

THE IDEA OF KNOWLEDGE

A MAJOR defect of the prevailing idea of knowledge is that it provides no means of defense against the abuses to which it leads. For this reason it ought to be called an ideology, instead of a genuine theory of knowledge, since the identifying attribute of ideology is that it blocks critical self-examination.

As a result of the dominance of the scientific ideology, vast areas of subtlety in human experience have been long neglected by Western thought. For centuries, now, no proposal about the nature of things—or the nature of man—has been taken seriously unless it was first reduced to a form that would submit to familiar tests of objective certainty. This requirement became so hard and fast, so externalizing in effect, that any idea seeming to hint at an incommensurable reality could be disposed of without debate—with merely a raised eyebrow or a conventional shrug. Eventually the entire culture adapted itself to this sort of ideological censorship. Anything claimed to be worth knowing must have only a devitalized content that would accommodate to existing techniques of determination. Harold Rosenberg summed up this state of affairs in *The Tradition of the New*:

An idea that has no direct application to any professional function is considered either something "literary" (even in the writing profession "literary" all but signifies "useless" or a misdirected effort) or a mere verbal knot in the brain of an outsider—it might also be a psychopathological symptom. This operational view of thought, elaborated under the name of Scientific Method as a criticism of metaphysics, is America's chief contribution to world philosophy and dominates our university philosophy departments. Through it philosophy itself has acquired a professional status as the watchdog of the professions against infiltration of their technical apparatus by hypotheses concerning what things are and why.

We know, of course, the arguments offered in defense of this rigorous guardianship. They go back to Galileo and to d'Holbach and Lamettrie. They are the polemics used by early champions of science against theological assumption and are morally grounded in the anti-clericalism of the French Revolution. In terms of past social criticism, these arguments were not without weight, being directed against an authoritarian religious certainty which had issued in both intellectual absurdity and systematic social oppression. But today, when the "operational view" has developed into the orthodoxy of a vast Establishment which dominates all aspects of culture and education, and affects even the reflexes of the man in the street—in much the same coarse way as the Medieval world-view controlled the mind of the common man of a thousand years ago—there is accumulating evidence of similar intellectual absurdity and social oppression. Where, we must ask, did the beautiful idea of scientific impartiality go wrong?

This is a question which now engrosses the best minds of our times, and we are beginning to get answers that promise an impact corresponding to the influence of Copernicus, Galileo, and Newton in establishing the spirit of science in the modern world. There is great resistance, of course. Orthodoxy, being by definition only imitative and not productive of thought, is fearful of comprehending the implications of what the new pioneers are pointing out. The only advantage today's innovators have over the early scientific discoverers lies in the quick spread of new ideas through modern communications systems. On the other hand, there was not, three hundred years ago, the mass of trivial reading material which now super-saturates the minds of great numbers of people, encouraging the conceit of an often meaningless literacy.

A natural question arises: Are not the authorities of the present-day establishment truly conscientious individuals, made responsible by thorough scientific education, and do not such people endeavor to direct the applications of scientific knowledge into constructive channels, in accord with the high humanistic purposes they so often voice? The answer must be that many of them answer to this description.

But analysis of motive does not sufficiently clarify our problems. When the method of objective testing is held to make scientific knowledge foolproof, one result is a careless indifference toward the ways in which the facts of science are spread. The educator now has undogmatic dogmas to teach. What *must* be true needs no laborious rational justification. Not all can be scientists, and why should it matter how people are persuaded to believe what it cannot be wrong to believe, since everything admitted into the curriculum is scientifically established fact? So it is that the whole of modern education, with rare exceptions, has become a vast system of indoctrination in the certainties and multiplying details of scientific knowledge. As time passes, there is less and less difference between education and the techniques of mass popularization. Already writers on education have noted that schools compete poorly with the communication skills of "the media," and the efforts of education systems to improve themselves in this respect are well known. As a writer in these pages recently pointed out, "the knowledge industry accounts for 29 per cent of the Gross National Product of the United States." What this industry is at least partly concerned with may be found out by reading Clark Kerr's *The Uses of the University*. Yet we should be wary of allowing the tendentiousness of an expression like "the knowledge industry" to conceal the fact that a great many teachers do what they can to resist this vulgarization of the idea of education. Such teachers are often modern education's most effective critics.

