and most prolific writer on butterflies. Theodore Lyman was an accomplished zoologist who became a congressman. There was William James, the philosopher; Albert Bickmore, who decided to found his own museum—the American Museum of Natural History in New York. Frederick Putnam became a Harvard professor of American anthropology and was instrumental in the growth of most of the country's anthropological museums. Alpheus Hyatt, who is said to have learned Agassiz's *Essay on Classification* by heart, became a professor of zoology and paleontology at M.I.T. and was one of the founders of the famous marine biological laboratory at Woods

Hole, Massachusetts. Alpheus S. Packard, one of Agassiz's student-assistants and later a teacher at Penikese, wrote *Guide to the Study of Insects*, the first major American textbook of entomology. Edward Sylvester Morse, one of those students Harvard would never have taken under normal circumstances, introduced modern methods of classification to Japan, became a sparkling lecturer, writer, museum director, and with Putnam, Hyatt, and Packard founded the *American Naturalist*.

Agassiz's son, Alexander, became a leading zoologist, and his widow, Elizabeth Cary Agassiz, was a founder and the first president of Radcliffe College.

Agassiz generated contagion for learning. His lectures were virtually chalk-talks, since he could draw skillfully as well as speak, but Shaler said that most of what he learned from Agassiz was acquired informally:

He would often work with me for hours unrolling fossils all the while keeping up a running commentary which would range this way and that, of men, of places, of Aristotle, of Oken. . . . He was a perfect narrator, and on any peg of fact would quickly hang a fascinating discourse.

How did Agassiz teach? By knowing and delighting in what he knew, and bubbling over with it. Apparently, his opposition to Darwin didn't affect the ranges of his influence; it only clouded his reputation during the last years of his life—a reputation Mr. McCullough has helped to restore.

Another teacher, Danilo Dolci, found from experience that *looking* is the only way to begin to understand human problems. In 1960 Dolci, who has been called the Italian Gandhi, organized a conference around the problems of a Sicilian city of about 20,000 population—Palma di Montechiaro. A preliminary study gave this profile of the place:

It told the conference that conditions had not materially altered since 1639, when the first census was taken; that 60 per cent of the houses were without water and 86 per cent without lavatories; that from 167 children examined three-quarters had tapeworms; . . . that in the heart of the town 3,404 people shared

their rooms with 5,085 animals. . . . that illiteracy was 64 per cent; only one house, of 600 seen, was free of rats and mice; of 100 women taken at random little more than half their total births (827 pregnancies) had survived; there had been a hospital—in 1666.

To an audience made up of reporters, regional deputies, "and half the Italian and cultural world," Dolci talked about his work. As recounted by James McNeish in *Fire Under the Ashes* (a life of Dolci):

He spoke about waste, his perennial theme, and explained what he was trying to do at Partinico and other centers. For Palma he proposed nothing. He merely stated. Afterwards people came up and asked what he intended *doing* about Palma. He replied, "Go back and look at this place." The evasion infuriated many people, and prodded by a situation which she felt to be a direct incitement to violence, Miss Nott [a journalist] was moved to say, in her frank, hearty way: "What would you do if you landed yourself in a revolutionary situation where nonviolence was impractical?" Dolci said he didn't understand. Daphne Phelps, whose Italian was fluent, repeated the question. He said he still didn't understand. Miss Nott demurred. Finally, Dolci said, "Go and look at this place yourself." "I now see," she writes, "that Dolci could not have answered me in any other way. To have given an answer one way or the other about the future, as it might be determined by his opponents, would be doing a kind of violence to that present which he is trying to initiate. Though to outsiders Dolci can appear somewhat mysterious, I believe myself that this is only because he is so obvious, so naively honest, and so consistent." . . .

Dolci has always believed that if you solve people's economic problems for them you don't solve all their problems; and that it is just as important that fifty men should get together and lay their own drain as it is that they should enjoy the benefits of sewerage.

He hoped the Sicilians would do something about Palma themselves. This they are now doing—after some delay, naturally.

Dolci is teaching something much more difficult to convey than natural history. Unnatural history, you might say, is his subject. But the lesson begins in the same way—with looking.

FRONTIERS

Bridging Information

AN underlying theme of E. F. Schumacher's campaign for appropriate technology is that when human beings begin to adopt appropriate ends for their lives, they will soon find ways to do what is appropriate at all levels, the practical as well as the ideal. Showing intelligent remedies for difficulties at the practical level is his way of getting people to do the thinking necessary for the transition to appropriate ends.

