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Raging Robots and Unruly Uncles


Wicked Jasper, a villain by profession, has seven sons he has named after great villains of history—Caligula, Nero, Genghis, Tarquin, Belshazzar, Adolph and little Jack. Wanting his sons to follow in his own wicked footsteps, he sends them to a select school for villains.

Jasper's twin brother, Julian, is, by contrast, a paragon of virtue. He sends his only child, Prudence, to the Select Academy for Old-fashioned Heroines.

As a practical joke, Jasper's sons mail Prudence a goody-goody robot, Lilly Rose Blossom, to taunt her. In response, Prudence sends Jasper's boys a fiendishly insolent robot called "the Nadger." The immediate result of this exchange is that Jasper's seven sons and Julian's daughter all run away from home and team up together. The Nadger then hounds Jasper with a level of bad behavior his own sons never attained to, and Lilly Rose Blossom suffocates Julian with ceaseless efforts to improve him.

In the end, Lilly’s virtue is turned on the Nadger’s viciousness. With the robots thus neutralized, a wiser Jasper and a chastened Julian rejoin their children, who have already formed a successful community together.

Though zany and wildly farcical, this story is also serious and thought-provoking. There is insight in the Nadger's claim that he and Lilly are Jasper’s and Julian’s true children, being "the children of their ideas." "You," he says to Prudence and the boys, "are nothing but blood and bones, but we are their thoughts. You grow tired but we go on and on for ever unchanging." (83)

When, a little later, the Nadger is threatened by Prudence with extinction, Lilly protests eloquently:

"It is true...that the Nadger has stolen a wide variety of goods from supermarkets—but is it not because that is what he was MADE to do? It is true he is a collection of tins wired together, but by now he has a name and he knows himself. Is it fair to destroy him for being what he was invented to be?" (85)

Here, in ethical as well as epistemological and metaphysical terms, is the problem of minds and machines. If the Nadger simply does what he was programmed to do, then surely he is not a person and has no mind. If, however, he knows himself to be the Nadger, then surely he is a person and has a mind. And if he is a person and has a mind, then surely it is wrong to destroy him for doing what he was programmed to do.

But does he know himself to be the Nadger? What would show that he does? or that he doesn't? or couldn't? And how, come to think of it, do we know that we weren't programmed to do what we do—programmed, not by mischievous electronics wizards, but by our genes and our environment?

Is free will the key? "You can stop playing the game of villains and heroes when you want to," Lilly says later on; but "the Nadger and I are bound, by wrong measurements and by wickedness circuits, to be heroine and villain forever." (85) Are we really any more free than these robots? Or are we, too, bound by our "measurements" and "circuits"?

In fact, Prudence, "with the skill of inspiration," changes the Nadger’s circuits so that, listening to Lilly, he will improve "to the point of being merely BAD." (88) Do we have any better hope?

Could one conceivably want one’s children to be consistently villainous? For that matter, could one want them to be consistently virtuous? As readers we are relieved to learn that virtuous Julian no more succeeds in his educational goals than wicked Jasper does. Is that because we, too, are mixtures of virtue and vice? Or is it because we have a wrong conception of virtue? Is there something inherently unsatisfactory about extremes, even extreme virtue? Or is it wrong to suppose that virtue could be an extreme? Is virtue, as Aristotle suggested, always and everywhere a mean?

None of these questions is answered by Margaret Mahy’s wittily wise story. But it would be hard to think about her story very long without taking a stab at answering some of them for oneself.
Herbert W. Schneider was for many years a professor of philosophy at Columbia University, and now resides in Claremont, California. This article is reprinted with permission from "Schooling, Learning, and Education," The Educational Forum, Vol. XXIX, November, 1964, pp. 31-38, and had earlier been given as the H. Gordon Hullfish Tribute Lecture to the Ohio Philosophy of Education Society, College of Education, University of Cincinnati.

Education and the Cultivation of Reflection

by Herbert W. Schneider
I propose to examine a whole life-time as an educative process which begins with trial and error learning, turns into studying, continues with reflective thinking and learning, and culminates in the personal appropriation of a culture. This seems to me to be the central theme of what Professor Hullfish taught and also the way in which Henry Gordon Hullfish lived. His mind and character, his career and influence, were, and still are an enduring example of cultural fruit, enjoyed by those who knew him and admired by those who witness the fine fruit which his education still bears. It is a rare teacher who succeeds in bringing his educative process to cultural fruitage in his students, and it is a rare student who continues to learn until his studies bear cultural fruit.

With Hullfish I now invite you to enter the schoolroom and to note what happens to a child who, according to some psychologists, has learned in his first six years more than he can learn in the next sixty. This child leaves the daily round of animal learning at home and in the family to become a professional student, manipulated by a professional teacher and surrounded by companions who are supposed to be his rivals in study but who really turn out to be partners in learning, making the best of their common confinement in a strangely furnished building under curiously benevolent guards. They spend the school day alternately making the rounds of what is well-named a "curriculum" and then running out of doors, but strictly not out of bounds, for recreation, relief, and companionship. Seen from a child's perspective and from that of an uneducated adult there is something artificial and almost inhuman about schooling. To be ruled by professional teachers may turn out to be better than being under amateur parents, for soon both parents and children are relieved when the youngsters run off to school in the morning and fail to run back straight home from school in the afternoon.

Despite its artificiality the classroom with its study atmosphere becomes normal to a child, as normal as a harness to a horse. Nevertheless, when a child becomes a systematic, professional student, he is no longer a normal child. Like Adam and Eve, the child no longer eats spontaneously, unreflectingly the fruit of the tree of knowledge-good-and-evil; he leaves the family orchard and concentrates with "the sweat of his brow" on the art of cultivation. He begins his double life of conscious labor and relaxed leisure at the normal rate of five to five—five school days to two free days; and five school hours to two of recreation. Thus the rhythms of the worker's career become established. It is important for a worker's morale that classroom activities be genuine tasks, real work, serious business, clearly separated from play, perhaps requiring reflective thinking but in any case requiring diligence, punctuality, and the other factory virtues. The student, if he takes a professional attitude toward his work, as a majority of children proudly do, is initiated into the universal community of workers. Schooling is obligatory and irreproachable child labor.

Historians of philosophy point out that there was a major crisis in the history of reflective thinking when Cicero transformed the idea of philosophy, which in Greek means a kind of love, into a kind of studium. Since the days of Cicero, philosophy has become a subject-matter, whereas it had been a way of living and loving. This is an evolutionary crisis of major proportions: analogous to the "fall from innocence" perpetrated by Eve and Adam (ladies first). A similar crisis occurs in the history of any individual when he is transformed from an innocently learning organism into a student worker with tasks and responsibilities. Schooling is essentially harnessing, burden bearing, submission to the day's work, initiation into the attitude of a willing, competitive worker. Analogous rites in primitive cultures are usually accompanied by some torture and blood-letting; but in advanced, industrial cultures they are usually accompanied only by mental traumas.

There is something pathetic and heroic in all this; something symbolic not only of the necessities which nature imposes on human beings, but also of the basic traits of our culture: laborare est orare. We become laboring animals before we ask critically: Is this labor also production? Does it contribute to the divine process of creation? Not being certain of the answer, we shrug our shoulders and say: At any rate, it is education. This initiation into the status of laborer before we are ready to undertake production in one of the serious arts and industries has a way of eating into our consciences and of teaching us unconsciously that busyness has priority over enjoyment of goods and occupation over vocation. As a result, the basic problems of schooling are moral; what discipline there is in the habits of reflective thinking is centered more on the duty of thinking than on the seriousness of the problem as an aspect of production. The knowledge acquired and the learning achieved are significant less for their relation to the problems of living than to the formal art of reflective thinking. This is the theory of the better educators, like Hullfish; I say nothing of the unspeakable older theories of formal discipline as sheer categorical imperatives. In short, schooling at best encourages reflective thinking for its own sake.

To those millions who are not accustomed to using the word "reflection" as Hullfish and Co. use it, there is something ex-post-facto, retrospective about reflective thinking, like saying prayers before going to sleep. Reflection at work and in work and for work is a novel idea to those of our citizens whose schooling is elementary. To them reflection comes, if at all, during the hours of leisure after work, it is part of their moral discipline to keep their leisure hours free of their daily cares, to devote them to relaxation and recreation and reversed reflection.

Thus reflective thinking, according to the popular idiom, has come to have a bad connotation. When, on the other hand, it is praised as something "spiritual" like meditation and contemplation, having a higher dignity than laborious thinking, it is purposely kept free of real problems. Fictional imagination, detective guessing, chess, or religion, these
are supposed to have a liberating, or at least an opiate value, precisely because they are unrelated to work. Pragmatic thinking is regarded as menial labor or as sordid for some other reason. This divorce or reflection and problem solving is a prevalent trait, not so much of our actual culture as of our reflection on it; and it produces schizophrenic states in those minds that imagine themselves to be educated, or even better, to be intellectually aristocratic. For this reason it is difficult for them to conceive of public schools as suitable places for reflective thinking. When they read passages like the following from the writings of Hullfish, they wonder whether the author has ever been in a real classroom:

The classroom is a segment of life . . . Each teacher each day confronts, in the normal work of the classroom, the opportunity to make the learning process a vital one. The situation in which he and his students are placed is as real a situation as either he or his students will ever be in . . . . The dogged pursuit of ideas is the sole issue at stake.1

If these statements are to be true of actual classrooms, not merely of normative classrooms, and of actual students and teachers, there must be a radical change in all three. I suspect that in a school of which this were true there might not be classrooms, teachers, and students. A "laboratory" (Latin for "workshop") in which the teacher is a coach and the students are working cooperatively at a real experiment whose outcome was not known in advance might come nearer to fitting the situation which Hullfish describes; but the combination of professional teachers, proverbial students, and typical classrooms will certainly not meet Hullfish's specifications of "real situations." Hullfish admits that teachers must be "reconstructed" (p. 196), and he suggests that "any sensitive teacher may initiate his own personal reconstruction" (p. 204). But this seems to me to be too hard on teachers, who usually carry the chief burden and blame when schooling goes wrong. I suspect that if the needed reconstruction is undertaken it will be much more than "personal." The whole teacher-student relation needs revision, if artificial teaching and ineffective studying are to be reconstructed.

Ideally, they say, teachers and students are "pleasant collaborators in a shared undertaking" (p. 205). If this were literally true, not only teachers and students would be transfigured human beings, but classrooms, schools, and perhaps society would be quite unlike what they are.

A schoolroom is not really a community of learning, and the relation between teaching and learning is by no means as close as it is thought to be or as it ought to be. Every teacher knows that conventional "studying" is a very inefficient way to learn, and that classroom teaching makes it practically impossible for teacher and student to join in the learning process. In short, an educative school, where learning is the primary aim and reflective thinking the method, is a different type of institution from what today we call a school.

A banker, who employed college graduates regularly, once told me: "I can teach your graduates more in six weeks than you teach them in four years, but, of course, I couldn't make them learn, if you hadn't made them study." I have taught, or thought I was teaching, most of my life, but have become increasingly skeptical of the efficacy of the teaching profession, if the aim is to teach students to learn.

There are many curious ways of earning a living, I know, but professional study and professional teaching, the more I observe them, the more they appear to me to be extraordinary curiosities. Of the two, I suppose the student is the more curious, especially the earnest one. I found students easier to teach out of school than in, when I did not know I was teaching and the student was doing something not recognized as studying.

If you interpret my remarks about institutionalized study as implying that a school is no fit place to learn anything, you no doubt think my harsh generalizations ridiculous. In distinguishing between schooling and learning, between studying and reflective thinking, perhaps too sharply, I am warning against the too optimistic identification of the two processes. We all agree that in school students learn to study, if they learn anything, but I wish to examine more closely how habits of study are related to learning something about that which is studied.

