

TOOLS OF KNOWING

IT is an irony of all writing that what one sets down never achieves the importance of what is felt by the writer. Good writing, we might say, records a succession of worthy defeats. There will never be a book to end all books. A bad book is one which discourages further reading. But this is only a half-truth, since a good book may help to discourage excessive reading. In short, reading can stir the imagination or it can smother or weight it down. The reader determines what happens.

Plato and Emerson are probably the best to consult on such questions. Plato, who wrote so well and so much, distrusted the written word. It deceives, he said, by seeming to have great authority. The dialogue—a lively interchange between active minds—was for him the best sort of communication. So, when he wrote, he wrote dialogues, capturing some of the tensions and provocations of speech. But be warned, he said. Real knowledge cannot be written down. And he tried to protect his readers from reaching fixed conclusions from what he wrote.

In his "American Scholar" essay, Emerson wrote about books with similar intent. He, like Plato, was prolific. Again like Plato, he allows no finality. Reading Emerson is like going on a colorful ramble. Of all past writers, he may be the most quotable. He affirms and affirms, yet he settles hardly anything. He will never say: Now you may put this question behind you. He is not much interested in questions that have settlements. He takes up matters on which there will always be more to say. Neither Plato nor Emerson ever seems in a hurry. No air of crisis pervades their pages. They take their time, trying to say what can never be said; or rather, responding to what can never be said with intimation and paradox, analogue and myth. A distinctive thread of feeling gives continuity to what they say. It seems likely

that one is least likely to be misled by reading a book by Plato or Emerson.

For we are indeed misled by reading books. The moments of learning, of discovery or realization, are not in books. Yet books have the appearance of being filled with knowledge. A book, the reader feels, is something he can use to conquer ignorance. And this sometimes happens, or seems to. We urge the books from which we have learned on our friends, and reviewers sometimes say that you really must read this one or that one. So we read books to get from A to B, or perhaps as far as L or M. Yet there is never a Z. The enterprise goes on. There seems a sense in which the more you know, the more there is to know. What should we find to do if there were no more ignorance to cope with? What is the world around us but a collection of things about which we know only a little and need to learn more? Should it be declared that ignorance is a necessary condition of life?

In an essay on education Vinoba Bhave has said:

In the Upanishads, the praises of ignorance are sung side by side with the praises of knowledge. Man needs not only knowledge but ignorance, too. Knowledge alone, or ignorance alone, leads him into darkness. But the union of fitting knowledge with fitting ignorance is the nectar of eternity.

Nectar is the liquid nourishment of the gods, who presumably are at home in eternity. We know nothing of eternity, which is a contradiction of all our terms the sort of "time" which is not cut up by a succession of events. What can we *say* of eternity? Well, we have a word for it, Duration, but its definition is only negation—nothing happens in eternity. Time invades duration or eternity whenever something happens; then eternity ceases to be, if it ever "was." This naming of things which do not exist ("stand out") is a

mistake we are obliged to make, in order to think. That in itself is enough to establish the reality if not the character of our ignorance.

What about the gods? Have we invented them, or are there indeed beings who are free to go into and out of eternity at will? We say various things about the gods—what they are like when out of eternity and here in our world. We say they have knowledge. They know what they have to do and do it almost perfectly—"almost," because in life on earth, which joins partial knowledge with collective ignorance, absolute perfection would also amount to a contradiction in terms. The only way to make sense out of the gods is to say that they are men who became wise. They went from sips to drafts of the nectar of eternity; then, looking at the world from the outlook of eternity, with this ultimate objectivity, they saw how it works and what it is for.

All this is really a misuse of language, but we haven't much choice. We *have* to talk about wisdom and eternity, about meaning and knowledge and ignorance, because feelings about these things make the substance of our lives. They lie beyond our familiar certainties and are therefore all that we really care about. Our reason for being arises out of what we don't know. So, when we talk about goals or objectives, the words we use represent clusters of mysteries. Since a mystery excites a particular kind of feeling in us, we are able to give it a name and understand (somewhat) one another when the name is used.

There are not very many good things happening in the present, but one hopeful development—perhaps the best—is that we are becoming able to think more clearly about the mysteries which surround and pervade our lives. For illustration there is this passage in *The Savage and Beautiful Country* (1967) by Alan McGlashan:

Who, or what, is the Dreamer within us? The question has a numinous feel. We know at once that it is supremely worth asking—and supremely unanswerable. It is unanswerable, perhaps, because

the terms employed are ordinary everyday terms that seem to invite an ordinary everyday answer, and on this level no possible answer fits. We lack the categories. We cannot even guess whether the Dreamer is a personality or a force. In some unknown but convincing way we recognize it is both, and neither. In other words we find ourselves struggling to express something for which the means of communication are lacking, or at least grossly inadequate. . . .