It remains true, however, that technicizing educational methods cannot help but add to the already formidable apparatus which, simply by being *apparatus*, reinforces cultural lag. And it cannot be ignored that mechanization, however sophisticated, works against the preservation of ambiguity and subtlety. Educational apparatus is much more adaptable to the intentions and methods of popularization, and so becomes vulnerable to the characteristic tendencies of all efforts to create mass opinion. On this subject, Mr. Rosenberg is again an informing analyst:

Popularization, which acts as journalistic or educational intercessor between the isolated mind of the theorist-technician and the fragmented psyche of the public, is the most powerful profession of our time and gaining daily in numbers, importance and finesse. It is the intellectual reflection of modern industry itself, which brings to mankind the physical products of an invention and technology which it does not understand. Neither the benefits of the arts and sciences, nor their secrets, are any longer restricted to the rulers of society. As total war guarantees to each citizen that he will be an equal target of any new development in armament, so the recruiting of audiences for art, psychotherapy, political action, accepts as its goal nothing short of the entire population. Mass media, institutional and agitational middlemen package modern painting as new design and better living; literature as morality, religion, politics, information; electronics as hi-fi; radicalism as join-the-party; total war as total security. Through mastery of the inversions of meaning that constitute "mass education," the intellectual go-betweens insure their own growth and predominance.

The popularizers find their natural allies in the rank and file of each profession, to whom the latest discoveries are as alien and disturbing as to the public itself. The union of salesmen, publicizers and distributors with the applied technicians is enough to give them control over any new idea or work. In no case does the founder of a method determine the use to which it shall be put by the profession nor what the public shall be told it means—as against the practitioner chiefs who head the university departments and professional associations, the influence of the actual practice of a Freud or an Einstein has been negligible, and the same is the case, of course with the innovator in the arts. He is doomed to isolation by the very processes through

which his work reaches society. The larger the part played by his creation in the profession the less need there is to understand it, and the greater grows the distance between his idea and the influence exerted by his work. The more widely he is known to the public the greater the misinterpretation and fantasy built upon his name and the greater distance between himself and his social existence. The famous "alienation of the artist" is the result not of the absence of interest of society in the artist's work but of the potential interest of *all* of society in it. A work not made for but "sold" to the totality of the public would be a work totally taken away from its creator and totally falsified.

The extent to which these strictures apply to education cannot be accurately determined in any "present," but their application to almost any "past" is clear enough, and we know what men such as Tolstoy or Dostoevsky would say. Meanwhile, there will be little contradiction if we say here that the focus of modern education has given almost no attention to the normal development of the non-specializing individual human being. The elaborate proliferation of scientific specialties has been a glamorous and absorbing undertaking, and it has resulted, through default in other areas, in a low estimate of human beings and in a gradually toughening pragmatic authoritarianism in their social management that has hardly been noticed by most scientists. The exceptions are men like Michael Polanyi, A. H. Maslow, Carl Rogers, and a few others. Nicola Chiaromonte is one who, while not a scientist, clearly discerns the roots of modern tyranny in the ideas of science as "a superior manifestation of objective truth."

The deflection of interest from man as subject and the neglect of human behavior except as it can be objectified by statistics are major causes of what Viktor Frankl calls the existential vacuum of the present. The same causes are back of what A. H. Maslow calls the "*metapathologies of the affluent and indulged young*," who suffer from "*deprivation of intrinsic values, frustrated 'idealism,' from disillusionment with a society they see (mistakenly) motivated only by lower or animal or material needs.*"

Writing of the present-day youth (in his paper on "Metamotivation," reprinted in *Readings in Humanistic Psychology*, Sutich and Vich, Free Press, 1969), Dr. Maslow continues:

Not only does the whole of official nineteenth-century science and orthodox academic psychology offer him nothing, but also the major motivation theories by which most men live can lead him only to depression or cynicism. The Freudians, at least in their official writings (though not in good therapeutic practice), are still reductionistic about all higher human values. The deepest and most real motivations are seen to be dangerous and nasty, while the highest human values and virtues are essentially fake, being not what they seem to be, but camouflaged versions of the "deep, dark, and dirty." Our social scientists are just as disappointing in the main. A total cultural determinism is still the official, orthodox doctrine of many or most of the sociologists and anthropologists. This doctrine not only denies intrinsic higher motivations, but comes perilously close sometimes to denying "human nature" itself. The economists, not only in the West but also in the East, are essentially materialistic. We must say harshly of the "science" of economics that it is generally the skilled, exact, technological application of a totally false theory of human needs and values, a theory which recognizes only the existence of lower needs or material needs.

How could young people not be disappointed and disillusioned? What else could be the result of *getting* all the material and animal gratifications and then *not being happy*, as they were led to expect, not only by the theories, but also by the conventional wisdom of parents and teachers, and the insistent gray lies of the advertisers?

Implicit, here, is the essential meaning of what Willis Harman in *Stanford Today* (Winter, 1969) heralds as "The New Copernican Revolution." It is insight which *connects* the unhappiness, aimlessness, and destructiveness of modern advanced societies with the orthodox scientific theory of knowledge and demands a new theory of truth and a new view of man.