The institutional blocks to doing practical things in appropriate ways are really the bad habits of civilization. People concerned with change find that the application of ideals to existing circumstances turns out to be very difficult. The wrong way of doing things is a going concern, so that extraordinary ingenuity is called for to get anything good started. Well, whatever else they may be, Americans are *ingenious*, and a fairly large number of them are now discovering inventive ways—*intermediate* ways—of applying their ideals. And to spur these efforts a number of what could be called *intermediate* forms of communication are developing. We are thinking of papers like *Rain*, *North Country Anvil*, *Self-Reliance*, and *Acorn*, to name a few. They are concerned, you could say, with inspiring, fostering, and supporting new and less rigid institutions—institutions intermediate between what is and what might be.

For example, *North Country Anvil* (Box 37, Millville, Minn. 55957) for December-January (1976-77) has a story on a Skill Pool (something like Ivan Illich's Learning Networks) that has developed on the Monterey Peninsula in California. The inspiration:

The idea was to build a new economic structure: a gift economy. In the words of [a former coordinator] of the Pool: "[It is] a way for people to meet their daily needs without supporting those elements of modern society which they are morally or politically opposed to: Taxes from your paycheck to the military, prisons, and government; your groceries

pay for agribusiness and [the] Teamsters; your rent supports private property, etc." The pool would free people from the daily need to earn money. More time could be given to building a better world through helping each other, or pursuing artistic or personal interests.

Dreams from the start included setting up a junk business to re-use the disposal of society, free schooling in household and auto repair, a land trust, a communal garden.

After enthusiasm brought an initial membership of fifty members, some problems emerged, mainly too heavy burdens on those with carpentering, plumbing, and auto-repairing skills, with not enough help from new or younger members. But the group survived from the determination of the founders, Joan and Roger Lorenz of Monterey, and it is today an active body with between 120 and 130 members offering sixty-four skills and services. There are still problems, but "it's an idea, an alternative, and in a sporadic, spluttering way, it's working." Among the services available are auto and bike repair, carpentry, woodworking, welding, electrician skills, architecture, accounting, herbal knowledge, painting, photography, plumbing, roofing, printing, translating, to name a few. Donations of money from the members (who benefit) help to keep the pool going.

The way it works is this: when you discover a need, or hatch a plan, you check the skill pool list in the area of your need. Say you need a plumbing job done—leaky pipe, or something more complicated. Look under Plumbing on your list and call one of the plumbers. The person will let you know when you call whether s/he has time to come to aid, and will help you as quickly as possible if s/he does. You will pay only for parts, and these frequently will come less dear through use of contacts at garages and junkyards. If the person has prior commitments, s/he may refer you to another member.

In turn, you will be asked to help by a brother or sister in their need. Properly worked, friendship and community can build around these contacts and sharing. . . .

The framework is set up: the members need only take a more active, vital role. Some members involved more actively are working on solar energy,

methane, or windmill generators, and one member built an electric car.

Acorn is a partly university-sponsored journal which comes out every two months, covering midwest developments in a wide range of alternative activities (published by the Midwest Energy Alternative Network, Governors State University, Park Forest South, Ill. 60466). One section reviews books and periodicals (such as *Organic Gardening*, *Countryside*, and *Acres, USA*). A current issue tells about a U.S. Agricultural Experiment Station director in Michigan who is crusading for development of energy alternatives in agriculture. It might well be that the further off you get from Washington, D.C., the more you are able to accomplish in such directions. Another page gives good advice for those whose plans need grants, public or private, telling how to apply for this help. A page of letters supplies a lot of information needed by newcomers to the "alternatives" field, and a story on a community cannery lists the advantages of having a community canning kitchen, with information on the equipment required and the savings achieved. "Canning centers provide a solid resource base, particularly for low-income communities." A group called "Women in Agriculture" started one in Boston, found help from CETA, and now think of their cannery "as a public facility—like a library."

Self-Reliance (1717 18th Street N.W., Wash., D.C. 20009), a monthly journal which grew out of a neighborhood reclamation project in the Adams-Morgan area of the capital, is concerned with urban gardening and everything that goes with it, including a variety of self-help efforts toward every kind of community autonomy. There are frequent progress reports on similar efforts around the country, with notes on what some state and city governments are doing to help. The horizon of this paper is suggested by the following by David Morris:

Americans have always been enthralled by gadgetry, and the hardware aspects of appropriate technology are fascinating; but if the social

implications are forgotten [the implications for local economic development based on local production which spurred the movement in the first place] then the appropriate technology movement will not answer the needs of those people it purports to aid. If the concepts of appropriate technology are carried to their logical conclusions, then the changes in institutional structures, in the scale of production, in tax structures and subsidies, in industrial organization and market strategy will be far more profound than the hardware development. The concepts imply decentralization and self-reliant development, both for developing countries and for industrialized nations. It may well be that state or national organizations, dependent on government funding and inherently centralizing in terms of knowledge and resources, are incapable of the kind of decentralizing and mobilizing efforts that are integral to a genuine people's technology.

This is one kind of "intermediate" communication—concerned with bridging information for step-by-step progress, along with some clarity about goals.