The identity of the Dreamer . . . who is as close to us as our own unspoken thoughts, who is concerned with our individual destiny while ranging infinitely beyond it, who is a tireless if often terrifying and incomprehensible Teacher. . . . The Dreamer who sees with eyeless eyes, who hears with earless ears, who wakes when the senses sleep. . . . Can we draw nearer to this mystery within ourselves?

Such a writer makes you want to read on. Dr. McGlashan accomplishes certain things, one being to bring to awareness the puzzling duality of the Dreamer's identity:

The Dreamer is extraordinarily disconcerting to waking thought-processes, in particular to our cherished laws of logic, including that venerable pair, the Law of Contradiction and the Law of the Excluded Middle—acceptance of which has always been regarded as essential to rational discussion. To put it less technically, the Dreamer constantly and effortlessly performs the rationally inconceivable feat of being both the experiencing subject and the observed object at the same moment and to the same degree. We have all dreamed that—"I am standing in a street, but at the same time I am watching myself standing in the street"—both experiences being equally valid, vivid and immediate, so that it would be false to give either priority. . . .

Well, you can see why science has been unwilling to give much attention to the experience of dreams—you can't get secure hold of them or of the one who has them. No clear and distinct ideas are available, and without definition science is not possible. Aristotle laid down the rule for science: it deals with matters we can be sure of—the demonstrated realities. But now we are becoming interested in the vaguely intimated realities and trying to form theories about them. Dr. McGlashan—he is a psychiatrist—puts

together ideas taken from an African Bushman and Carl Jung, saying:

If Stone Age man and this great modern are right, the Dreamer may be some *supra-personal mode of experiencing*, and the dream process, when attended to by the conscious mind, may be a unique form of colloquy between the personal and the supra-personal. On this hypothesis the Dreamer is talking to the conscious mind, the Ego. It is trying to awaken the Ego to those factors in the total situation which lie outside the Ego's range, and which the Ego could never arrive at by its own efforts, however far the conscious mind *at its existing level* were developed.

Dr. McGlashan seems to think that this secret, or inner, or higher life of which dreams now and then whisper—along with less attractive communications—was better known, or felt, long ages ago. To taste eternity—to get partly out of time—to be with or like the gods, who are our and their Fathers—was for the ancients a more natural undertaking. Dr. McGlashan speaks of how they attempted to arrest the rule of time—of invading finite events—over their lives. Writing of archaic man, he says:

By an approach which his descendants only sporadically revived and have now for centuries discarded and forgotten he made a sustained, magnificent, and in some ways successful attempt to give certain parts at least of his life the quality of timelessness. His method was to sacralize the essential human activities.

According to man's earliest beliefs, in the beginning, in *illo tempore*, man lived in a timeless world on terms of near-equality with the gods, with whom he freely conversed he could fly or climb to heaven at will; and he possessed also the power of communication with many of the lower forms of life, with birds and beasts and even insects. To paraphrase these naive beliefs in contemporary terms, primitive man held that human consciousness instead of being confined to its present narrow range, had once extended "upwards" into the spiritual sphere and "downwards" to the animal level. He believed—in company with certain modern philosophers, notably Bergson—that this pristine range of consciousness had been lost, and that man's first aim must be to recover it, if only momentarily. To bring this about he tried in all his essential activities—eating, drinking, hunting, sleeping and waking, copulating,

dying—to imitate the actions and attitudes, as known to him through oral tradition, of the superior beings from whom he believed himself to have descended. By so doing he tried to lift these particular actions out of the temporal and accidental into the timeless atmosphere in which these beings had lived. That is, he raised as much as he could of his daily life to the level of a sacrament.

How can this concern *us*? Dr. McGlashan's book, so gently persuasive, was written to answer this question. A sense of the potentialities of the past as still existing in the present pervades his writing. He says in his Foreword:

. . . although the archaic vision of life has been driven out of contemporary consciousness into the shadows, into a cobwebbed corner of the human mind, it lives on there with spiderish tenacity. For the archaic vision embodies, despite all its limitations and absurdities, a valid aspect of life's meaning which may be devalued or simply forgotten, but can never be completely cancelled.

It would be more than foolish to fly to the opposite extreme and start deriding and belittling the staggering triumphs of the objective-scientific attitude. But it may be permissible to suggest that man has been for some centuries now sufficiently self-impressed by the public image of himself as scientist-explorer. . . . and that it is time some attention were paid to his less premeditated postures. This book is an attempt to perform such a service. It portrays contemporary man not in any of his well-defined attitudes, scientific, religious or philosophic, but in his spontaneity, in his vagrant fancies, nostalgic memories, idle and unvalued daydreams; in the unnoticed motivations of his inventions and discoveries; and perhaps most revealingly in the fantastic images which throng around him in the hours of sleep.