Naturally, since a new science of man will begin with observation of himself, its initial findings are bound to be classed as "psychology," although its discipline has very little in common

with the objectivist psychologies of the past. The two do not breathe the same air and their conclusions are in different universes of discourse.

It is important to notice at the outset that this new idea of knowledge, the new scientific epistemology, was originally shaped by a moral energy. It has its own sort of "objectivity," the ethical equivalent of the old, externalizing objectivity, finding its first expression in the work of a chemist turned sociologist from moral concern. Those interested in the foundations of this sort of scientific thinking should read Michael Polanyi's book, *Personal Knowledge*, published in the United States by the University of Chicago Press in 1958 and now available in paperback. Two small books by Polanyi, *Science, Faith, and Society* (Phoenix paperback) and *The Tacit Dimension* (Anchor) form an excellent introduction to his major work. From these the reader could well turn to the writings of Carl Rogers and A. H. Maslow. Polanyi endeavors to show the moral foundations of all important knowledge. He is also concerned with the psychology of discovery, of primary perception and conception, and the slow evolution, within the individual, of defining ideas. The potentialities of study of thought at this level are explosive for reforms in education and in formulations of the nature of man.

By restoring subjective observation to scientific inquiry, the delicate realities of moral longing, the vague but very real inspiration of great artists, the creative processes of poets, the philosophies of mystics, become a new world of mind to be explored. The focus, instead of being turned away from the excellences of human beings, is directly upon them. By this means humanistic ideals regain an intellectual musculature that has been wasting from misuse for hundreds of years. Science may once again deserve to be honored as Natural Philosophy, as it was in its beginnings, with Ethics its necessity instead of its haphazard after-thought.

Naturally enough, much of the initial inquiry of the humanistic psychologists focused on the shaping of scientific theories that were later proved experimentally. They became curious about the structure and subjective tangibility of processes of concept-formation, finding that these preliminary subtleties of thought are crucial to knowledge of every sort, whether or not they lead, later on, to discoveries in physics and chemistry where indisputable demonstration is possible. There are other fields of vital knowing where means of verification must become possible and acceptable, even though the truths thus found may never be "public" in the same way that a physical law becomes public truth. In a comparison of the two ways of knowing—the objective and the subjective—Carl Rogers says (in "Toward a Science of the Person," *Readings in Humanistic Psychology*):

There is still another point to be made about this objective way of knowing. Since it has had such vast importance, and since it has led to such incredible technological advances, it is often forgotten that it is not necessarily superior to the first, subjective way of knowing, and that in crucial instances, it bows to it. For example, the evidence for extrasensory perception is better than, or certainly as good as, the evidence for many of the principles which psychologists believe. Yet, with very few exceptions, psychologists reject this evidence with vehemence. It is not easy to impugn the methods which have been used in studying ESP, for they are the same as those used in any field of psychology. But the psychologist falls back on this subjective knowing. The evidence does not fit with the pattern of knowledge as he expects to find it, does not fit with his experiencing of the world. Therefore he rejects it.

This is precise scientific history. Many years ago, a candid defender of orthodox psychology, Joseph Jastrow, wrote in the *American Scholar* (in 1938): "In the minds of psychologists who accept a comprehensive view of their responsibilities, it is the *general objections* to ESP that weigh most heavily." In evidence Jastrow quoted a scientific contemporary:

ESP is so contrary to the general scientific world picture, that to accept the former would compel the

abandonment of the latter. I am unwilling to give up the body of scientific knowledge so painfully acquired in the Western world during the last 300 years, on the basis of a few anecdotes and a few badly reported experiments.

That is the way the orthodox dispose of evidence that will not fit into their scheme of things. They call it "a few anecdotes and a few badly reported experiments," and *shrug*. One is reminded of the aplomb of the learned doctor of the Church who told Galileo that there couldn't be spots on the sun because Aristotle had made no mention of them. Generously, the doctor had taken the trouble to look—not through Galileo's telescope, but in Aristotle.

ESP research has indeed become part of the new world picture, and while it may not prove as potent for change as William McDougall hoped, it has certainly contributed its share of influence. While psychical search is counted by Willis Harman as a factor in the New Copernican Revolution, the major impetus seems to lie in an emerging moral renaissance, and it should be recognized as such. This motive, after all, was also behind the work of William McDougall as long ago as 1923, when, still at Harvard, he wrote:

Unless Psychical Research can discover facts incompatible with materialism, materialism will continue to spread. No other power can stop it; revealed religion and metaphysical philosophy are equally helpless before the advancing tide. And if that tide continues to rise and advance, as it is doing now, all signs point to the view that it will be a destroying tide, that it will sweep away all the hard-won gains of humanity all the moral traditions built up by the efforts of countless generations for the increase of truth, justice and charity.