By proper studying a student may learn to recite well, to pass examinations, and to write what are euphemistically called 'compositions.' But are these tests useful measures of thoughtful learning? A sensitive teacher is usually dismayed or disheartened by reading student compositions and correcting the formal faults. These performances not only "smell of the lamp" (as the Greeks used to say), but they show that the material learned remains a foreign substance in the learner. It is seldom that the author gives the impression that he knows what he is talking about and that he cares whether or not he knows. The subject-matter is extracted from a book but not really appropriated to a person; it is not really in the mind.

Most academic production, even when it satisfies academic standards, is not production of consumer's goods, nor even capital goods for the producer. It remains lifeless, without the expressive functions of songs, dances, and story telling. Learning to perform in this way seems to me to have little relation to education and leaves both teacher and student dissatisfied, not so much with each other as with the whole process.

Learning, in order to be educative, must be an integral part of a personality. It is experience that transforms a human organism into a person, but conventional schooling adds little to genuine experience. To the student, studying seems to be "learning the hard way." To a more experienced adult, it is the harder knocks of practical problems that are really "the hard way" as well as the most common way of learning. Whether hard or soft, it is the lessons of experience that are the most valuable and memorable; they become part of our very being. The aim of schooling should be to help a professional learner to overcome obstacles by skillful thinking instead of by still harder experience, in order to avoid the bitter and often tragic reflections that come from stupid stumbling. In Hullfish's phrase, reflective thinking should bear cultural fruit; school lessons should be those which can be built into the working capital of experience.

Occasionally schooling produces a learned person; this is one of its minor cultural fruits. Such a person is in danger of making only pedantic use of
his experience; he exhibits his learning as an excuse for not being a personality. Such disembodied minds have a modest function in a culture. Like dictionaries, encyclopedias, computers, and other lifeless bodies of knowledge they have real utility. However, a person who has become learned, and knows it, is usually a person in the past tense. He appears to be educated, whereas he merely wears an education along with the rest of his clothes. It would be a cultural tragedy if schools were primarily factories of such scholars. How pathetic it is when schools become so successful in making students that their graduates remain students for life, doomed to serving life-sentences in school. I recall once when I was in graduate school listening to Professor Dewey explain his favorite theme, that school should be continuous with life, a fellow-student burst out in despair: “But Professor Dewey! Some of us want to get out of school.” To which Dewey replied in his quiet, slow, reflective manner: “Well, you’re not in school now.” It was part of Dewey’s genius that he never acted as though we were in school. He used the so-called classroom as a place where he could converse with God or some other obstacle. The class was seldom in his line of vision.

I tell these tales out of school not in a spirit of rebellion or even of criticism, for I have enjoyed many good schools. My aim is to warn ourselves against exaggerating their educative value. There is the large quantity of so-called “basic” learning that comes before school, then
a few years follow of "study-periods," and then comes the long career of postgraduate learning. The normal product of a life of learning is not a learned scholar, but an educated person, for whom lessons yield experience, and problems bring out personality.

This leads me finally to say something about education as a process. A well-educated person does not think of himself as possessing an education, any more than an educated scholar thinks of himself as learned. A person whose mind is part of himself and whose thinking is a way of gaining experience is always in the course of being educated. He is not a professional learner but an habitual thinker, and what he knows shows itself not so much in what he remembers as in how he responds to a situation.

You are all familiar with the old definition of education: Education is what you have left when you have forgotten what you learned. This is an uneducated way of stating a truth. Let me try to say it more precisely, less concisely. The "educative process" is a name for the personal appropriation of whatever is experienced as significant. Such an organization of experience is not a system of ideas or a philosophy but a living integration of meanings into a personality structure. The growth of character and mind is the net product or the cumulative assimilation of thinking and learning. All depends on how a person learns, how he uses what is learned, how well he can draw on experience, and how wide the range of his experience is. A well-educated person is never a finished product. He continues throughout life to absorb, or make his own, whatever cultural resources, natural opportunities, new experiences stimulate his reflective thinking; this appropriated capital of thoughtfully ordered experience is available for seeking and interpreting new events and situations. Education is not a storage of knowledge, but an ability to use knowledge in living intelligently.

Education in this large sense was formerly called "cultivation" and a cultivated person was called "cultured." These terms now have a stilted sound and are associated with the class of persons known as the elite or the intelligentsia, a class which makes a more or less professional exhibition of its superior achievements. To avoid such class consciousness and snobbery I prefer, and common usage prefers, to speak simply of an educated person, meaning by this both more and less than a person of higher schooling. An educated person need not be learned, and seldom is.

However, it is important to understand that being educated in this sense implies "higher" education. Any real education is higher. To refer back to our text, it takes time for elementary schooling and learning to show itself as education. Education comes close to meaning what Aristotle meant by eudaimonia (in case you wish to trace the idea back to the Greeks)—life well lived. To live an educated life or to be an educated person requires certain advantages and opportunities, but these do not imply that education is restricted to an "upper" class. The educative process, to be sure, requires a certain amount and kind of travel, for the sense organs first of all must be exposed to educative sensations, to fresh experiences, cultural variations, getting out of physical ruts. But even more important are the opportunities for getting out of mental ruts and for wandering in the realms of literature, music and the other fine arts, and in religion when it is of an educative kind. This means more than mere contact with these realms, it means dwelling in them until one is at home in them. Having the distant present is for an
educated person an essential feature of his very being.

I insist on this conception of education, "the liberal appropriation of the actual, the past, the distant and the imaginative in both nature and culture," because I wish to make two applications of the idea and to relate them to the educational ideas of Hullfish. The first application is a criticism of the concept of "the educator." Are there educators? There are school masters, administrators of schools, colleges, and universities; there are critics of educational systems, educational theorists. But do they really do any educating? Can an education be man-made? Is not the educative process a creation of divine grace, or a natural growth, or a cultural fruit—call it what you will—but not an artifact? No man can educate another, nor does he educate himself. There are self-made men, to be sure, but they are not educated. The educated self is the outcome or fruit of the educative process, as Hullfish well names it.

The person is not the educational agent, but the culmination of a process half natural, half cultural. We may be educators in the sense that we are digestors. Cultural assimilation is analogous to physiological assimilation; the latter process culminates in a healthy organism, the former in an educated person. Neither process can be performed by one person for another. Just as each individual must take care in the choice of food, so each person must take the necessary measures to promote his own education. But the process itself, the actual appropriation, is a gradual growth or kind of experience. Experience is not made; it happens. School masters, teachers, books and laboratories, travel and communication—these are all educational aids or instruments, but only in this sense are they educators. Education is not a profession as teaching is. Though Hullfish is known as an eminent educator, I believe he would agree with me in distinguishing between the eminently educated person that he was, and the eminent expert that he was in teaching the arts of teaching, learning, and thinking. I cite one passage from a speech of his to members of his profession, which shows that he was well aware of the dangers of confusing education with indoctrination:

To stand firm for the right to create educational conditions within both the school and culture on which the continuing growth of free men depends is to take a positive position, a professional one . . . . It represents . . . . the acceptance of the unique and difficult assignment given the schools by free men. 2

Here he clearly recognizes the importance of creating "educational conditions" in school and society so that men can become free through education. I have not emphasized the relation of education to freedom and democracy, for you are familiar with Hullfish's emphasis on this relation. Liberation and education are aspects of a single process, and they require the conditions which the nature of the process indicates. Men are not created either free or equal, but under favorable conditions freedom and self-development emerge as cultural fruit.

The second and last point I wish to make is a very elementary one and yet one that raises difficult practical problems: a teacher should be an educated person. This is easier said than done. A teacher should be trained to teach, of course, and he should know his subject; but he may have both these qualifications and still not be educated. He can be an instructor or coach without being a personal, living example of an educational process. He may help students learn without stimulating them to use the learning educationally.

It is expecting too much of a teacher that he be an educator, but if he be not himself educated, his students get the wrong idea of what they are doing in school. All of us know teachers who are professionally competent and yet fail to be useful in the educative process. They bring no "cultural fruit" to the classroom, if I may repeat Hullfish's apt words. All of us know literate persons who are mere graduates and alumni, who rejoice that their school days are over and who imagine that they have or had an education. Unless they have assigned lessons, they have no occasions for thinking reflectively or understanding real problems; they become dull after graduation.

Only a minority of educated persons return to school and enjoy teaching. This is as it ought to be. But there is a danger that students become teachers before they have had an opportunity to be educated. The need for education, or as Hullfish calls them "reconstructed," teachers is especially critical in our secondary school systems. It is during adolescence that students have need especially of working with educated persons, so that they have immediate contact and acquaintance with persons whose actions and conversations are evidences of education. A teacher is very important during extra-curricular activities, for it is these activities that evidently require education. It is not enough to teach reflective thinking; such thinking must be conspicuous in action, in habits, in character, and in communication. Only teachers whose education has been built in without being stored in memory mechanically, who are more than teachers, can create what Hullfish refers to as "educational conditions in the schoolroom." If we as citizens take this problem seriously, we shall provide more liberally and intelligently for the education of prospective teachers, presumably during the years in "normal school." They are entitled to educational opportunities as persons, but they have a professional obligation to promote their education as part of their teacher training.

I have studiously avoided the current talk about "general education" because those who are trying to promote general education are trying to make of it a subject-matter for the school room. This is dead wrong and futile. A genuine education is general, to be sure, but it is general not in an academic sense, but in the sense that it must permeate the person generally. It is not general unless it is personal and it is not personal when it is merely studied. The process takes time as well as intelligence. And that is why we should conceive our educational system as going far beyond the process of studying, beyond the formal learning, to include the bearing and enjoyment of cultural fruits.

FOOTNOTES
1 Reflective Thinking, p. 209.
2 Reflective Thinking, p. 256.
Charles Peirce, in reviewing Lady Welby's What Is Meaning? in The Nation, recognized her originality and the important implications of her work for philosophy and for education:

The greatest service the book can render is its bringing home the question which forms its title, a very fundamental question of logic, which has commonly received superficial replies...To direct attention to the subject as one requiring study, both on its theoretical and practical side, is the essential purpose of the work. In doing this, the authoress has made a contribution towards the answer to the question, in pointing out three orders of signification.

Peirce added that the problem of meaning was to be one of the most important for future philosophy and demanded a systematic study of signs. He was interested in Lady Welby's three orders of signification, since they seemed to him to correspond to his own ideas of "firstness, secondness, and thirdness." Moreover, he applauded her urging that priority be given to logic — the ethics of language, and that logic should constitute the "basis or core of any good education."

From 1885 until her death in 1912, Lady Welby's philosophical interests were completely centered on problems of language and meaning. One must begin, she argued, with an analysis of meaning, which in itself is multi-dimensional. The three main levels of meaning are for her, sense, meaning and significance (although these might be better understood as observation, meaning and value.) In a letter dated March 14, 1909, Peirce commented:

I had not realized...how fundamental your trichotomy of Sense, Meaning and Significance really is. It is not to be expected that concepts of such importance should get perfectly defined for a long time...I now find that my division (of the three kinds of Interpretant) nearly coincides with yours, as it ought to do exactly, if both are correct.

Of course, there are, according to Lady Welby, other dimensions to language: "We have purport, import, bearing, reference, indication, application, denotation and connotation, the weight, the drift, the tenor, the range, the tendency of a given statement." And, she writes, if we are to make sense of the world we live in and communicate that sense to others, it becomes essential that we sensitize ourselves to all of the dimensions of meaning that different situations and contexts demand.

Lady Welby specifically intended her work to have implications for education. She recognized that children have strong metaphysical tendencies with their endless "whys," their craving to make sense of the world and their ability to assimilate and freely use abstract terms. She thought children naturally tend to be active, to inquire and to hunt for reasons. In light of this, education should be designed in such a way as to make the most of these tendencies. Her suggestions to educators might be summarized as follows:

1. One should begin with children's discourse in teaching, rather than with formal disciplines.
2. One should encourage children to speak to each other and to adults.
3. Teachers should aim at developing children's powers to draw distinctions, to recognize formal and informal fallacies in everyday conversation and to avoid inconsistencies.
4. Teachers should aim to help children recognize the significance of context, and the crucial role that it plays in determining the words that we use.
5. Teachers and parents should capitalize on the child's natural tendencies to ask why and to seek for reasons.
6. Teachers should help children
master the method of inquiry. Since it has never consciously been cultivated in early childhood on a large scale, we don't know of what children are capable.