What will doing this get us? The question may be a bad one, or miss the point. The point may be to learn, if we can, how to stop blotting out the presence of eternity in our lives. Trying to "evoke" it may seem a bit silly, but letting it flow around us might be a natural thing to do.

What protection, in such wonderings, can we have against impulsive, wishful and shallow thinking?

Well, there is rigor in this book. The rules adopted are not explicit but the result of a discipline is there. One rule the author practices is to "insist on relating thinking to feeling *at all times*," on the ground that if the unity of heart and head is lost, "human life becomes meaningless and insane." And the book, he says, "is opposed to feeling-run-riot as much as to thinking-run-riot."

What is sought in these pages is not some flamboyant new form of consciousness that will seize men's minds and revolutionize the world, but an almost imperceptible inner change—a willed suspension of conventional judgments, a poised awareness, a *stillness*, in which long-smothered voices that speak the language of the soul can be heard again. It is a quiet secret.

Is it possible, someone may ask, to be "scientific" in this sort of inquiry? One may think that a reformed science would welcome the opportunity to study man during his times of spontaneous inclination, his casual, wondering, visionary interludes. The idea is to catch ourselves in moments of reposeful alertness, when time has relaxed its hold, when the preoccupations of mission-oriented action have waned and we become, so to speak, "free." What are the ranges of exploring thoughts when remote areas of the association network are entered—playfully, it may be? Might we have intimations of the identity of a waking Dreamer? The strength of conviction in Dr. McGlashan's book must have had a ground in experience.

How are such feelings acquired and confirmed? What sort of "exercises" enriched Whitman's reveries? Surely he did more than just "let go"!

A scientist, Abraham Maslow proposed, has obligation to think of these things. He wrote in *The Psychology of Science*:

If there is any primary rule of science, it is, in my opinion, acceptance of the obligation to acknowledge and describe all of reality, all that exists, everything that is the case. Before all else science must be comprehensive and all-inclusive. It must accept within its jurisdiction even that which it

cannot understand or explain, that for which no theory exists, that which cannot be measured, predicted, controlled, or ordered. It must accept even contradictions and illogicalities and mysteries, the vague, the ambiguous, the archaic, the unconscious, and all other aspects of existence that are difficult to communicate. At its best it is completely open and excludes nothing. It has no "entrance requirements."

Furthermore it includes all levels or stages of knowledge, including the inchoate. Knowledge has an embryology, too; it cannot confine itself to its final and adult forms alone. Knowledge of low reliability is also part of knowledge. . . .

It is both useful and correct to consider as falling within the definition of knowledge all "protoknowledge," so long as its probability of being correct is greater than chance. This usage would imply then a hierarchy of stages or levels or degrees of knowledge, ranging downward in degree of reliability to expert guesses, hunches and intuitions, tentative conclusions based on insufficient cases or upon crude methods, etc. Knowledge is then seen as more reliable or less reliable but still knowledge so long as its probability is greater than chance. The word "empirical" then gets used as the physician uses it, i.e., to describe an inchoate, apperceptive mass made up of thousands of experiences of "trying out" remedies on himself as well as upon his patients, of accepting common sense remedies tentatively, of judging face plausibility, etc. This adds up to the tacit knowledge accumulated by the "experienced" physician. Hardly anything he knows has been adequately proved.

The Psychology of Science is a fine book to read because it is unsettling. It is restorative of the true idea of the scientist, finding it necessary for this purpose to break up crystallized conceptions of the meaning of science and scientific knowledge. "The lay picture of 'the scientist' as one who keeps his mouth shut until he is sure of his facts is quite incorrect," Maslow remarks—"at least for talented, 'break-through' scientists." We need the facts, of course, just as we need earth to walk on, houses to live in, and food to eat. But the pursuit of knowledge takes leave of facts in order to add to them. As Maslow puts it:

The feeling of the scientific originator is that of a first explorer of an unknown wilderness, an

unknown river or a strange mountain pass. He doesn't really know where he is going. He has no maps, no predecessors, no guides, no experienced helpers, few hints or orientation points. Every step he takes is a hypothesis, as likely to be a mistake as not.

And yet the word "mistake" hardly applies to a scout. A blind alley explored is no longer an unexplored blind alley. No one else need ever explore it. Something has been learned. If presented with a choice between a left and a right fork in the river, and having tried the left fork and found it to be a dead end, he doesn't consider that his choice was a "mistake" or an error. Certainly he would feel no guilt or regret and would look with astonishment upon someone who upbraided him for having made a choice without evidence or for moving ahead without being sure. He might then point out that upon such principles and with such rules no wilderness could *ever* be explored and that such principles were useful in re-exploring but not in exploring for the first time.