Well, McDougall was partly right in his prediction; we have already been through a lot of the sweeping-away effect, although the opposition to materialism has not come only from psychic research. It has come also from the psychotherapists and from a lot of other people, some of them artists, art critics and historians, and from articulate humanists and not least from

conscientious objectors to war. There has even been a strong assist from modern physics, notably in the person of J. Robert Oppenheimer, who told American psychologists in 1955: "the worst of all possible misunderstandings would be that psychology be influenced to model itself after a physics which is not there any more, which has been quite outdated."

Which is to say that the old scientific orthodoxy isn't there any more, or that its supports are gone; that its god, too, is dead. In its place is the ominous existential vacuum, waiting to be filled. It will not wait for long. No vacuum waits.

REVIEW

IMPERFECT HERO OF SCIENCE

THE disenchantment produced in the ordinary, hero-enjoying reader by Frank E. Manuel's *A Portrait of Isaac Newton* (Harvard University Press, 1968, \$11.95) has something of an antidote in what is said by the author very early in the book. After observing that his intention is "to depict and to analyze aspects of his [Newton's] conduct, primarily in situations of love and hate, and to probe for forces that shaped his character," Prof. Manuel disclaims any effort to "explain" Newton's extraordinary accomplishments in science:

We stand in awe before genius, and wonder the more because its works are achieved in the face of odds that have crushed lesser men. When the magnitude of the forces that might have led to disintegration is recognized, the acts of sheer will and overcoming astound. There have doubtless been others with psychic configurations similar to Newton's who have never been heard of since. Elements of quiet strength in men of genius are naturally harder to identify than those of weakness or uncontrolled violence, for we are more prone to remark upon the turbulence of the waters than to notice their stillness; but that is perhaps true of our observation of all life processes that may be isolated.

What does Prof. Manuel set out to do? Two things, at any rate, are apparent. He traces Newton's extreme defensiveness and insecurity to his yeoman origins and certain childhood emotional deprivations; and he restores to the account of his driving interests much that was deliberately suppressed by nineteenth-century biographers who wished to present Newton to posterity as only a tough-minded rationalist and the inventor of the World-Machine. Since the author has sought to comprehend the "turbulence" in Newton's nature, much of the book is concerned with the great controversies—virtually feuds—in which Newton engaged with several of his scientific contemporaries—Hooke, Leibniz, and Flamsteed—men whom he was unable to see except as rivals. Their threat to the single-handed priority of his discoveries affected him as a kind of blasphemy. One would have to call Newton *mean*, save for the fact that his anxieties were reactions to offenses

against an almost Sacred egoism—these people were challenging Newtonian Holy Writ. Other great men, Emerson is an example, sometimes felt as Newton did—that a more than merely human intelligence drew them on—but preserved their emotional balance with much more success. In the case of Newton, it seems, this humanizing sense of proportion could influence him only at the end of his life, when the partisan angers of controversy were exhausted, or when the infirmities of age had stilled the claims of his passionate self-righteousness.

So readers who go to this portrait of Newton hoping to find their image of a great hero of science complemented by corresponding human splendors will be sorely disappointed. It is difficult even to *like* Isaac Newton, as Prof. Manuel presents him, and as, apparently, he was. Why did he need to be so cruel to other and often much lesser men? He did what he did, it seems at least partly clear, because he believed in a fearful and cruel religion. While not a Puritan, Newton could not escape the influence of this fanatical movement. He was Puritan enough for his noble mind and vast creative tendencies to be seriously marred by the religious intolerances that made heresy-snooping a favorite occupation in seventeenth-century England. Although he disavowed religious persecution, his deep need to be right, right, RIGHT became a major compulsion.

Yet there is in this meticulously reported record of Newton's psychological life suggestive evidence of feelings of high calling and of a sense of destiny that might have flowered more attractively in philosophically generous and less spiritually competitive surroundings. Prof. Manuel gives this account of how Newton thought of himself:

Throughout his life Newton arrived at his conclusions, whether in physical science or world chronology, by intuition—by the intrusion of the Holy Spirit—after long concentration upon a single idea; for he was in direct relationship with his father, and things were revealed to him as they had once been to the Hebrew prophets and the apostles of the ancient world whom he identified with one another. Though Newton could speak freely in praise of Moses and Toth, Thales, Pythagoras, Prometheus, and Chiron the Centaur, he only rarely had good words to say about either living scientists or his immediate

predecessors—and then not without equivocation. History had begun anew with him. Among contemporaries he and he alone had access to the significant truths about God his Father's world. God revealed himself to only one prophet in each generation, and this made parallel discoveries improbable. Despite Newton's lip service to the common promotion of knowledge, he often felt that the findings of his fellow scientists were of no consequence, or only ancillary to his own system, or else outright thefts from his "Garden." There was no aspect of creation that would be hidden from him—the inventions of mathematics, the composition of light, the movement of the planets, the elements of chemistry, the history of antiquity, the nature of God, the true meaning of the divine word in Scripture. Newton's occasional denial of his mission self-disparaging references to his discoveries in natural philosophy and in world history as "divertisements" are only the other side of the coin. Prophets have often tried to escape their destiny, at least since Jonah.