7. Teachers should organize the curriculum around children's tendencies for seeking significance.

8. Teachers should help children distinguish the important from the trivial within the various disciplines.

9. Educators should develop a sequential curriculum that begins in early childhood and encourages children to move from the "that" and the "what," to the "how" and the "why."

10. Children should be given the opportunity to experience the interpenetration of thinking and doing in their everyday classroom.

11. Children should be given the tools to draw connections between the various disciplines that they study — that is — be given a Principle of Translation. Lady Welby defines this principle as that by which the common denominator of all subjects learnt, however diverse, may be discovered, so that within varying limits, each may illustrate the other.

12. Since children are naturally of a metaphysical inclination, they should be exposed to the ideas of philosophy from early childhood.

Lady Welby thought that if educated appropriately, children could contribute significantly to our understanding of the world. "In time we will begin to see that the child may not merely contribute to a truer psychology, but also to a more significant philosophy than any we yet dream of."

Let us . . . consider how the teacher of the future, himself thus trained, can accomplish this transfiguration of study. At present the child's natural interest in and control over language is by direct and indirect means systematically blunted, especially by the premature teaching of formal grammar; while his typical instinct, that of asking for the reason of things, of putting the question Why, is not sufficiently recognised as the keynote of true education as of true mental growth.

The necessity for social consensus (which in the really most important directions we are impotent to secure) is pressed to the uttermost as a reason for the merely customary. We waste the often valuable innovations or corrections of current fashions of speech unconsciously made by children. These are merely received and recorded in shouts of laughter, so that the children are careful never to repeat them. But in time we shall begin to see that the child may not merely contribute to a truer psychology, but also to a more significant philosophy than any we yet dream of. Only first we must put into his hands the power to understand the value of what we call 'meaning'; we must 'educate' in the fullest sense of the word; we must aim at bringing out and thus expressing treasures of human nature now hidden in helpless silence or ineffectual talk, or in the shy reserve intensified by dread of the snubbing process.¹

¹ The result of pressing home all forms of knowledge in an appeal to sense, meaning, and significance, is an enormous development of the child's power of appreciating and using distinction, and of avoiding confusion and fallacy. The child is also helped by the use of a principle of Translation by which the 'common denominator' of all the subjects learnt, however diverse, may be discovered, so that within varying limits each may illustrate the other. The appeal to the child's expression-power will always make for that pictorial road to the abstract which is natural to the young mind. It must be remembered that the child's mind begins with the generic (e.g. all men are at first 'Daddy'), which might, perhaps, be called the mother of the abstract.
The instinct which prompts the typical child to ask Why at every turn would thus for the first time be fully worked upon. We should at last touch his natural tendency to seek a 'because' for everything—to link together all parts of his growing experience. As all fun and chaff, no less than all wit and humour, depend on turns either of sense or meaning or significance; as the ludicrous depends on the incongruous, and our sense of the incongruous, this method of education would lend itself, as no other could attempt to do, to the child's craving to be interested, excited, even amused in learning. Then we should see in 'brain-work' an unbroken continuity from that marvellous, untiring, intelligent 'nerve-work' which gradually perfects the organic activities. And this natural brain-work entirely takes the sting out of monotony, even out of drudgery. As we have seen, the young child faces both with undaunted perseverance in its natural process of acquiring and extending both vocabulary and sentence-form.

When, instead of giving him ready-made answers or none, we have learnt to take up nature's plan, and thus shown every child at school how to discover these Whys of hard work and good conduct for which from the first he has normally thirsted; when we have made it a duty on his part (instead of a distracting luxury) to hunt for reasons, to look through the that and the what to the how and the why,—we may reap an unexpected practical harvest. For to work and to ask; to do and to inquire; to see why he should learn, and how he shall succeed, and what success ought to signify to him,—these very things are already his deepest instincts. They only need translating. And when men have learnt to translate them into conscious and voluntary action, then 'reform,' industrial or other, will assume a different aspect in their eyes; it will appeal to all in a different way from any now possible. We shall have learnt to respond to the 'next higher' in social development exactly as the baby responds to the call to stand, walk, talk, ask—only in a higher and yet more entrancing form.

The truth is, the infant unconsciously translates all its labour, its pains and its troubles, into 'more abundant' Life. So we have everywhere to teach the child to translate, giving him the additional incentive of knowing that he is using a royal power, one which exalts him in all eyes, his own included.

[We should] be sure that the pupil's powers of interpretation will be trained in a fresh and living sense. This interpretative power (leading to valid inference) is still so feeble that we resent the least obscurity, even where such obscurity is the inevitably condition of expressing facts of the highest importance from a new point of view. Where this is really the case (and is not the device of the sham thinker for evading the inconvenient critic under a shower of fine words) we might as reasonably complain of the shadow which gives to physical light its value. The child will thus learn to unravel and to reconstruct sentences and paragraphs, and to detect changes of sense which alter value or 'venus.' He will be shown the loss of clearness, the confusion, the poverty of idea caused by the common neglect of valuable distinctions such as that between the imaginative and the fanciful . . . . The pupil will then be given lessons in 'seeing through' the most ingeniously and convincingly plausible statements: in detecting, not merely formal fallacy, but also intentional or unconscious inconsistency, which (as we are) easily escapes notice.

The intentional production of illusion has never yet been systematically used in education or employed by a philosophical writer to put his readers on their ground against errors which are not merely logical. It is a pity that the highest developments of the power to produce at will, and therefore to detect and expose fallacious inferences, have hitherto been called mere 'conjuring,' and devoted only to money-making by amusing trickery, if not to less defensible objects.

If the power wielded by the conjurer, which is largely the result of special training, were only translated into an altogether higher form, we might look forward to striking results in education. We should obtain most valuable studies in ambiguity of thought as well as of word, both voluntary and unrecognised; and students would learn the extent to which the plausible dominates us. They would also realise how easily even the ablest writers occasionally miss significant points by fixing attention on issues really less centrally important than others which, through the present lack of early signific training, may even seem trivial. . . .

The child must therefore learn to gauge context by context, and to hunt with unerring scent for some else unnoticed peculiarity of apparently chance expression or form of expression which gives a clue to the writer's (or speaker's) real sense, and therefore to the true order of sentences. In this work he must even in interests of detection ignore grammar. He must learn to become a sense-detective, detecting his own as well as others' more subtle blunders, more hidden flaws in that significance which it is the object of articulate expression to convey. The accomplished Significanist is at least a Sherlock Holmes, and more, a Helmholtz.

When the pupil has been thus trained he can be trusted to economise Sense and to clear himself. For throughout his studies he must be constantly reminded that were it once understood that it was possible to learn to be more expressive, much of his labour would be needless. But his teachers and examiners must first set him the example. When an average child informs his examiner in history that Wat Tyler led the pheasants' revolt and pillaged the Crystal Palace: that the Black Prince extinguished himself at Crecy, and that Common Pleas should not be carried about on the king's person: when he answers to such a question as "What is a watershed?"—"A shed for keeping water in"; or to the question "Where were the kings of England crowned?"—"On their heads," this simply betrays the failure of his teacher's methods, or the absurdity of this kind of question at a given stage. The answers make, of course, delightful nonsense; but while enjoying the joke, we ought to realise with shame the terrible witness to educational stupidity (and that not the child's) represented by these specimens.1

A curious witness to the strength of
our natural interest in questions of expression and therefore of sense, meaning, and significance, may be found in the general delight, sometimes even too absorbing, and common to all classes, in guessing riddles, solving puzzles, putting letters together to form sentences, re-setting anagrams, and so on. So with games like 'cross questions and crooked answers,' 'Russian scandal,' 'buried cities,' verse-making and story-telling (each one contributing line or incident without knowing what the other ones are), besides charades and dumb crambo. And this takes the form even of more serious mathematical problems, cheerfully undertaken by the ordinary family party as an evening's amusement!

It must, of course, be remembered that much of the work here suggested describes at least in part or in spirit what is already the aim of every progressive teacher. The point is that such work is only incidental; that it has never been gathered up under a definite general term; that it is recognised in no public school or university curriculum, and depends wholly on the chance of individual tendencies, where these are free to act. Whereas, in the mode of teaching which the term Significs properly connotes, the child must everywhere and always be so imbued with the sense that the one thing first needful is Sense, and with the idea that, having this, all things may be added unto him, that he will instinctively and habitually start from it and look for it in every step of his way; knowing that it is this which he has to grasp—to mark, learn, and digest—in every part of every subject; so that in after life he 'cannot help'—cannot avoid—becoming a private, at least, in the great army of specialists of a transfigured Expression and a new transvaluation.² He will, at last, unconsciously accept or reject, as he already does in letter-forming and spelling, in reading and in cypering.

One advantage of the signific method is that the danger of specialism is avoided, while its advantages are developed. The bent (sometimes more than one) of each child and young man having been discovered, he would be permitted as a privilege to pursue his favourite aim. And when the examiner's turn came, the master and tutor would say: Examine Smith major in that; all the rest of his course is elementary. Only it would be understood that, of course, all the boys alike had their penetrative and interpenetrative powers cultivated to the utmost; so that they would, according to their several abilities, have seized the gist, the purport, the application, the true value even of those subjects which they had not specially chosen as their own. Thus there would be fewer specialists in the bad sense—men whose minds are warped, who can harp only on one string, and who, therefore, cannot play in the best way even on that.

But there would be more specialists in the good sense: men who are real masters of one subject—of two or three, if they are great enough—and the intelligent discerners of significance in all others. Thus they can place their own subject, and compare it with others; they can enrich it by realising alike its relations and its uniqueness. When a man boasted that he read nothing but the Bible, "then you haven't read that," was the deserved retort. We may paraphrase one famous dictum, and prefix every lesson with the pregnant maxim that there is nothing gained in life which has not been first found in sense; and continue with another dictum, that where all experience begins in sense (in one sense) it assuredly all ends in sense (in the other sense): that whereas in one sense we may leave 'sense' behind, as we acquire meaning and advance into the domain of pure intellect and abstract reasoning, we only need it more and more in the other sense which issues in Significance.

When the study of Significance becomes a recognised and vital element of education, as the very nexus of all experience and expression, it may naturally become the subject of a series of Lectures. And these would include a course on the principles and practical working of imagery—popular, poetical, philosophical, and scientific. (This, of course, might be varied to suit audiences of the young or the uneducated, or of any degree of culture.) The lecturer on Popular Imagery would have a number of simple objects and some elementary apparatus by which he would illustrate the original, generally the material, conditions of figurative usage. For instance: he would show a given object reduced or magnified or distorted in various ways by the action of lenses through which it was seen. He would show it also through media of varying degrees of transparency and manifold tints. He would 'throw light' upon it and then obscure it. He would show that while, say, its form and its colour and size were distinct, they could not be separated except in certain cases and senses, and he would show what these were, and how we should gain in clearness by using the idea of separateness to mean different classes of fact.

Again, standing on a given spot, he would grasp various objects, and then make efforts to reach what was nearly or quite 'beyond his grasp.' Then he would show that he could still smell the rose beyond his reach, and remind us that he could hear what was much too far away to touch or smell; and beyond that could see what 'transcended' the utmost powers of hand, foot, nose, or ear to reach. Lastly, he would remind us of the further world (strictly 'transcending'
that of the unaided senses) which microscope telescope, spectrascope, revealed, or in which the X-rays acted. And once more, he would suggest that as we already used these very expressions, and were tempted to refuse to have anything to do with what we could not ‘grasp,’ that we had better learn when young to use such terms in a truer and more orderly, therefore simpler and clearer, fashion.

Then he would have a box, a doll, a nut, etc., to illustrate the metaphorical use of inner and outer, and a model of a house with its foundations, also a model of a globe set fast on a fixed stand (showing that the stand again required a table, the table a floor, the floor a ‘ground,’ and so on, but ‘under’ all—what? he would ask).