...

But my main point is more radical. If we define science in terms of its beginnings and its simplest levels rather than in terms of its highest and most complex levels, then science is simply looking at things for yourself rather than trusting to the a priori or to authority of any kind.

The main point, then, is that everyone, even young children, can learn to be scientists! The beginning is simple, the middle difficult, and the end unknown. Interestingly, Maslow strikes the same note as Dr. McGlashan:

The process of acquiring knowledge (at all its levels) and the contemplation and enjoyment of it is turning out to be one of the richest sources of esthetic raptures, of semi-religious ecstasies, of experiences of awe and mystery. Such emotional experiences are among the ultimate joys of living. Orthodox desacralizing science has for various reasons tried to purge itself of these transcendent experiences. Such purging, far from being necessary in order to safeguard the purity of science, is instead a deprivation and a removal from science of its human necessities. It is in the peak experiences that Being-cognition is most likely to take place. In such moments we are perhaps most able to see into the heart of things.

"Nectar of eternity" seems an appropriate way of identifying the peak experience. The nectar will not be found in books, yet from books

one is led to think of such possibilities. Like the ladder to a height or a boat to the farther shore, books serve best as tools that we shall no longer need, some day.

REVIEW

AN AMERICAN TRADITION

THE themes of sturdy independence, self-reliance, and an uncompromising adversary outlook toward all powerful and oppressive social forces have been present in American thought and culture since the days of Sam Adams and Shays' Rebellion, emerging again and again in militant expressions throughout our history. The struggles of the labor movement reached a climax of political expression in the activities of Eugene Debs early in this century, while the strikes of the Wobblies on the West Coast gave colorful shape to a tradition of resolute demands for justice.

What has happened to the spirit that was distilled in the songs of Joe Hill? Has it died away? Something of this tradition was revived by the New Left in its early days, but later confrontations, mainly with government, focused resistance more in the anti-war movement than in the labor movement, and social criticism now seems mainly directed at the activities of enormous conglomerates and multinationals, in particular agribusiness. Unions have grown so large and powerful that working people who have an independent spirit begin to wonder what side they are on. The fight for fair wages, hours, and working conditions still continues, but with little evidence of the heroic qualities which filled past struggles with high drama and even romance. The farm labor movement inspired by Cesar Chavez is not without these qualities, but in his leadership they are joined with a Gandhian temper of nonviolence, marking a distinct change in the psychology of militant action. There is also a sense in which the issues have changed, as becomes evident in Barbara Garson's report on the strike against the General Motors Vega plant in Lordstown, Ohio. The men there struck, not for more money—they were quite well paid—but because they couldn't stand the meaningless, mechanized work on the assembly line. Commenting, this writer said:

I wasn't particularly surprised by the negative things I saw in the factories: speed, heat, humiliation, monotony. I'm sure the reader will have guessed that I began this research prepared to expose and denounce "the system." The crime of modern industry is not in forcing us to work, but denying us real work. For no matter what tricks people play on themselves to make the day's work meaningful, management seems determined to remind them, "You are just tools for our use." (*All the Livelong Day*, Doubleday, 1975.)

Barbara Garson's book shows what is different about the life of working people in modern factories, but it also reveals what is the same as it was generations ago. There is a side of the industrial system that is bound to remain the same, so long as we have acquisitive economic enterprise devoted to taking profits as its first principle. In such a society, the workers will always be regarded as means.

The conditions of life imposed on working people by this kind of enterprise make the subject of a series of small books now being published by Miles & Weir, Ltd., P.O. Box 1906, San Pedro, Calif. 90733. Three little paperbound volumes—almost "vest-pocket" size—called Singlejack Books, available at modest cost, describe the work experience in America. The titling of this series by the publishers is reminiscent of the Wobbly spirit. They say:

The term singlejack originated with the hardrock miners of the American West. The drilling of holes for the insertion of dynamite was a tough and dangerous job. The miners worked in pairs, with one kneeling to hold erect the steel drill, which he would turn slowly as his partner drove it into the rock with blows from a sledge (or single jack) hammer. They would switch tasks now and then, and since the job demanded as much mutual trust as skill, many lasting friendships were formed.

Around the turn of the century, on-the-job organizers for the Western Federation of Miners and the Industrial Workers of the World [I.W.W.'s, known as Wobblies] brought additional meaning to *singlejack*. They used it to describe that method of organizing where dedicated advocates are developed one at a time on a highly personalized basis—as between partners.

In turn, still broader veins of definition can be extracted from this rich historical term. We like to apply it to that private bond which ideally is sparked between a reader and a book. We hope you agree.