As for the mode of Newton's inspiration, the record is sparse, although it is plain that he had an insatiable curiosity about the natural world and was a tireless worker. Prof. Manuel quotes his reply when asked how he made his discoveries: "I keep the subject constantly before me, and wait till the first dawns open slowly by little and little into the full and clear light." Newton seemed familiar with the meditative disciplines of mystics and while at Cambridge gave attention to systematic methods of training the mind. But he was always a *scientist*:

Though Newton had a consciousness of his special calling as divinely inspired, his insights always had to be verified, even as Maimonides would have the imaginative faculty restrained by the rational in the true prophet as distinguished from the mere enthusiast. The distinction was fundamental for Newton. The scientific notations that follow his illumination are akin to the symbolic acts performed by the prophet in transmitting his message. As a scientist Newton did not dispense with the traditional controls, the lengthy proofs; but at some stage in the process there was a massive, willed concentration that bears at least a kinship to mystic meditation. And his discoveries were often accompanied by a kind of profane exaltation.

One valuable contribution by Prof. Manuel is the restoration of Newton as a man of his times—one

who shared religio-philosophical views with the Cambridge Platonists, especially Henry More; who spent much time in alchemical experiments and cautiously corresponded with other high-minded investigators of the transmuter's art; and whose operative first principles were undeniably religious. Incidentally, modern embarrassment at Newton's interest in alchemy overlooks the recent tribute paid to some of the alchemical thinkers by modern chemists such as Fritz Paneth, the latter remarking that the trend in modern chemistry "is toward rather than away from the theories which were condemned by the official science of the last century," and adding that "modern and ancient alchemy are very close in agreement as to the existence of a primordial matter." (*Science*, Oct. 29, 1926.) Prof. Manuel has a good passage on this aspect of Newton's interests:

That Newton was at one time engaged in a quest for the golden fleece, the alchemical designation for the philosopher's stone, is still doubted by bowdlerizing rationalists, who summarily dismiss the great pile of alchemical manuscripts in his hand, the reports of secret conversations with adepts, and at least a hundred alchemical volumes in his library, and insist on defining his addiction to this literature as an orthodox scientific interest in chemistry. . . .

That all great truths about nature had been recorded somewhere by the ancients is one of the basic postulates of Newton's thought, and it was the duty of the searcher to decipher the hieroglyphs in which ancient wisdom was cast. If Newton could from the symbol of the lyre deduce that Pythagoras had understood the law of gravity, even its mathematical formula, why might not the truth of a universal medium be concealed in one of the many rare alchemical writings he copied, abstracted, studied and explicated? . . . The alchemical substructure of Hermetic, Pythagorean, and neo-Platonic thought was not strange to Newton and his philosophical colleagues in Cambridge. Though the heyday of the Paracelsians under the Commonwealth was passed, there was still support for Van Helmont's reformation of Paracelsism, emphasizing experimentation and avoiding mere fancies. The new mechanical philosophy pointed in a different direction, but the breach with the past was neither sudden nor universal.

In respect to influences on Newton's thought, there is one possibility which Prof. Manuel may have

overlooked, or looked at too briefly. Early in his volume (page 73), speaking of the "mystical element" and the atmosphere provided by the Cambridge Platonists, he says: "Though there is no convincing testimony that Newton ever read Jacob Boehme. More may have been the agent of transmission for notions from the metaphysical German cobbler." Directly on this question, the following is taken from Margaret Lewis Bailey's *Milton and Jakob Boehme* (Oxford University Press, 1914, pp. 79-80):

William Law (1687-1762), the great eighteenth-century disciple of Boehme, states in a letter to Dr. Cheyne: "When Sir Isaac Newton died, there were found amongst his papers large abstracts out of J. Behmen's works, written with his own hand. . . . It is evidently plain that all that Sir Isaac has said of the universality, nature and effects of attraction, of the three first laws of nature, was not only said, but proved in its true and deepest ground, by J. B. in his Three first Properties of Eternal Nature. . . . Sir Isaac was formerly so deep in J.B. that he, together with one Dr. Newton, his relation, set up furnaces, and for several months were at work in quest of the Tincture, purely from what they conceived from him. . . . Sir Isaac did but reduce to a mathematical form the central principles of nature revealed in Behmen."