Then, by means of a rotating globe (one of the ordinary ones used in elementary science lectures), he would show the difference made in our ideas of the over and under, the above and below, the higher and lower, by the discovery of the antipodes. So he would explain that it is no longer true in the ancient or absolute sense that the ‘heaven’ is higher than the ‘earth,’ or above us; while it remains true in a practical sense. Then he would have scales of ‘higher’ and ‘lower’ temperature, and would show that whatever we call the ‘higher’ gifts of intelligence were actually associated with the ‘highest’ point in our physical frame.

Then the Lecturer would have a veil, to be drawn or undrawn between Looker or Observer and Object,—this again (like the box) making an inner and outer, and ‘sides’ and ‘aspects.’ He would show how, in fact, whether you will or no, you imagine yourself an Outsider trying to look into the recesses of a nucleus, the innermost point of which you imagine as something smaller than yourself, immensely within your own scale of magnitude; or else you imagine yourself an Insider, trying to look out to the expanding reaches of the sky as to something immensely beyond your own scale of magnitude, and in that sense Outside. Thus his audience would find out that you cannot say Insider, or outsider, or look ‘into’ even the farthest, the ‘outermost’ stretches of space.

Then he would translate the mathematical abstraction of a ‘line’ into a wire, or a rope, or a plank to picture a ‘path,’ etc., and to represent that which we all unconsciously represent when we say we are taking this or that line. Also he would translate it into a scratch or mark, and then ask, What can we do with that only,—never going beyond it on the ‘one hand or the other’? Then he would show the practical equivalent of a plane surface, and thirdly of a cube; and he would give representative passages of commonplace writing from letters, newspapers, simple books, showing that we do in fact use these three main ways of putting things: in other words, that much of our mental picturing has a relation to the ‘three dimensions’ of which perhaps we have not even heard. Then he would show a ‘dead-end,—a cul-de-sac beyond which to go would be—nonsense. But, reminding us of the ‘veil’ or ‘curtain,’ he would show how a subject may be ‘closed’ and ‘reopened’; and then he would pictorially show a ‘way’—whether roadway or waterway—proving that an object using any means of advance or progress must needs leave more and more of such ‘means’ behind it.

Then he would take a straight line and show that the farther it went (was produced) the farther it was from its starting-point. He would show that this idea did not apply to a curve, and was reversed in a circle. Thus he would show that, while a straight line may always form part of a great curve—one too great to be detected,—a curve can never form part of a straight line.

Then he would revert to the globe, and show, by that analogy, that when we start from a point upon it we come back to where we started,—but from the opposite direction. Pointing to the rotating and moving sphere representing our earth in movement, he would show that meanwhile we have really moved on, first round our sun, then with that sun in a further unknown direction. He would thus show the difference between thinking on one line, thinking on many lines on a flat surface, and thinking in cube; also how thinking in the round and in motion like our earth, differs from thinking on the flat and the fixed, like a fabulous and fictitious and impossible world. He would show us what we lost both by using current imagery in false senses, and by not learning to use the priceless figurates which science is putting into our hands.

Then he would show us a lump of stuff which could not move of itself, and if moved would stop of itself without resistance or friction, and in that image represent to us the ‘mind’ or the ‘soul.’ Again, he would show us a complex of movements—a passage of melody, the evolution of birds on the wing, the movements of water, our own co-ordinated muscular actions and various combinations of wave-motion observed or inferred in air and ‘ether,’ and he would show us how different the ideas called up by the two classes of imagery must needs be, and therefore how different our practical inferences. In every case (and he would have a legion to choose from) he would warn us to make sure that the original of the image, the thing or occurrence which we use figuratively, does really bear the use to which we put it, does really yield the notion we want, does not actually contradict or confuse this, does not, that is, convey something quite different; and thus makes us, unconsciously, the cause of the confusion we condemn in others.

Then he would wind up with a collection of ‘bulls of metaphor,’ which would certainly make his audience, already excited and amused by a new way of looking at things, explode with laughter. They would in the end disperse with the seeds of a new figurative conscience implanted in them, and the first blow struck at a demon of Confusion.

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We may once more urge upon the reader a significant contrast. On the one hand, we have the energetic and never faltering labours of the infant and of the young child, first to master complex muscular feats, and especially those of the hand (even at the cost of discomfort, fatigue, and pain); then to master language and to apply a primitive logic (failing only through lack of experience) in its use; then to question, to inquire, to explore—to ask not merely the What and the How, but against her, are defeating ourselves and wasting our own highest gifts.

But still we do our little best to stupefy
our children; and then we shake a mournful head before the puzzles, the paradoxes, the ‘insoluble problems’ of life—we, note well; we who have ourselves had our ‘free-swimming’ organs docked and paralysed and been ourselves imprisoned in a cruel network whence we once vainly struggled to escape; we who have been in our precious springtime set to a treadmill round of ‘acquiring’ raw knowledge and packing it away in an overloaded ‘memory.’ Thus, mentally, we never transcend that ‘fixed’ order; we never become true animals, much less men at all; we never reach the stage in which we are free to swim, to run, to leap, even to fly. Failing to recognise the inversion of true order which this implies, we never become fully able to explore, to discover, to interpret—evolving meanwhile sense after sense—until, as the true end of our little lives we reach the seer’s throne.

And this is not all. It is proverbially difficult to fix a true standard of the normal in mind. The alienist has a ‘borderland’ in which he practically feels this difficulty. But if, for the reasons now suggested, we have misunderstood and misinterpreted ‘genius,’ it follows that those of us who are least suspected, or least suspect themselves of insanity, are all the time victims of, or at any rate liable to, distorted or ‘morbid’ views of sanity. However, to follow up this line of thought would lead us too far at present.

What then have we gained so far by our inquiry? Have we reached a point from which, even on a distant horizon of thought, we can discern a possible answer to the question why man asks Why, and also a reason why he needs to be warned of the danger and penalty of asking it where it does not apply, and therefore cannot be rightly answered?

Before we can attempt to answer this question it will be well to review the course which we have followed. We began by pleading for an extension of the bounds and resources of expression corresponding to a wider range of experience, both in fact and conception.

In the application of a threefold idea of import to consciousness and experience, our appeal was to science, which supplies us, both in astronomy and biology, with the presumption that this order best ‘describes and resumes’ natural fact. We saw that this implied fresh views of the work of analogy, and a revelative instead of a merely plausible lucidity. We considered a few out of many possible ways of bringing to bear, in practical method, the recognition of the supreme importance of clear and ordered ideas whatever their own school experiences may have been. But these are merely sporadic; they are always considered merely as a question of special personal influence; there is no systematic recognition of the supreme value of such training. And thus we have never, in the way now proposed, suggested to the child that not only in a religious sense is its true home in heaven: that ‘heaven’ has throughout the ages been used for the ideal home of the race, because Man has always instinctively felt that his destinies, like his origin, were what is here called ‘solar’ and ‘cosmic.’ We have never suggested to him that he belonged, not like other animals merely to this world as the centre of his natural universe, but also to the star-world which he animised, to the sky which roofed him in; that in however grotesque or inexpert a form his race has always reached out to the beyond and the unknown.

...
about the nature of sense, meaning, and significance, and the extent of our power to convey and to appreciate them. We exclaimed all idea of discarding the acquired habits or traditional customs of language, seeking rather to enrich and to transfigure them, as well as to rectify all which now makes for hindering instead of fostering our means of expression; and we suggested that metaphors like 'binocular mental vision' and 'thinking in cube' might be used to indicate developments in conceptual power for which, on this line of thought, we might reasonably hope.

But first, we tried to show that our current ideas, both psychological and philosophical, were vitiated at the outset by the bias of an untenable because pre-Cooperian view of the world and of man. This brought us (as indeed in every case we have been brought) to the question which ought everywhere to be recognised as vital. In what sense is any proposition, any statement, any theory, any postulate, true or valid; and, in what sense is it here used?

This led us to the suggestion of a method of Translation in a sense wider than any in which the word has yet been applied. An examination of the implications of this idea brought us to the definition of man as in one sense the expression of the world. And this again suggested an inquiry as to the soundness of the accepted modern view of the primitive mind, of the myths, grotesque or fantastic, which grow with man's early growth. Thus we reached the moment of the first human query.

Supposing these broad lines to be accepted, here arose the question, how then to effect the needed new start? We proceeded to show that, in any full sense, a new start could only be accomplished by a generation which for the first time had been universally trained to recognise the central importance of sense, meaning, and significance: to distinguish and rightly to interpret all three.

Such a training of the future is here called Significs, because this raises the very idea of Significance to its true and supreme level; because, taking sign and what it signifies at their lowest and humblest, it leads us through a fresh study of sense to a fresh study of meaning which shows us significance as the key of keys to reality.

No more can here be added. Some attempt may later be made to show how the method of inquiry and observation which in the form of physical science has led to the triumphs evident to all, but which has apparently never yet been deliberately and consciously cultivated in childhood, can be applied to some of our unsolved problems. Among such problems will be those of space and time as affecting our conceptions of immortality and divinity, those of personality as affecting our ethical ideals, and especially those connected with a dynastic view of the universe (and therefore of all in every sense within it); a view which science now sanctions and enforces, and which, more widely applied, both accounts for and solves some of our most 'hopeless' puzzles. This will be the natural result of concentrating all the mental and moral energies of man, while yet his mind is wholly plastic, upon that form of question which breaks through the surface of things. Such questioning wins, or rather earns for the first time, knowledge which not only stands, but invites the most searching tests available. This true knowledge sees even the poetry of the future as born out of that very science and that very criticism which are now supposed to kill it. At least, let the experiment be fairly tried; at least, let us begin by giving sense, meaning, and significance that central place in our attention and our interests that, whether we will or no, they already have in the world of human experience.

The activity which we call mind expresses itself in infancy, soon after language is acquired, in the form of the question Why. It gives the secret of knowledge and of mental and moral domination. This genetic spirit of inquiry, as we have already seen, is the very spring of science. If it has seemed on the philosophical side to go astray into regions where answers are mutually discordant, thus incurring the scorn or neglect of all but a small section of mankind, this has surely been because the lack of the training here pleaded for has tended to deprive the highest thought of a constantly rising standard of expression; and has thus earned for 'metaphysical speculation' a deserved bad name. For the only true metaphysics is the growth-point of the sense which is common to Man as Man, the sense for real criterions of truth and true criterions of the real; the sense (which, alas! we degrade into superstition), that we are penetrated through and through with potential knowledge which only remains in the form of 'insoluble' problem and 'baffling' mystery, or of vague irrational mysticism, because we have not learnt how to approach and deal with it through the encouragement and cultivation of the child's Divine gift of the Why. And from this point of view the true philosophy does not yet exist.

For we do not yet fully realise that the youngest child is himself in a true sense a 'metaphysician.' From his earliest speaking days he assimilates and freely uses abstract terms,—like 'other,' etc. Is it not, then, a cruel pity that if his natural interests are what are called practical, he should be allowed to grow up in the idea that 'thinking over and working at whys'—investigating causes or reasons, expressing the meaning and value of reality, or its knowledge, interpreting himself or his world,—is either hopeless or mere dexterous thought-spinning and word-weaving? If, on the other hand, he is a born thinker, the result of such bringing up too often is that he tries to model the world of reality on his own special pattern. He becomes the victim of his own powers and his own knowledge. He does his fellows the grave disservice of providing them with a thought-cage wherein they may safely play. He founds a school of philosophy which at best appeals in a good sense only to a certain type of mind, while in a bad sense it either makes for confusion or for petrifaction. Such a system causes, e.g., the scientific Man to insist upon a rigid confinement of attention to what are for him the only demonstrable and therefore the only real or valuable facts, i.e. those capable of being proved by actual experiment; while the practical man remains serenely content to muddle on through interminable and quite avoidable blunder, the product of his own fallacious theory that he has and need have no theory at all! But if we can 'inaugurate' an era of Significs, and substitute that idea for what is now the
misleading idea of metaphysics (properly, if anything, concerned with consciousness or what we now mean by psychology); if in every intelligent man alike we can appeal to the sense of meaning, and beyond that to the sense of significance which is also the sense of value, and thus disentangle the vital worth from the endless perplexities of question, of problem, of experience in every form, then what is there that we may not hope for?