This sort of publishing deserves support and encouragement. The men who do it both have other jobs—one is a longshoreman—and edit the Singlejack books in their free time. What are the books like? True to the series title, they represent threads of continuity of the Wobbly spirit. The books now available are *Steelmill Blues* (75 cents) by Steve Packard; *Longshoring on the San Francisco Waterfront* (75 cents) by Reg Theriault; and *Labor Law for the Rank and Filer* (\$1.50) by Staughton Lynd.

After working a while for U.S. Steel at the Gary, Indiana, plant, Steve Packard mused:

Forty years ago, workers fought to unionize these mills. Gary has a proud and powerful history, where the army was called out many times to suppress militant workers and prevent the establishment of a union. But people fought on and sacrificed for many years and the union finally won.

Or at least that's what I read in radical history books.

No one from the union ever talked to me. I've never been issued a "union card." (What would I do with it, if I had one, I wonder? I never see a sign, a poster, a leaflet, or announcement, passed out or posted up, by the union. People don't discuss the union. I wonder, does it have meetings? Do they vote? Is there a union hall? And all the heroism and bloodshed, the years of hard organizing work, what were they for?

Actually, I was afraid the union would be racist and conservative, and we would have to struggle against them. I didn't expect that there would just be no union. I ask people if they know who our grievance man is, and almost nobody does. The union takes a few bucks out of my paycheck, I can see it listed over by the taxes and the F.I.C.A. and all the other paycheck leaks. That's my only evidence it still exists.

The union doesn't do much of anything, but the men keep the company in line. Steel is heavy and has to be moved around by crane.

One day a white craneman was assigned to a good crane that should have gone to a certain black. The foreman made some little excuse to explain it, but really he was doing a favor for a white friend, and at the same time showing everybody who's boss. This foreman was new or he never would have been so foolish. . . .

Nothing can operate long without the cranes bringing and taking steel, so blacks quietly stopped the whole mill. They kept the cranes in lowest gear and worked in super-slow-motion. Foremen soon began hatching out of their offices, looking around, rubbing their eyes in disbelief. It was like the whole building popped LSD or the air had turned to some thick jelly: everything but the foremen moved at one-tenth normal speed.

Steel was piling up, and men stopping working. Foremen yelling and cranemen explaining fall the complex problems that had somehow suddenly developed. Calls were coming in from the main office in Pittsburgh, where the computer showed that our statistics had all stopped. So of course the company quick called the union.

Union sharpies swooped down from nowhere. "Men, men. Come on now. What is the problem? Let's go through channels on this thing. Right? Submit a grievance. What you're doing is an illegal strike!" But everyone knew that grievances take months, and that the day this foreman had to be wised up was today.

After a couple of hours the company backed down. Higher level bosses appeared and announced that the foreman had "made a mistake." They switched around the black and white cranemen and the slowness thawed right out and the mill began to hum again at its normal rate. According to the rules. The workers' rules.

So much for the continuation of the past. The book concludes on a theme that is new:

I think the deepest needs of my friends here, the things that require radical changes, are the same kind of unclear things that once made me want to wear long hair and raggy clothes, that made me rebel against the Vietnam war and ask the most basic questions about my own life. For a sense of revolution was in the air. I felt like history was ready for the development of a whole new kind of person. Things like art, community, sex roles, civil rights, a different sense of work, participatory democracy,

creativity—somehow things like this were being remolded into a new vision.

Then came the worst years of the war and the worst years of Nixon. Cynicism took over. I began to abandon the dreams that I most cared about. But when I look back over my time in the mill, it's clear that it's exactly that newer, freer, higher vision that people need. It's the one real thing that Billy and my other friends could really throw their lives into.

The *Longshoring* book is by an older man, but has similar qualities. Staughton Lynd's study of labor law, telling how working people are able to use it without hiring a lawyer, is filled with common sense along with understandable explanations of what the major labor laws now in force provide.

COMMENTARY

THE BEGINNINGS OF THINGS

IN this week's lead article, in a quotation from his *Psychology of Science*, A. H. Maslow speaks of the importance of including "proto-knowledge" as a part of knowledge, since all science begins with inspiration, wondering, and sometimes indistinct ideas that are difficult to communicate. He suggests that this hospitable spirit toward "the vague, the ambiguous, the archaic, the unconscious," is a way of renewing the original spirit of discovery. "If," he says, "we define science in terms of its beginnings and its simplest levels rather than in terms of its highest and most complex levels, then science is simply a way of looking at things for yourself rather than trusting to the a priori or to authority of any kind."