Miss Bailey points out that David Brewster (Newton's nineteenth-century biographer) distorts his subject by trying to make light of both Newton's interest in alchemy and the influence of Boehme, going on to recall that most of the early members of the Royal Society were believers in alchemy and astrology. Since these are corrections of a sort which Prof. Manuel also labors to accomplish, one might think that he, like Miss Bailey, would see no reason for rejecting Law's testimony that among Newton's papers were abstracts from Boehme's works, especially since quantities of these papers have been lost or have somehow disappeared. Pertinent, here, is the fact that papers of Newton relating to Boehme were once listed as being at Trinity College, Cambridge, but that Miss Bailey, searching over fifty years ago, could not find them there.

Not many readers, perhaps, will follow William Law to his far-reaching conclusion that Newton but gave mathematical rationalization to Boehme's conceptions. However, the twentieth-century

philosopher, Morris Cohen, thought enough of Boehme's influence to remark (in *Reason and Nature*) that formulation of the law of gravitation would have been impossible without prior knowledge of the "daring and unorthodox speculative idea (which Newton derived from Boehme and Kepler) of a parallelism between the celestial and the terrestrial realm."

As a historian of culture and ideas, Prof. Manuel does Newton the service of enabling the reader to understand him as he wanted to be understood, or as he, at the end of his life, understood himself:

The more Newton's theological and alchemical and mythological work is studied, the more apparent it becomes that in his moments of grandeur he saw himself as the last of the prophets, living on the eve of the fulfillment of his times. . . . But Newton's insistence that he was part of an ancient tradition, a rediscoverer rather than an innovator, is susceptible of various interpretations. In manuscript scholia to the *Principia* that date from the end of the seventeenth century he expanded his belief that a whole line of ancient philosophers had held to the atomic theory of matter, a conception of the void, the universality of gravitational force, and even the inverse square law.

The closing paragraph of the book shows Newton in his dual nature as representative of the age he inaugurated, however involuntarily:

The polarities of nature are paralleled in the ambiguous nature of science itself. On the morrow after he discovered the mathematical expression of matter, he turned to trivialities of existence and the cruel exercise of dominion, even as some three centuries later the collective discoverers of the infinite potentialities of matter have been first driven to exploit its destructive power. The overwhelming question remains whether Newton's science, which gave him great power and little wisdom, can in some other incarnation bestow that wisdom upon his fellowmen. For the times are not yet fulfilled.

COMMENTARY

FASCINATIONS OF THE MEANS

How can we protect ourselves against the great historical disasters flowing from over-confidence in methods and means? It is obvious that we accomplish little or nothing without the development of means, yet the goals of limited means—and *all* describable means are limited—turn into prisons when allowed to shut out other possibilities, other conceptions of realization and fulfillment.

The social struggle is always, in the end, against the blind resistance of wornout and misapplied means. Passages quoted from Harold Rosenberg in this week's lead article illustrate the terrible confinements imposed by the vulgarized and inverted means of the scientific method, by the claim that if you practice the method you don't have to worry about "morality"—it's built into the correct procedures.

The worst thing about this situation is the popular faith which rejects any investigation of such mistakes in their formative stages in individual thinking. Because only "objective" evidence is acceptable, we wait until the consequences are hideous enough to arouse political passions—which means that the popular diagnosis will be coarse and unseeing of what is really wrong.

These mistakes need investigation *before* they become "social" issues. Newton, for example (see Review), lived in an age when both scientific and religious method were taken seriously, and while he was critical of scientific method in a way that his successors and popularizers ignored, he was tragically vulnerable in his narrow understanding of religious method—that is, he was sure he knew exactly how "God" worked, setting him (Newton) apart for unique duties which no one else could perform. Prof. Manuel may be right in suggesting that Newton's religious egoism ironically became the profane conceit of scientism, with

consequences of which we are now terrifyingly aware.

The need, it seems evident, is to learn how to recognize and define all such vulnerabilities so clearly that the fascination of some wonderful new "means" will not be able to shake our critical balance. They may involve conceiving of knowledge as first existing at a high level before its bifurcation into the polarities of science and religion, before it splits into what we term subjective and objective truth.

A. H. Maslow's differentiation between being-needs and deficiency-needs may be a key to such undertakings. This comprehension of man makes the monopolistic case of the Grand Inquisitor break into fragments. If taken seriously, it compels well-meaning Organization Men to ask themselves the necessary questions. It may supply the only hierarchical order of values with enough self-evident truth in it to guide the development of a genuinely humanized technology.

The creation of a world in which the individual is not functionally frustrated in his own self-development is the task. This means a world in which the norms of all other activities are subordinated to the norm of individual self-development—with the highest priorities reserved for being-needs. And this may mean returning to school, in a chastened mood, to teachers who give evidence of having understood these matters, and listening carefully to men who would not compromise on short-cuts or painless ways to apply what they taught.