Of course, as now, we shall be drawn to or have to choose some special line of thought and action, and it is imperative this this should not be confounded with 'not to ask silly questions.' If they bid themselves not to give silly answers their request would be just. (G. P. Mudge on "Darwinism and Statecraft," *Nature*, April 11, 1901.)

There is no doubt that the method of Socrates might be and ought to be freely used in education. As the *Spectator* (March 25, 1899) has well said, "The greatest method of destroying error, of unveiling truth, of awakening the mind, was the method of Socrates. Perhaps of all our needs to-day there is none so great as a thorough dialectic for the manner of Socrates, in which all the vexed questions of our time should be subjected to that most wonderful intellectual analysis. How our mental shuffling, our begging of the question, our stupid confusion, would be burnt up in that consuming flame!" And no one would appreciate and benefit by it more than the child and the youth, for many of their own questions which we often merely laugh at or snub are in fact Socratic, although they themselves may be but partly conscious of the irony of these.

Man as a craftsman and as artist can 'create' on the sense-level; that is, without deliberate or reasoned intention; he may even be surprised at the result of his own labour. He can only in the full sense think on the meaning-level. He reflects on what he has made or is going to make. When he has reached significance he enters that which can only be called Life in a transfigured sense. Again, man can 'create' on the planet; beyond that limit he can make nothing. But he can (and in the highest sense he must) think in the 'solar' world. Once more, in the transfigured sense which to us makes life essentially worth living, he lives in the cosmos.

Welcome. For even the engineer, yes, even the soldier and the ploughman, will work the better for it; while science will for the first time find itself appreciated and assisted by those who now stand aloof, or appear to the scientific eye to be pursuing unrealities: will indeed by enabled to express itself as never before. We shall in the fullest sense acquire a new power of intertranslation with new possibilities of interpretation.

Science is self-confined to the method of measurement. Philosophy is free to use all sane and rational methods. Now science constrains its votaries each to welcome another's re-statement or correction for the development of his thesis. Even as this is written, we find Sir W. Crookes witnessing both to this noble example set us by science and to the power of change in expression. Referring to Dr. Johnstone Stoney's term 'electron,' he says, "Thus my early hypotheses fall into order by the substitution of one expression for the other" ('electron' for 'radiant matter').

The true philosophy, like the true science, appeals to intelligence as intelligence; and this appeal embraces the utmost conceivable variety and difference always on the basis, not of separation (except in some cases with a temporary or special object), but of distinction, which, however sharp, is always compatible with unity. The true philosophy comes not to abstract, but to interpret; not to destroy, but to fulfill; not to give mere passive reflection, but to prove itself the creative energy of mind,—a ray of that Light whereby we learn what beauty, what goodness, what love, in brief, what life in its highest sense may be.

NOTES

1 "Any one who chooses to observe the development of a child's mind will, if he does not suppress its natural bent, convince himself that a child from three to five years of age possesses thinking powers of greater capacity than we are in the habit of crediting to it. One of the external evidences of a thoughtful mind is the asking of questions which bear definite and logical relations to each other; and this is precisely what an average child of that age, when talking to a person in sympathy with it, is persistently doing. It is not content with a filmy and evasive answer, and how strong is its Intellectual craving is manifested by its evident disappointment or display of temper when its Ignorant parents impatiently curb its curiosity. It is very seldom that one finds a mother who has endeavoured to retain her child's thinking capacities. I was once present when the four-year-old little daughter of such a mother was making inquiries about the planet Venus, and after she had been informed that both Venus and the earth travelled round the sun, and were illuminated by it, she put the query, "Then if there were people on Venus our earth would look to them like Venus looks to us?" This question demonstrates that a child possesses thinking powers sufficiently vigorous to enable it to see the logical relationships of bodies to each other that would certainly do credit to many of its superiors in point of years. This is not an isolated instance, and my impression, derived from observation and from conversation with observant persons, is that the average child, if not suppressed, is capable of a quality of thinking that leads its elders, when they try to follow it, into an Intellectual quagmire of inconsistency and absurdity from which they beat an inglorious retreat by angrily bidding it
Several years ago the subject of ethics was introduced in Byelorussia’s high schools. Yuri Sapozhkov looks into why and how in the article below, which is reprinted from Soviet Life, September, 1982, p. 16.

Teaching Morality in Byelorussia’s Classrooms

by Yuri Sapozhkov
A class in ethics is in session. The eighth grade class of 15-year-olds at Minsk's Secondary School No. 1 is listening attentively to what Rina Lapotko is saying.

"Now let me give you two examples," she tells them, "and you consider the moral implications involved. Imagine that you are talking to two friends. One says, 'I love math. You know, I don't think there's a problem I can't solve. I come to school early so the kids can copy my homework. Our teacher thinks we're great since we all have even the most difficult problems right. I'm performing a service to my class.' The other says: 'I was the first one to finish a timed test, so I immediately handed it in. My friends who didn't finish early accused me of thinking only of myself. Is this right?'"

Interest glowed on the teenagers' faces. The situations were familiar to them all. While they were thinking, whispering to one another and exchanging glances, Lapotko explained her lesson plan for teaching the introductory course in ethics.

"During the first few classes I present simple problems often from things that have happened in the class itself. Once problems become more complex, they become more detached. We may discuss whether it's possible to judge a person from the way he or she performs a job. Or I will ask them to comment on whether we should be as self-conscious within ourselves about the things we do that are bad as we are before others. Should we avoid doing things that are bad regardless of whether everyone or no one will find out about them? In short, there are hundreds of moral dilemmas. I try my best to make sure that each time the 'theory of behavior' accomplishes a specific positive declaration. The discussion must be down-to-earth and convincing. And of course, it must be emotional. That's why I cite cases from everyday life—situations that leave no one indifferent. I'll end today's lesson with one."

A few minutes later, having successfully resolved the ethical problems of the two high performers in mathematics, the class was told this remarkable story:

During World War II, a Byelorussian woman saved 42 orphans: 26 boys and 16 girls of various nationalities. The medical records of a number of them read like death sentences—asthma, rickets and anemia. The children needed more than just medicine, they needed the kind hands and loving heart of a mother. As a result of the horrors they had gone through, the children did not remember their last names, and some didn't even know their first names. However, they all became Dervskys.

Alexandra Dervskaya raised every one. Of course, she had help. The City Soviet of Romny gave her a separate house and two hectares of land for a garden. People she didn't even know, people who were also in need during those years after the war, brought bread and shoes.

All the Dervsky children turned out to be good and honest workers. They became tractor drivers, dressmakers, engineers, geologists and scientists. Each year they come from cities throughout the Soviet Union to visit their mother's grave. The modest obelisk is inscribed: "You are our conscience, Mother." Forty-two names follow.

I asked Anna Kontsevaya, Byelorussia's First Deputy Minister of Education, to comment on the teaching of ethics in the classroom.

"We live in a very complex world today," Kontsevaya said. "People are being deluged with contradictory events and facts, especially young people. Unless they can recognize and understand them, they can't enter into social life naturally, sort out the endless social happenings and derive real joy from their work and interaction with other people. I'd say it's a matter of finding guidelines for behavior; then young people themselves will be able to add to society's moral values. This is the reasoning behind our decision to start an introductory course in ethics in the schools. It's for eighth graders, and the classes are required for everyone."

"But why the eighth grade?" I asked.

"Wouldn't it be better two years later, in the tenth grade? The students are older and have a broader outlook and more knowledge."

"Every Soviet student goes through the eighth grade. After that the paths for obtaining a complete secondary education go different ways—technical school, vocational school or 10-year school. This leaves eighth grade as the obvious year to give each student a sound background in ethical principles. Intermittent talks won't do it. The same applies to attending talks on the theme of morality during classes in other subjects. Although, undoubtedly, we need these too."

"Is there a study program for the class?"

"Of course. Rina Lapotko makes creative use of the recommended material to organize her lessons. The program was prepared by the Laboratory for Teaching Ethics in School at the Gorky Teachers Institute. The course covers all the main principles of ethics that the science of morality includes."

"Do you have a textbook and other teaching aids?"

"Five variants of the textbook were prepared, but only the latest one has been accepted. It is due to come out soon. There has been no shortage of aids and booklets. Narodnoye Obrazovaniye (Public Education) Publishing House is putting out a series of books called Ethics for Pupils. We expect about 30 booklets to appear in the next few years. They will be used for outside reading for seniors. An educational film has been made and slides are now available."

"Nevertheless, ethics is an unusual subject to teach, and a lot depends upon the sincerity, kindness and frankness of the teachers, plus his or her ability to capture an audience."

"And on his or her resourcefulness," Kontsevaya added. "For it's the teacher who chooses the format of the lesson. It may be a conversation, a dispute, a seminar, a lecture, and so on. The teacher must show flexibility not only in selecting methods, but also in combining them. The most important thing is the ability to communicate with people who are only 15 years old."

"But somehow all this must be taught."

"We are running a special series of lectures, seminars and conferences for ethics teachers—who usually happen to be historians or linguists. There is also a related course in every college and university in Byelorussia."

"Not all the problems have been solved yet," Kontsevaya concluded, "but life has borne out the importance and necessity of this step. This means that the moral education of our students will be enhanced."
The Goals of Science Education

By Michael Martin

So far we have argued that certain propensities characteristic of the spirit of science should be the major goals of science education. We have argued that these propensities—properly understood and qualified—are not only an improvement over other commonly stated goals, but are justified in their own right. Indeed, we have argued that anyone who engages in meaningful rational debate about the goals presupposes that some of these propensities are desirable.

However, the propensities that we have advocated and their development in science education should not be conceived of narrowly. These propensities, correctly understood, are characteristic not just of the ideal scientist, but of the rational man. As the Educational Policy Commission suggests, "What is being advocated here is not the production of more physicists, biologists, or mathematicians, but rather the development of a person whose approach to life as a whole is that of a person who thinks—a rational person." Thus the complete manifestation of the spirit of science goes beyond the confines of what is usually called science into practical, moral, and even religious contexts. The goals of science education should also be conceived of in these contexts.

An excellent physicist who is mindless and uncritical in buying his son a bike or himself a new car is deficient not just in his consumer education. There is something profoundly lacking in his science education. He would not dream of accepting a new physical theory without careful evaluation of the evidence. Yet he accepts the claims of the manufacturer without a qualm. For a well-trained scientific mind, the claims of the manufacturer ought to be hypotheses to be evaluated in the same objective way as any other hypotheses. Similarly, a good chemist who is uncritical of some simple-minded answer to a certain complex moral problem is not just lacking in his moral education, but is also deficient in his scientific education. The well-trained scientific mind would consider the alternatives and the relevant
evidence in considering an answer to a problem in chemistry or morality.

The aim of science education ought to be to produce people imbued with the spirit of science who manifest that spirit in all relevant contexts. In order to bring about the manifestation of the spirit of science in typically nonscientific contexts, science education will have to be conceived of much more broadly. Instruction in science, for example, can no longer be considered the sort of activity that goes on in the typical science classroom. Consumer education and parts of moral education, to cite just two examples, should be conceived of as an essential part of science education.

In actual practice how might this generalized conception of science education work? Two different approaches might be taken. Consider, for example, consumer education as part of science education. First, the traditional science education curriculum might be harmonized with a consumer education curriculum. For example, the content and structure of a general chemistry course might be dovetailed with a home economics course that concentrated on consumer problems. The home economics course might be dovetailed with a home economics course that concentrated on consumer problems. Consumer education and parts of moral education, to cite just two examples, should be conceived of as an essential part of science education.