Interestingly, a similar appeal is made in Hazel Henderson's book, *Creating Alternative Futures* (see *Frontiers*), where the author speaks of the neglect by established authorities of innovative activities of the sort so often described in these pages—solar energy projects and other intermediate technologies. Inevitably, the opinions of authorities are always based on *past* achievements and the needs of *existing* institutions and relationships, with the result that "the growing shoots of the society go unmeasured and are overlooked."

Not unrelated is the concern of Alan McGlashan with "an almost imperceptible inner change—a willed suspension of conventional judgments, a poised awareness, a *stillness*, in which long-smothered voices that speak the language of the soul can be heard again."

Dr. McGlashan is talking about a meditative flow of thought in which thinking, as he says, is related to feeling *at all times*. Well, thinking, as people so often say, is linear. It goes off in only one direction. Scientific thinking seeks to solve particular problems and technology undertakes to do particular jobs. It is this particularism which makes both science and technology so vulnerable

to unexpected effects. No one saw them coming. Unlike life, which is multifaceted—and which in its organic health serves countless interests and needs, some doubtless unknown to us—the linear approach has a single, isolated objective. As Charles Reich said a few years ago, the sole object of a machine is more production. No biological or ecological system, as Gregory Bateson has pointed out, is ever limited in this way. There is spontaneous balance in behalf of the whole in the structures made by life. It is as though nature always "feels" its way.

The continuous coordination of thought and feeling insisted upon by Dr. McGlashan may be regarded in another light—as the unification within a single human of what we call "science" and "religion." At root science is the enterprise of the intellect—it is linear thinking. Religion is basically feeling—holistic, not linear. When a man feels, he feels with his whole being. Thinking held in line by feeling may be thinking subject to all the subtle balances that action in nature reveals. In nature there is hardly a distinction between thinking and action—no reflective thinking, that is—while in humans the suspension of feeling when we think—and the suspension of thinking when we feel—may be responsible for practically all our serious mistakes.

CHILDREN ... and Ourselves DELICATE MIGRANTS

[Since the beauty and habits of butterflies change not at all from year to year, this report by Geoff Selling, a teacher in the School in Rose Valley (Moylan, Pennsylvania) printed in the School's *Parents' Bulletin* for November, 1973, is not in the least dated. We would have used this material before if it hadn't been so carefully put away for just that purpose!]

THE monarch butterfly offers children a unique chance to see the entire cycle from egg to butterfly in a span of four to five weeks. The handsome black, white, and orange-brown adult is a fitting reward for the children's labors. Beyond that, monarchs demonstrate fantastic defensive chemistry by containing certain chemicals in their body fluids which are toxic or at least very distasteful to their enemies. They are familiar and ubiquitous and in the fall their migratory behavior makes them conspicuous.

With these factors in mind I made all kinds of curriculum plans over the summer, that included hatching monarchs.

Most monarchs lay their eggs in late August and early September, so I began searching for eggs in August. Monarchs usually lay their tiny silvery eggs on milkweed leaves which grow plentifully in the school's flowerbeds and on surrounding properties. I checked every milkweed plant I knew for weeks and saw no signs of anything resembling monarch eggs. I gave up hope at the end of September and changed the curriculum.

Two weeks later, children excitedly brought monarch caterpillars to the science room. They had found them living outside Faith's classroom on the same milkweed plants that I had checked for five and a half weeks.

The yellow, white, and black-horned caterpillars were already about 1200 times bigger than the newly hatched ones, perhaps two thirds

of the way through the larval stage. We put them in a terrarium on moist paper towels, and the children brought milkweed leaves daily to feed our hungry guests. In one night eight large leaves were consumed.

At the end of the larval stage, slightly less than a week after we found them, the caterpillars left the milkweed and climbed to the top of the terrarium where they spun small silken buttons to the screening. Reversing themselves and attaching their anal prolegs to these buttons, they hung upside down in a "J" for about a day. Then, when no one was looking, they split open, dropping their larval skins, and revealed the bumpy chrysalises or pupae. Within hours these had turned a deep jade green and become smooth as cellophane. Tiny gold dots punctuated their surfaces, making each chrysalis look like a tiny earring rather than a metamorphosing insect.

For two weeks a steady stream of children eagerly checked the terrarium only to see no visible changes. The pupal stage usually takes two weeks; so many small nature lovers began to worry. As the third week arrived, the chrysalises began to darken until they seemed a shiny black. Closer inspection revealed the wing pattern of the adult monarchs showing through the clear cases. By Friday of the third week we could clearly see the butterflies curled tightly in their little cases.

Naturally all three hatched that weekend when no one was around to witness the spectacle. Even so, the following Monday was an exciting one as dozens of children trooped down during recess and after school to see nature's handiwork.