CHILDREN ... and Ourselves

THE ONLY PRACTICAL PROBLEM

EVENTUALLY, the entire pluralist conception of science, as well as the specialist conception of competence, may have to be discredited. There will be some compromises, of course; it is a very large order to maintain that one has to know something about *everything* before even limited certainties can be trusted, but this, after all, is what we mean when we say that a man without common sense makes a mess of nearly everything he does.

In the present, men with an uncommon amount of common sense are obliged to masquerade as specialists in order to get a hearing. Sometimes they acquire a very wide hearing by this means, which is fortunate for us all. But it is fruitful to ponder why. Maybe they get the hearing not because they are such knowledgeable specialists, but because some kind of wisdom shines through their specialty. They may, of course, and usually do, apply this wisdom most noticeably in the area in which they have become somewhat famous, but it is still the wisdom which attracts and makes us want to read more of what they say.

Take the case of John Holt. He is believed to know about educating the young. He does. His books about children and schools are best-sellers, and they ought to be. It is surely a sign of common sense in the American public that so many people recognize the sense in what John Holt says on these subjects. His books are written to improve education in the United States; however, you don't exactly know, after reading one of them, what to start out doing, the next day, to further this end. Instead, what probably happens is that his readers renew their thinking about basic questions and issues which have consequences in all directions, and this, indeed, may be the best possible result of reading John Holt. For the schools will not get any better until

enough people think more seriously about the sort of questions John Holt raises. The schools are off-prints of the community, and the community is an off-print of the way people think and decide to live their lives. The schools, then, will get better when the community gets better. That, in the end, turns out to be John Holt's point, just as it is Paul Goodman's point, and as it was, a long time ago, Plato's point.

Mr. Holt's new book, *The Under-Achieving School* (Pitman Publishing Corporation, 1969, \$4.95), seems a kind of catch-all for his recent writing. Whatever he says is hot stuff so a new book was hurried into print. It doesn't matter. It *is* hot stuff. It should be put into print, in any form at all. At the beginning is a long essay titled "Schools Are Bad Places for Kids." Well, says the man of scientific balance who dislikes sweeping statements, they're not *all* bad. Mr. Holt would agree. But he has found that most of them are bad, and when he happens on an exception he makes you think he has located another Pike's Peak.

In this essay, as in others, he shows that the schools aren't bad because bad guys run them but because of misconceptions about the nature and learning processes of human beings. We—our schools—are too much in the hands of the experts on education. Mr. Holt remains ingenuous. He studies the kids, not the experts. By this means, in the chapter, "A Little Learning," he exposes the great Piaget as sometimes the victim of what the Buddhists called the delusion of Name and Form. As Holt says, "When we try to predict reality by manipulating verbal symbols of reality, we may get truth; we are more likely to get nonsense." He explains:

Many current learning theories are closely related to those of Piaget. To see the flaw in their reasoning we must look at one of Piaget's simpler experiments. Before a young child he put two rods of equal length, their ends lined up, and then asked the child which was longer, or whether they were the same length. The child would say that they were the same. Then Piaget moved a rod, so that their ends

were no longer in line, and asked the question again. This time the child would always say that one or another of the rods was longer. From this Piaget concluded that the child thought that one rod had become longer, and thence, that children below a certain age were incapable of understanding the idea of conservation of length. But what Piaget failed to understand or imagine was that the child's understanding of the question and his own might not be the same. What does a little child understand the word "longer" to mean? It means *the one that sticks out*. Only after considerable experience does he realize that "Which is longer?" really means, "If you line them up at one end, which one sticks out past the other?" The *meaning* of the question, "Which is longer?", like the meaning of many questions, lies in the procedure you must follow to answer it; if you don't know the procedure you don't know the meaning of the question.

Mr. Holt develops the consequences that might result in children's lives if they really believed the way Piaget says they do; then turns to wider applications:

From this fundamental error—the idea that our understanding of reality is fundamentally verbal or symbolic, and that thinking, certainly in its highest form, is the manipulation of those symbols—flow many other errors, and not just in the classroom. Having given a group of things the same label, because in a given context they have important qualities in common, we then tend to think and act as if they were permanently and in all respects identical. This often puts us badly out of touch with reality, and gets us into very serious difficulties, as in the case of our foreign policy, still largely based on the crazy notion that all Communists are alike (like Joe Stalin, to be specific), and forever the same. We think, and above all in the classroom, that almost any experience, insight, or understanding can be conveyed from one person to another by means of words. We are constantly talking and explaining, aloud or in print. But as classroom teachers know too well, our explanations confuse more than they explain, and classrooms are full of children who have become so distrustful of words and their ability to get meaning from words, that they will not do anything until they are shown something they can imitate.