In actual practice how might this generalized conception of science education work? Two different approaches might be taken. Consider, for example, consumer education as part of science education. First, the traditional science education curriculum might be harmonized with a consumer education curriculum. For example, the content and structure of a general chemistry course might be dovetailed with a home economics course that concentrated on consumer problems. The home economics course might illustrate many of the practical applications of chemistry in choosing products for general consumption. The chemistry course could give students the theoretical background and analytic tools to understand the practical applications. General chemistry and home economics might be required as a course sequence.

Secondly, the content and structure of the traditional science course might be changed, instead of being integrated with other courses. In a biology course, for example, illustrations and field trips could be partially devoted to consumer problems. Biology textbooks, instead of discussing Redi's test of spontaneous generation as an illustration of scientific method in action, could discuss the testing of the hypotheses that cigarette smoking causes lung cancer and high dosages of vitamin C prevent colds. Field trips, instead of consisting of a search for interesting wildlife in the local woods or parks, might be a search for biologically relevant health menaces in the community.

Consider moral education as essentially connected with science education. Again, science courses and courses devoted to social and moral questions, e.g., civics or social studies courses, could be harmonized. Certain facts about heredity and birth learned in a biology course could give students the information needed to discuss and consider intelligently in their civics or social studies courses social issues connected with eugenics, racism, and birth control. Of course the biology and civics or social studies courses would have to be designed carefully so that the necessary feedback and dovetailing occurred. The civics and social studies courses would be designed to show the relevance of biological theory and findings for social issues; the biology course would be designed to give students the information and theory necessary to understand the issues discussed in the civics or social studies courses. The emphasis throughout would be on the importance of scientific method and knowledge for understanding social issues.

Another possibility would be to raise certain moral issues in science courses themselves and attempt to attack them in the same way that other issues in the course are attacked—by the use of scientific method broadly conceived. Indeed, some moral issues might arise naturally out of the very process of conducting the course. One example might be the dissection of insects and other small animals that is typical in biology courses. Such dissection raises important moral issues that are seldom considered by the teacher, let alone brought to the attention of the pupils. For example, what moral right do we have to dissect these animals?

An answer that is sometimes given is that such creatures do not feel pain. But this answer is surely not very satisfactory. First, how can we be sure that they do not feel pain? Secondly, even if they do not feel pain, what right have we to kill living creatures? Indeed, where does one draw the line? Most biology teachers and students would be horrified at the dissection of a small dog and yet they proceed with qualms to dissect a large beetle. Where along the continuum of living things is killing in the name of science permitted?

It is sometimes argued that the small animals and insects that are killed and dissected are pests. But this is not true in all cases. One of a horde of grasshoppers destroying a farmer's crops may be a pest, but a lone grasshopper in a city lot is surely not. In any case, the question remains, even if some animals are pests, does this give humans the right to kill them? Recall that some dogs and even people are considered pests. They are not usually dissected because of this.

All of this is not to suggest that students should not dissect insects and other small animals in their biology courses. What it does mean is that a decision to do so is a moral decision that can and should be made intelligently and rationally, a decision that should be made in the light of the alternatives and the evidence by teachers and by students.

Whatever the details of the integration of moral and scientific education, one thing is clear: the ways of science and the ways of morality are intimately connected. The intellectual virtues characteristic of science—honesty, objectivity, impartiality, and rationality—are moral virtues. Science education broadly conceived ought to foster these virtues in both scientific and moral contexts. Let us venture to hope that in the future the ways of science will become meaningful to students and become their ways.

FOOTNOTES
The Higher Level Skills: Tomorrow's "Basics"

The Education Commission of the States

INTRODUCTION

The United States has entered the age of rapid information transmission. Breakthroughs in electronics and communication technology are responsible for this transformation and permit unprecedented industrial restructuring. Structural changes in the labor force characterize an expanding economy, however, and need not threaten economic stability. Thus by examining the skills needed in tomorrow's labor force we can better prepare workers for the changing conditions they will encounter.

Other factors significantly related to economic growth are advances in new knowledge and increased education levels of the work force. Occupational growth throughout the 1980s is projected to expand most rapidly in the higher-skilled, technical occupations. Tomorrow's workers will likely need improved skills in the selection and communication of information. Many of today's skills considered to be of a "higher" level are the potential basic skills of tomorrow. Attention given only to the minimum competencies as currently defined shows a lack of foresight and leaves many students without adequate preparation for future learning and employability.

The National Assessment of Educational Progress (NAEP) surveys the knowledge, skills and attitudes of the nation's 17-year-old students. Survey results indicate that today's minimum skills are demonstrated successfully by a majority of students. Higher order skills, however, are achieved only by a minority of 17-year-olds, and this proportion declined over the past decade. If this trend continues, as many as two million students may graduate in 1990 without the skills necessary for employment in tomorrow's marketplace.

Many efforts are already under way to promote higher standards of educational achievement. Future actions must include long-range planning in the following areas:

- An increased awareness of the contribution of human resources to economic productivity
- An understanding of the diverse needs of tomorrow's students and of workers displaced by technological changes
- Improved education/industry partnerships to maintain relevant goals in education
- Re-evaluation processes of essential employment skills
- Improved curricula that incorporate future requirements and the instruction of higher order skills

Recent advances in electronics and communications have exponentially expanded our technical knowledge. The age of rapid information transmission, or, The Information Society, may radically alter traditional approaches to economic expansion. Tomorrow's jobs will require new skills as technological devices are applied to traditional production methods.

This report upholds the view that investments in human resources can contribute positively to economic growth. Although technological advances respond to existing manufactur-
ing and communication challenges, education and retraining dilemmas accompany them. The preparation of today’s youth, as the future workers of our country, concerns many educators and legislators. Skills such as analysis and synthesis become increasingly important when information multiplies. The education students receive today will have long-lasting impacts on future economic conditions.

“Skills such as analysis and synthesis become increasingly important when information multiplies.”

Inattention to the education of tomorrow’s workers has serious social and economic consequences. For example, high unemployment is devastating to the economic security of any industrialized nation. Critical problems are associated with rising unemployment: decaying cities lose their populations; income tax revenues are lost; welfare costs and violent crimes increase; health and housing problems increase; and an increased proportion of workers become discouraged.

High unemployment in one sector of the labor force and a demand for workers in another frequently accompany breakthroughs in technical knowledge. Today’s rising unemployment rate of blue collar workers—32 percent since December 1980—provides evidence of this phenomenon. At the same time, severe labor shortages exist in higher-skilled, technical occupations (Employment and Earnings, January 1981 and July 1982).

Although the unemployment rate is expected to decrease by 1990, scores of workers will not be able to return to the jobs they previously held. Between 1949-1965, 8,000 types of jobs disappeared from America’s labor market, largely due to automation. At the same time, more than 6,000 new job types appeared (Dede, 1981). In a technically oriented society, unemployment is largely the consequence of a lack of education and skills rather than a shortage of job opportunities.

Industries can assume some of the responsibility for retraining experienced workers to move laterally within their firms. They will not, however, assume full responsibility for all unemployment problems, particularly for workers whose basic educational backgrounds are insufficient (Dede, 1981).

What types of skills will be required by tomorrow’s labor entrants? A typical job description in 1990 will likely include many tasks such as these:

- Operate various computer and peripheral equipment.
- Prepare input for and execute utility programs.
- Maintain files of technical information and verify the correctness of file input.
- Monitor work flow of production systems.
- Participate in the enhancement of system and development efforts.
- Interface with other departments about possible enhancements and determine computer program errors.
- Provide technical liaison and assistance to users.
- Evaluate and maintain new software/hardware.
- Provide training in the above tasks for less experienced personnel.
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- Provide training in the above tasks for less experienced personnel.

This list by no means exhaustive and not intended to represent the job level of every future employee. Tasks such as these, however, will become more widespread across all industries. Obviously the more technical the job, the more on-the-job training that will be required.

But students who lack the minimum skills can expect to encounter stiff competition for employment and advancement in the labor force.

The “basics” of tomorrow are the skills considered to be of a higher level today. These skills include:

- Problem-solving strategies (including mathematical problem-solving)
- Organization and reference skills
- Synthesis
- Application
- Creativity
- Decision-making given incomplete information
- Communication skills through a variety of modes

What do we know about the achievement of these skills by today’s students? The National Assessment of Educational Progress has surveyed the knowledge, skills and attitudes of over one million students since its inception in 1969. The National Assessment project is mandated by Congress and administered through the Education Commission of the States. Information collected by National Assessment is the only source of national survey data that describes the educational attainments of today’s youth. Examining National Assessment results in combination with economic trends and future projections reveals the shortcomings of students nationwide.

The remaining sections of this report describe more fully these findings, beginning with an overview of economic trends and future employment projections. The National Assessment results that follow present survey findings for 17-year-old students in the areas of reading, writing, mathematics and science. The final sections of the report explore questions raised by the data, including the problems confronting educators and some actions currently proposed. This report is a resource document intended to stimulate research and communication among groups concerned with technology’s impact on education.

CONCLUSIONS AND IMPLICATIONS

To summarize the National Assessment findings, it appears that a majority of 17-year-olds across the nation have command of very basic reading, writing, computing and thinking skills. However, although percentages may be
"In addition to a mere mastery of the basics of today, schools must teach students the understanding and application of higher level skills, the basics of tomorrow."

as high as 90 percent for some basic tasks, the remaining 10 percent who are unable to perform them represents hundreds of thousands of people.

In addition to a mere mastery of the basics of today, schools must teach students the understanding and application of higher level skills, the basics of tomorrow. The data from all four learning areas—which are developed independently—indicate that students have acquired very few skills for examining ideas. Many are capable of preliminary interpretations, but few are taught to move on to extended comprehensive and evaluative skills. The results of these national assessments provide evidence that schools currently are not fulfilling this goal. In every learning area presented here the pattern is clear: the percentage of students achieving higher order skills is declining. Furthermore, percentages of students unable to successfully demonstrate competence range from 38 to 85 percent, depending on the type of skill.

Achievement scores on the Scholastic Aptitude Test (SAT) support National Assessment results: both the mean mathematics and verbal scores on the SATs declined over the 18-year period from 1963 to 1980. The number of students scoring above 700 (possible 800) on the SAT mathematics test leaves many students without adequate preparation for future learning and employability.

The National Science Board’s Commission on Precollege Education in Mathematics, Science and Technology has defined three tasks that our education system must address:

1. Generate a sufficiently large pool of well-prepared and motivated students to pursue professional careers in science and engineering;
2. Provide a range of high quality educational opportunities that are sufficiently broad and flexible to prepare a wide spectrum of students for careers in technically oriented occupations and professions; and
3. Raise the general science and technology literacy level of all students to prepare them better to live in the society of today and tomorrow, regardless of what careers they elect to pursue (National Science Board, 1982).

Available evidence indicates that we are modestly fulfilling the first task (Hurd, 1982; National Science Board, 1982), although it will be necessary to increase the percentage of high school students drawn into this pool as the number of high school graduates continues to decline throughout the 1980s. It is with tasks two and three that shortcomings of the U.S. education system are particularly noticeable. Because the majority of students are from these two latter groups, education goals must address their needs as the future workers and citizens of our country. To attend primarily to the minimum competencies as they are currently defined shows a lack of foresight and leaves many students without adequate preparation for future learning and employability.

The United States stands virtually alone among the industrialized nations in expecting so little from its youth. In addition, our education system poses unique problems by its inherent commitments to diversity and local and state control. "The emphasis is more on what a student wants to know than on what is important for advancing the nation’s welfare" (Hurd, 1982).

The National Center for Education Statistics predicts the number of high school graduates in 1990 to be 2,444,000. Thus, if the decline of higher order skills is not reversed by then, as many as two million students may graduate without the skills required for employment in tomorrow’s technically oriented labor force. In addition, the underdeveloped pool will expand each year as successive graduating classes enter the workplace. Consequently the gap between the number of qualified workers needed and the number being produced is widening. Clearly we are not cultivating the raw materials, our future workers, vital not only for economic progress, but ultimately for economic survival.

In the United States, a difficult transition lies ahead as educational and industrial leaders shift their thinking to future economic demands. The explosion of technological applications necessitates progressive strategies for both the interim and future problems it poses.