After they had gotten used to their surroundings and pumped enough body fluids into their wings, we began to feed them a homemade nectar solution of five parts water to one part honey. We soaked a sponge in the solution and then set the butterflies on it. With a straight pin, we delicately unrolled their long proboscises and placed them on the wet sponge. These sucking mouth parts enabled the butterflies to drink up the nectar easily, and within three days, they had been

conditioned to unroll their own proboscises merely by being set on the sponge. Feeding then became an easy task.

A very cold spell set in before the end of the week. This troubled both the children and myself, for monarch butterflies are migratory insects. An extensive tagging process, carried on by relays of scientists in many parts of the country, has revealed a complex migratory system. In the late summer, monarchs lay eggs that metamorphose into butterflies in the early fall. These then migrate to the southern United States and often into Mexico and Latin America. One butterfly, tagged near Lake Ontario, was found 2,000 miles away in Mexico. This migration may take from five to eight months. It is amazing that butterflies can survive so long, since most insects have adult life spans of a few weeks or months. All the hazards of a long migration must take a large toll of the migrating monarch population. Their inborn hardiness must be considerable to achieve this. Naturally, some butterflies don't make it. Not too many butterflies are eaten by predators since the milkweed eaten in their larval state gives them a toxin that makes most of their would-be enemies sick. A bird will never eat another monarch after one such disastrous experience. But though a few fall to predators, others may be stopped by wind, cold, or rain. The children were concerned that the cold weather of early November would prevent their butterflies from making the migration successfully. After discussion we decided to try to have them flown to Florida by commercial airline. A former Rose Valley teacher, Jo Faulkner, put us in touch with a school in Fort Lauderdale; a phone call to their headmaster and science teacher found them enthusiastic and eager to join in. They agreed to meet the butterflies, and after spending a day or so watching them, to release them in some woodsy place. Jo's suggestion of the University School of Nova University in Fort Lauderdale was a marvelous one. They couldn't have been more cooperative.

Arrangements were made with an airline to transport the butterflies in a special shipment on a regular flight to Fort Lauderdale. The shipment cost \$26.00. On but one day's notice the children brought table-loads of food for the "Butterfly Bake Sale." We raised over \$36.00—enough for the ticket and all the phone calls to Florida.

The next day a bus load of children, whose names had been picked from a hat—two from each room—piled into a bus with the lovingly packed butterflies, the money, pictures, and a pile of stories they had written to the Nova School's children, explaining the project to them, and some lunch, and off we went to the airport. A newspaper article had forewarned everyone of our coming, and we were greeted with smiles and curious looks. A friendly policeman even let us park in the NO PARKING ZONE. Delta took good care of us, taking the children on the plane and treating us in a warm, albeit commercial, way. We were a bit self-conscious with the TV and newspaper photographers around us. After the butterflies were on their way, we returned to school exhausted.

Recently we received a large packet of stories and letters and pictures from the Nova School, reporting the safe arrival of our friends and their subsequent release. They really carried the project through beautifully.

An interesting footnote followed about one month later. A Ph.D. candidate studying butterflies in Kansas heard about the project and wrote us a long and encouraging, but somewhat critical letter. He questioned the ecological implications of what we did. He argued (1) that our monarchs might have migrated safely despite the cold, and (2) that perhaps we interfered with nature rather than helped it. Since only the hardiest butterflies successfully complete the migration, the butterfly stock that returns in the spring and summer would be the offspring of the strongest and healthiest monarchs. By sending our monarchs south, we may have introduced weaker butterflies into the population. He

suggested that, although our five would hardly upset the monarch population, that I was overlooking a significant biological principle. He also told us about much cheaper ways of safely sending butterflies. In addition, he gave us advice for future projects.

I was pleased to get the letter and will read it to the children. It should form the basis for an interesting discussion. My own feeling about his point is that he overlooked an important human factor—we were dealing with children who had a very sentimental attachment to the butterflies. In a day and age when so much emphasis is being put on destruction and on man's needs over nature's, I was very pleased to see the children caring so much about a few fragile butterflies. Their tender nursing and eager waiting were very refreshing. . .

The School in Rose Valley
Moylan, Pennsylvania

GEOFF SELLING

FRONTIERS

Diagnosis and Prescription

HAZEL HENDERSON, whose new book, *Creating Alternative Futures* (Berkeley Windhover paperback, \$4.95), has just been published, calls herself a futurist. But since she shows that practically everybody worth listening to is some kind of futurist, we prefer to identify the contents of this volume as the work of a social psychologist. First, there is the demonstration that the socio-economic system we now have cannot work for very much longer. The evidence for this is both objective and subjective. Second, the book describes the growing recognition—instinctive, intuitive, rational, and practical that there must be basic changes from the way we live now. Finally, Hazel Henderson provides a detailed account of the many things people are doing, at various levels, to bring about these changes. The book, in short, is a depth study of the processes of personal and social change. The value for the general reader lies in the encouragement it gives him to think that his feelings, efforts, and hopes are shared by many, and in the showing that there are numerous resulting changes already on the way.