Reducing children to this tendency to imitate, as a form of self-defense, is not the least of the reasons why schools became bad places for kids. Mr. Holt's criticism connects up with much that

Herbert Read has said, that Robert Jay Wolff said, not to mention again what Paul Goodman has said (in the April 10 *New York Review of Books*). Actually, more "research" is not needed. What ought to be done about educating the young is quite well known. What is needed is people who will begin to see that it gets done, starting, perhaps, with their own children. Plenty of teachers are ready and waiting. Unfortunately, they have to eat.

FRONTIERS

Thoughts on Future "Evolution"

THERE is a value, even for those convinced that the problems of the world must finally find Socratic solutions, in thoughtful estimates of the future possibilities of technology under cybernetic guidance. For these wonderful and often terrifying developments are not going to go away. Probably the man best equipped to reconcile the literate, humanistic individual of the present to some rational form of the technology of tomorrow, despite its distinct antihuman tendencies in the present, is R. Buckminster Fuller who is himself an outspoken humanist and a champion of individual resourcefulness as well as of a broad ethical foundation for the uses of technology. He is this, and at the same time an enormously practical and wildly original technological thinker—you could think of him as a science-fiction dream of a warm-hearted engineer who has made some of his visions come true. Geodesic domes dot the globe.

Some years ago, at the University of Southern Illinois, where Mr. Fuller presides over the department of Design Science, he started compiling an inventory of the world's resources, as the basis for using them with greater morality, efficiency, and dispatch. In charge of gathering and organizing the data of this inventory (of which six volumes are in print) is John McHale, an artist and designer who has been characterized as a man who carries in his head greater particularized grasp of the sophisticated forms of advanced technology than practically anybody else. On leave from Southern Illinois, Mr. McHale is now director of the Center for Integrative Studies at the School of Advanced Technology, State University of New York at Binghamton. He also holds a Ph.D. in sociology.

Mr. McHale has written a new book, *The Future of the Future* (Braziller, 1969, \$7.95), available after Aug. 18, in which all these talents become manifest. You get the impression that

human evolution, for the author, is at least partly made up of the development of an elaborate exoskeleton of technological extension of man's faculties, sensory equipment, and powers—somewhat as Marshall McLuhan suggests in respect to the electronic media, but more as Buckminster Fuller suggests in relation to the refinement, miniaturization, and even the organicizing to practical invisibility, like internal organs, of servo-mechanisms and other devices. The pictures in the book show engineer's visualizations of what apartments for explorers on the moon might be like, and various other robot-like developments. The tone of Mr. McHale's thinking about future technology is indicated by the following:

Technology may be as natural a part of human evolution as the differentiation of finger and thumb, and in this sense has been until now almost as free from man's possible control. We do not yet fully understand or accept the organic evolutionary quality of technological growth. The idea is, in itself, somewhat alien to our comprehension.

Man has always assumed that an evolving technology would be of the mythological robot variety, formed in his own image. This is why it is difficult for us to observe the evolutionary phases of the airplane from single person/single engine with multiple wing surfaces to propellerless jets of enormous size, speed, and possible 400-passenger carrying capacity, almost in one generation; or to accept easily the evolution of the family of "extended eyes" from bulky, tripod, wet-plate still-cameras to microminiaturized television cameras spinning around the globe outside the earth's atmosphere. For the time being, we can only "humanize" technologies and hope to exert more conscious control over their development by extending to them a more inclusive and ecological approach rather than treating them as recent and alien intrusions into our society.

We wish that, somewhere, Mr. McHale would deal with the "caste" problem that is likely to develop if many more of the intimate processes of our daily living become dependent upon the know-how of a comparatively small number of brilliant technologists; this is always the ominous lining of such dreams, from a humanistic point of

view. However, the author has some doubts along these lines:

The range of predictions regarding the future is now relatively enormous. The number of professionals engaged in exploring the future is, possibly, matched only by the number employed in excavating the past. Futures research—as it is now rather primly termed—is already divided among a variety of academic disciplines. The danger is no longer that the future may be neglected, but rather that it may become over-professionalized—if not out of existence, then at least out of reach of lay participation and interest.

Well, that is a warning. Yet there is really no such thing as "lay participation" in arranging and living one's life. Either you arrange and live it yourself, or you don't. Having to see a mechanic to keep your car running is bad enough, but having to consult the technological master-minds about more important things—well, the prospect is not inviting. On the other hand, one has the feeling that there must be some positive value in the idea of the internalization of technology, even though we don't have the key to it as yet. The development of all this equipment must have *some* human meaning, or would with the right direction and restraints, and it seems wrong to say only that it will enslave us at one level while it makes us "free" at another. Yet this danger is surely real. More attention to Dr. Maslow's distinction between deficiency-needs and being-needs is urgently in order.

Meanwhile, John McHale's book is probably one of the best for finding out where we are now, technologically speaking, even though using the pronoun "we" in such connections seems a bit silly for a great many of us, and will doubtless remain silly for a long, long time.