The remainder of this paper focuses on two areas:

1. Specific elements of the problem facing our country’s education system;
2. Some current actions proposed by educators, legislators, and corporations to strengthen the relationship between education and technology.

"In every learning area presented here the pattern is clear: the percentage of students achieving higher order skills is declining."

WHAT ARE THE PROBLEMS CONFRONTING EDUCATORS?

1. Changing definitions and diverse needs of students. Technology used for educational purposes holds the potential to reshape instructional delivery systems. As equipment costs come down, a decentralization of learning may occur from traditional schools into homes, communities and industries. The increased use of educational devices will result in a larger portion of society having access to instruc-
Future students of our technologically oriented society will emerge from many diverse sectors, with each having a variety of different needs. Secondary and postsecondary students planning to enter technical careers will demand more rigorous and up-to-date training within their respective fields. With technological devices pervading everyday lifestyles, students who are not planning a technical career will need an understanding of the basic principles underlying their operations. Additionally, retraining of workers displaced by automation must be assumed by public or private institutions and industries.

A concern voiced by the Council of Chief State School Officers is that a new disadvantaged class may emerge: those who do not have access to technology in their schooling. Technological equipment will be adopted first in advantaged school districts, creating a "have and have not" situation. The Education Products Information Exchange predicts a gap in computer literacy between the rich and poor districts, just as there is in traditional literacy (Heard, 1982).

2. Education responsibilities and relevance. Critics of education institutions are abundant, and schools are blamed for everything from high unemployment rates to the increase in violent crimes in the United States. Fortunately, there exists a large number of concerned citizens, teachers and educators who are responsive to the shortcomings of the structural design of the systems. For example, prior to the establishment of minimum competency programs, graduation requirements in some states were based on attendance measured in Carnegie units and not on the actual skills achieved by students. Minimum competency testing programs have attempted to respond to this imbalance and establish a new validity for the high school diploma.

Current criticisms focus on the decline of higher level skills and the lack of relevance of education to the real world of work. Minimum competency programs have since gained disfavor, arousing fears that the minimums are becoming the norms. American schooling no longer lacks the basics but rather the "complexities that make for mature learning, mature citizenship or adult success" (Casteen, 1982).

Underlying this shortcoming in the schools is a public attitude that technical topics are best left to the specialists and that there is no need to educate the majority of students beyond the basic level. It is not widely recognized that a higher level of functional skills will contribute to the economic growth and prosperity of our country.

One of the alleged shortcomings in the management of education is the lack of data on individual accomplishments upon completion of schooling. Because acquiring follow-up data on students is costly, there are no means by which to measure the success of program goals. If education is to become more relevant to the world of work, it is essential to establish feedback systems on the successes of students who have completed the required curriculum. Quality control focuses on the inputs into the system—teachers and textbooks, for example—and not on the outcomes. Thus, no attempt is made to incorporate long-term information into the management system's program planning. The Consortium on Education for Employment describes this failure in more detail in its report, Quality Assurance in the Preparation of Youth for Work (1981). The Consortium states:

...neither education systems, nor employment and training programs are structured to assure employers that individuals coming from systems are prepared to function effectively in the work force. (p. iii).

Their recommendation emphasizes more client-centered management, focusing on the accomplishments of individuals and program goals. The basic unit of measurement for these accomplishments should relate to employment competencies.

Program planning conducted in the absence of this information encourages remedial training following graduation. This approach is counterproductive as resources are funneled into corrective programs rather than into the elimination of basic inadequacies. The future education of our nation's youth and work force for a technical society must incorporate information from many sectors: business, industry and graduates (employees), as well as educators.

3. Curriculum and skills. In a time when it is essential for students to gain an understanding of the concepts and applications of science and mathematics, enrollments in these courses are declining (National Science Foundation). How can participation in these classes be encouraged and, just as important, how can nonmajors obtain a working knowledge of these fields? If present science curriculum materials favor those with an aptitude or interest in scientific endeavors (also reports by NSF), what instructional materials can be provided for students not planning careers in science?

It is not enough merely to require more coursework in science and mathematics. Curricular materials must draw upon new knowledge in learning research and match abstraction levels to the majority of students.

"American schooling no longer lacks the basics but rather the 'complexities that make for mature learning, mature citizenship or adult success'."
In U.S. secondary schools and in colleges, students enter a course in physics or chemistry and are immediately introduced for the first time to the highest levels of abstraction, without any intuitive basis or prior empirical knowledge. Thus many find these subjects hopelessly difficult and fail or drop out (Klein, 1981).

Skills that transcend traditional course delineations, such as problem solving, creativity and analysis, must also be taught. Other countries (Venezuela, Canada, United Kingdom, Australia and others) are currently focusing efforts upon the systematic teaching of “thinking” skills to their students and citizens. In fact, Venezuela has recently created a new position which carries the title of “Minister of State for the Development of Human Intelligence” (Martin, 1981). The methods employed are based on those developed by Edward de Bono, a recognized world authority on teaching thinking as a skill. Dr. de Bono charges that the greatest fallacy of education is that thinking skills are automatically thinking as a skill. Dr. de Bono charges that the greatest fallacy of education is that thinking skills are automatically

“Skills that transcend traditional course delineations, such as problem solving, creativity and analysis, must also be taught.”

Dr. Stanley Pogrow has identified the seven most prominent barriers impeding the large-scale use of computers in schools:

- Inadequate capital resources for schools to purchase computers
- No incentives for teachers to use computers
- Lack of computer literacy among existing teachers and administrators
- Shortages of graduates with technical majors entering education
- Political resistance by teacher unions
- Lack of incentives or profit opportunities for industry to develop educational software
- Inadequate protection against software piracy

5. Teacher shortages/ training. Education instututions are experiencing increased competition from industries for individuals with scientific or technical training. Faculty salaries have traditionally been lower than those offered by industries. Future teachers with technical skills must be provided with more incentives to remain in the teaching professions. For example, the executive director of the Scientific Manpower Commission notes that good postsecondary schools have been able to attract top-level faculty because of the opportunity to do research at the forefront of things. This is no longer true—research can now be better done in industry (Iker, 1982).

In addition, those who remain in teaching must have access to mechanisms for further enhancing their expertise and staying on top of the state-of-the-art. To equip students for a technological society, teachers must be familiar with the new skills. Some teachers will be reluctant to upgrade their computer literacy for various reasons: they may fear revealing inadequacies in fields where they were masters, or they may believe educational technology threatens their jobs. The current incentives for teachers to use the new technology are weak. Compensation for earned professional education credits and time in service does not promote computerized efficiency (Heard, 1982).

In the future, teachers’ skills must include a familiarity with new delivery systems, which they will convey to students through more individualized instruction. If meeting social needs validates educational programs, then instruction must stimulate future learning conditions.

6. Accreditation issues. As long-distance learning become possible via telecommunications that transcend state and regional boundaries, accrediting associations and states must resolve several issues. Specifically, they must modify accreditation standards and revise their application.

In a sense, long distance learning via telecommunications is an extension of the problems involved in off-campus and out-of-state operations. Considerable progress has been made in these operations both in the home institution and in the place where programs occur. The Grover Andrews study on Assessment and Nontraditional Learning has been one part of the picture, and, more recently, policy statements by regional accrediting associations are carrying this further. It should, however, be emphasized that telecommunications add a new dimension and will require special attention.

7. Joint responsibilities and finance. Education revenues are insufficient for fulfilling the demands made by
changing populations of students, training programs and up-to-date equipment purchases. Thus industries will be sought to fill the gaps. State governments can provide more tax incentives to industries for equipment donations and staff sharing. Additional industrial functions might be:

- increased number of on-the-job training programs
- educational environments within industries
- information exchanges with local school districts to assess which skills are required
- job incentives for students who meet certain industrial requirements
- summer internship programs for secondary students
- participation in determining local districts' curriculum
- benefits for employees with technical expertise to teach in schools and universities
- research and training fellowships

Industries cannot afford to pass up these opportunities and others because their future existence depends upon it.

Unions may also play a vital role in responding to the needs for training. As white-collar unions increase their membership, the masters of the new "trades" must be called upon to establish expanded apprenticeship programs. Because a union's bargaining power partially lies in its ability to produce individuals qualified in their crafts, it will be beneficial for both unions and displaced workers to band together and create solid apprenticeship programs.

WHAT'S BEING DONE?

Although this list is not exhaustive, some recent actions to remedy discrepancies between technology and education are presented below.

"In its second year of a three-year project, the U.S. Department of Education is exploring what is currently possible in the teaching of thinking skills."

- Governor Edmund Brown Jr. initiated a comprehensive modernization of California's education and job training for the 1980s. The goals of the $25.7 million "Investment in People" program include:
  - the promotion of mathematics, science and computer studies in California's elementary and secondary schools;
  - the support of employee-based, high technology job training in California's community colleges;
  - an increase of output by engineers and computer scientists from California's universities; and
  - training and job assistance for displaced workers, welfare clients and youth from high unemployment areas.

- In its second year of a three-year project, the U.S. Department of Education is exploring what is currently possible in the teaching of thinking skills. The program has four major goals: (1) to provide school and college instructors and administrators with consultant advice on the quality of existing programs; (2) to relate research to educational practice; (3) to initiate research, setting an example and a standard of quality; and (4) to identify researchers and practitioners interested in cognitive skills training. With the conviction that students need skills to learn new information easier, the final product will outline a detailed curriculum for cognitive skills training (U.S. Department of Education, 1982).

- The Bethlehem Area School District (Pennsylvania) piloted a Philosophy for Children Program during the 1979-80 school year. To address student needs for life skills in the face of societal dilemmas and technological change, the program focuses on decision making, problem solving and logical thinking, and the stimulation of creative thinking. Materials for the program were developed by Dr. Mat-

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  - an increase of output by engineers and computer scientists from California's universities; and
  - training and job assistance for displaced workers, welfare clients and youth from high unemployment areas.

- An increasing number of education leaders, including the Council of Chief State School Officers and the National Conference of State Legislatures, have become involved in the identification of education priorities for our changing economy. Governors James B. Hunt (North Carolina) and Robert D. Ray (Iowa) have played an instrumental role in improving technological literacy. A special session of the National Governors' Association 1982 Annual Meeting was devoted to "Education for a High Technology Economy."

- In a foresighted effort, the State of Vermont included reasoning skills as part of its statewide Basic Competency Program in 1974. During the past eight years the state has developed 15 reasoning competencies, teaching strategies and assessment methods. Vermont's Basic Competencies in Reasoning include problem solving, classifying and organizing, making reasoned judgments and research skills (State of Vermont, 1982).

- Mississippi Governor William Winter suggested "... using funds to raise teacher standards, improve secondary school curriculum to require more math and physical sciences, enhance libraries and create 'centers of excellence' in specific educational programs" (O'Connor, 1982).

- In November 1981, the National Science Board of the National Science Foundation (NSF) established a commission to evaluate science education in secondary schools. The commission will encourage state and local governments and private organizations to address science and technological issues. Previously stated priorities of the NSF are:
  - Support research-level education through predoctoral fellowships;
Monitor science and engineering education and identify national needs; and
- Intervene in selected areas where improvement in education outcomes is possible.

NSF proposes, additionally, to tap the underused talents of minorities and women (NSF Correspondence, 1981).

• A 10-year project began in 1981 to review college preparatory curricula in the United States. The College Board sponsors the project with financial support from the Ford Foundation. Included in the goals of Project EQuality (with both the E and Q capitalized for emphasis on quality and equality) are the redefinition of academic competencies taught in high school and the development of a core curriculum that students should master before entering college.

• The Southern Regional Education Board (SREB) has proclaimed the "substantial improvement of academic standards above minimal expectations" as one of its goals for the 1980s. In a report entitled "The Need for Quality," SREB's Task Force on Higher Education and the Schools provides 25 recommendations for improving teacher education, curriculum, vocational state and local cooperation and presents financial implications for the recommendations. While some of the recommendations are based on the South's experience, they are generalizable to all regions of the country. The overall concerns are to challenge all students to attain higher levels of achievement and to reduce the need for remedial education at the collegiate level. The report addresses competencies required by an increasingly technological society:

In a time when states are exploring the possibility for expanding high technology industry, it is essential that a work force be developed which is well-grounded, flexible and adaptable to new industry needs, rather than trained for skills already on their way to obsolescence (p. 21).