The analysis of the decline and impending breakdown of the industrial system is ordered by simple propositions. First, existence requires structure. Second, existence involves growth, which brings more structure. Third, if the growth is excessive and in wrong direction, structure gradually chokes growth and wears away at existence. Part One of *Creating Alternative Futures*, titled "The End of Economics," details example after example of the failure of the system by its own measures of success. It isn't working well at all. Hazel Henderson calls this advancing socio-economic entropy. "In such a society, due to its unmodelable, unmanageable complexity and interdependence, social costs begin rising exponentially and exceed actual production." Obviously, a point will be reached where, due to practical waste of resources and energy, the

people will have to change the system or they cannot afford to stay alive. First the poor are priced out of participation, and then the middle class begins to feel the pinch which makes them poor, too. The growing pressure sets class against class and anxiety stimulates the worst sort of individualism.

When there is the wrong kind of growth—the kind that clogs the system and wastes people, money, and time—the cost of keeping things going begins to be greater than the return in productivity. For a while we fool ourselves by adding such maintenance and corrective costs to the GNP—the grand total of what we make—but this can't go on for long. Miss Henderson says in summary:

As Ralph Nader has said, "Every time there is an automobile accident the GNP goes up." Similarly, the social and environmental costs of growth: the cleaning up after the wastes of production and consumption, the maintaining of adequate supplies of clean air and water, the caring for the increasing numbers of human casualties of massive incomprehensible technology and inhumanly scaled organizations the mediating of conflicts, the controlling of crime, addiction and other pathology and generally maintaining a fragile "homeostasis"—all are counted in the GNP as positive production.

But this is only on paper. The deception will last only for so long as people are able to tolerate relentlessly rising costs, to say nothing of the various pollutions for which money has no remedy. There are no technological fixes for a one-horse-stray sort of collapse. Its time has come.

More and more people are suspecting that the publicity concerning our existing system is just plain false, no longer even "sincere." The author says:

In any period of cultural transition, the dominant organs of a society often increase their efforts to reassure the public, while their leaders privately express doubt and fear. This is not surprising, since it is precisely these institutions of government, business, academia, labor and religion, as well as their leaders, which are in decline and

whose power is threatened and eroding. The information gathering and disseminating media, the statistics and the indicators are all geared to measure the society's well-being *in terms* of the well-being of these existing institutions. Therefore, the growing shoots of the society go unmeasured and are overlooked and will remain insufficiently monitored and studied as possible new social models.

Try getting a copy of, say, *Rain*, from any sizeable public library! *Rain* monitors the proliferation and spread of growing shoots of alternative culture and economic process; it reports on grass roots self-reliance and inventiveness, and on the formation of loose, adaptable, new institutions that function more flexibly than the old ones. The present, quite evidently, is a time of the genesis of another sort of society, with, however, a very great deal remaining to be done.

Miss Henderson continues:

We cannot afford to wait until the conceptual wreckage of industrialism is sifted and composted. We need to study the counter-economy at the same time that we are examining our new inappropriate statistics. As we drown in useless data, we must remember that there is a natural hierarchy in information-systems: from the smallest bits of raw data to models which pattern it, to concepts that inform the models—to goals that give purpose to the concepts—and finally, the values from which the purposes flow and which *drive the entire information-system and the culture itself*. New perceptions and paradigms can generate more realistic models and provide more appropriate statistics, and the new efforts in this area are cause for encouragement.

Why does the modern world—in the persons of its leaders and conventional authorities—seem so blind to what must eventually happen; to what has already begun to happen on the frontiers of society: in private lives, small groups and communities, and wherever counter-cultural activities are surfacing? The author gives this answer:

As ecologist Gregory Bateson has noted, it is rare to find ecological or biological systems which are activated by a specific need or which seek to maximize single variables. Meanwhile, information

at the interfaces between many of our social problems is sparse because our society is ill-equipped to perceive, let alone research, these overlooked areas of interplay.

In short, we are trapped into ignorance and blindness by past assumptions. Ultimately, it is the quality or level of our assumptions which shuts out awareness of the need for change. The new spirit is essentially ethical, and the economics of profit-taking (a single variable) knows nothing of ethics. An ethical outlook brings order to chaos because it has synthesizing power; it seeks the good of the whole. When intelligence is added to ethical purpose—and the two make a natural blend—people become able to understand what they must do. This is evident from Hazel Henderson's new book.