• Exxon donated $15 million to 66 colleges and universities to supplement salaries for junior faculty members and to create teaching fellowships (Sciquest, 1/82).

• Westinghouse recently donated $1 million to Carnegie-Mellon University (Pittsburgh) for their robotics institute (Sciquest, 1/82).

• General Motors, General Electric and Boeing have contributed $1 million to Rensselaer Polytechnic Institute for the construction of a productivity center (Sciquest, 1/82).

Six major areas are targeted for rigorous programs: reading, writing, speaking and listening, mathematics, reasoning and studying.

The College Board also proposes to "keep up with the accelerating change in the uses of technology that are affecting business . . . ." and plans to "involve representatives of business, industry, labor, government, and the military in dialogues about the basic academic competencies . . . ." (Annual Report, 1980-81).

• In 1981 the College Board began a three-year comprehensive education improvement project, "Options for Excellence," in Bexar County (Greater San Antonio), Texas. The identification and education of future professional leaders for the nation's academic, political and social institutions comprise the major efforts of the project. One of its goals is the improvement of college preparatory curricula in public and private secondary schools.

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FOOTNOTES

While results in this report are presented at the national level for 17-year-olds in school, National Assessment also provides analyses in ten learning areas for 9- and 13-year-olds, geographic regions of the country, several racial groups (where sample sizes permit), and achievement by sex, level of parental education, and size and type of community. A publications list is available from the NAEP Distribution Center, (303) 803-3745.
A Protestant Doctrine of Education

Education is training in how to think rather than in what to think; it is a confrontation, a dialogue between ways of assessing evidence and supporting conclusions. It implies that the teacher's primary job is that of making clear the bases upon which he weighs the facts, the methods by which he separates facts from fancies, and the ways in which he discovers and selects his ultimate norms.

Such a teaching process by no means calls for special pleading; rather it calls for that meticulous honesty which is at the heart of objectivity. So far as he is capable, the teacher describes the facts of a given matter—and instead of trying to inculcate his own perceptions and evaluations he tries to display the processes by which he observed and evaluated the data. If his methods and criteria commend themselves to his pupils, they will adopt for themselves similar patterns, but not necessarily identical conclusions. The dialogue that constitutes the teaching-learning interaction, in religion as elsewhere, becomes a debate over alternative ways of thinking and evaluating. Upon this basis one can interpret history or public affairs or the sciences or religious ideas without becoming partisan and without denying one's own allegiances or goals.

This concept of teaching, whether of religion or of any other subject, requires that the purported facts be accompanied by the reasons why they are considered to be facts. Thereby the teacher exposes his methods of reasoning to test and change. If the facts are in dispute—and few important items in religion or in most other fields are beyond dispute—then the reasons why others do not consider them to be facts must also be presented, thus bringing alternative ways of thinking and believing into dialogue with each other.


In Explanation of Just About Everything

A certain railroad station in Ireland has two clocks which disagree by several minutes. When a helpful English traveler pointed out the fact to a porter, the reply was, 'Faith, sir, if they told the same time, why should there be two of them?'

—from Martin Joos, The Five Clocks

On Believing and Knowing

People have and share beliefs but not knowledges. This is so because the immediate object of believing is a belief, a picture of reality. The immediate object of knowing is not "a knowledge," a picture of reality, but reality itself.


Education as ordering—a Thomistic-Augustinian view

Most important (according to Thomas), the teacher can suggest order in proceeding. In this way, as Vincent Smith suggests, the teacher is a logician of sorts. That is, he leads the learner from the known to the unknown by rational discourse. That is the heart of teaching. Let us consider a very simple example. Suppose someone says to you, "There is a cow in your yard." As Augustine pointed out, there must be meanings already in your mind, prior to all these verbal symbols, or the symbols will convey nothing. You must know what cows are, what yards are, what "there is" means, and so forth. To that extent, the statement tells you nothing you did not already understand. But the way the words are arranged points to a new set of relationships; it tells you something you did not already know, namely, that there is a cow in your yard.

This grossly simplified example illustrates in what, essentially, all teaching consists. If you did not understand the statement of the person who told you about the cow, you and he might discuss it in other terms. If you still did not understand, he might take you to the window and show you the cow. Again, someone says, "The price of milk has increased." You know what a price is, what milk is, what it is to increase, and so forth. Now all of these elements are synthesized into a new judgment, a new piece of information. The one who performed this service for you was teaching you. Teaching is ordering. One might discover without being told that there is a cow in his yard or that (non sequitur) the price of milk has increased. Anything one learns by instruction, one might possibly have learned without instruction, though people are very little inclined to make certain types of discoveries without the conscious guidance of another.

Writing as reasoning
A syllogism, the classic unit of reasoning, is in itself a small paragraph. I want to say something about Socrates, and what I want to say about him is that despite his great wisdom, he is still mortal. Why is he mortal? Because all men are mortal, and Socrates is a man, as I can go on to demonstrate in a paragraph of characteristics. Much of our thought concerns "somes" rather than the "all" referred to in this syllogism, but the pattern can be adapted.

In other words, reasoning means giving reasons—that is, it deals with the relations between statements, and these relations are of a few basic kinds: basically of cause or purpose—if this, therefore this, or this is so because, or of choice—this or this, but both are impossible at once; or of association—this and this go along with this. In other words, these are the kinds of possible simultaneity or sequence of statements. Once a student recognizes that his own thought moves in these basic realtions—perhaps just because he is a man and all men are mortal—he will be apt to enjoy both the art and the social force of the simple reasoning process of the paragraph. His planning our outlining will show first what main point or predication he is planning to make about his subject, then the main blocks of material he will use to support it, with pro connections and, or, if, and con connections but, or, though; and finally a new main point, revised from the first hypothesis in the light of the evidence as it has developed.

—from Josephine Miles, "The Use of Reason," Teachers College Record, April 1, 1962.

Education as lateral transmission of knowledge
In this world the age of the teacher is no longer necessarily relevant. For instance children teach grandparents how to manage TV, young expediters come into a factory along with the new equipment, and young men invent automatic programming for computers over which their seniors struggle because they, too, need it for their research.

This, then, is what we call the later transmission of knowledge. It is not an outpouring of knowledge from the "wise old teacher" into the minds of young pupils, as in vertical transmission. Rather, it is a sharing of knowledge by the informed with the uninformed, whatever their ages. The primary prerequisite is the desire to know . . . .

In thinking about an effective educational system we should recognize that the adolescent's need and right to work is as great as (perhaps greater than) his immediate need and right to study. And we must recognize that the adult's need and right to study more is as great as (perhaps greater than) his need and right to hold the same job until he is 65 years old . . . .


Clarifying moral meanings
What then is philosophy, as I am using the term? It is the art or science which does for words what mathematics does for numbers. We all spend quite a lot of time talking; and some of this we spend arguing with one another, using words for this purpose. It is no accident that philosophy started in Greece, because the ancient Greeks were perhaps the most argumentative people the world has ever known. It was one of them, Socrates, who made for the first time the move which started philosophy in the sense in which I am using the word. He found some people arguing about some substantial question; and instead of joining in the argument on one side or the other, he insisted on having some key term in it explained to him. He did not put his questions as questions about the meanings of words; but they were that. To know what rightness is, is to know what we mean by 'right.' In the same sort of way, you could imagine a father and his son having an argument today about whether something is right or wrong (it could be about something important or about something unimportant—about whether it is right to fight for one's country, or about whether it is right to grow one's hair long); and you could imagine some modern Socrates coming along and saying to them, 'How can you possibly settle your argument if you don't know what you mean by 'right'? And this advice would be sound. For until we understand the questions we are asking, how can we possibly set about answering them?


How does one play the philosophy game?
When Socrates was asked some large and exciting question, it was characteristic of him to find some other question that would have to be answered first. For example, when he was asked whether virtue could be taught, he said that he was unable to answer the question because he did not know what virtue was. He meant, of course, that he did not know exactly what it was. It is understandable that many people found his way of doing philosophy maddening. For consecutive thought is such a difficult achievement that it is natural to feel resentment when someone takes up the first word and questions its exact application. He is not playing the game. But of course he is not. That is his whole point.

—David Pears, in "Wittgenstein and Austin," in Williams and Montefiore, British Analytical Philosophy.
A Savvy 7-year-old

In the Reign of King Arthur, near the Lands-End of England, namely, the County of Cornwall, there lived a wealthy Farmer, who had one only Son, commonly known by the Name of Jack the GIANT-KILLER: He was brisk, and of a lively ready Wit, so that whatever he could not perform by Force and Strength, he compleated by ingenious Wit and Policy, never was any Person heard of that could worst him; nay, the very Learned many times he baffled, by his cunning and sharp ready Inventions. For Instance, when he was no more than 7 Years of Age, his Father, the Farmer, sent him into the Field to look after the Oxen, which were then feeding in a pleasant Pasture: a Country Vicar, by chance one Day coming across the Fields, called to Jack, and asked him several Questions; in particular, How many Commandments are there? Jack told him There were Nine. The Parson replied, There are Ten. Nay, quoth Jack, Mr. Parson, you are out; it's true there were Ten, but you broke one with your Maid Margery. The Parson replied, Thou art an arch Wag, Jack. Well, Mr. Parson, quoth Jack. You have asked me one Question, and I have answered it, I beseech you let me ask you another. Who made these Oxen? the Parson replied, God made them, Child: Now you are out again, quote Jack; for God made them Bulls, but my Father and his Man Hobson made Oxen of them. These were the witty Answers of Jack. The Parson finding himself outwitted trudged away, leaving Jack in a Fit of Laughter.

—from The History of Jack and the Giants, an 18th century chapbook.

The Craft of Thinking

It is not for optical reasons that the lynx-eyed Red Indian cannot detect misprints or see that a chessplayer's queen is in danger. If he has not learned to read or to play chess his lynx eyes cannot tell him these things. Now the same thing is true of thought. What a person thinks on a certain matter is true or else it is false; it is accurate or else inaccurate; it is definite or else it is vague; it is clear or it is muddled; it is well or else ill founded; it is expert or else it is amateurish, and so on. Some practice and often some tuition is a sine qua non of our being able to think out any problems at all, however simple, within certain fields. It is not from lack of quick-wittedness that my Red Indian cannot work out or even be defeated by a chess problem, but because he has not learned the game. Thinking, like fencing and skating, is a consortium of competences and skills. Like them, it has tasks which it may accomplish or may fail to do so. It has room in it, therefore, for high and low degrees of these competences and skills, i.e. of low and high degrees of stupidity and silliness. In our thinking we exercise good, moderate or bad craftsmanship. Thought is not something that just happens to us and in us, like digestion. It is something that we do, and do well or badly, carefully or carelessly, expertly or amateurishly.


Reading Alice

She would read aloud to my brother and me from the Alice books—her favourites as well as ours. This was the greatest of treats but, like most pleasures in youth, cruelly brief: indeed, it was the very intensity of the enjoyment it gave all three of us which set a limit to its duration. In this case, it was not the children who ruined their own fun by getting ‘over-excited’ but the grown-up who soon became physically incapable of continuing, silenced by an uncontrollable fou rire. Some touch of inspired inconsequence, of exquisite absurdity in Lewis Carroll’s text would prove too much for my grandmother. Her short, square body, clothed from neck to ankles in shiny black satin, would start to shake convulsively, rocking the chair we leant on; the wide black brim of the picture hat, worn even indoors over her brightly-dyed golden hair, would quiver in sympathy, then rakishly dip over her whitened face, by now convulsed and weeping in an ecstatic agony of soundless mirth. Then the pale-framed spectacles would slip off her nose to become dangerously entangled with the long necklace of amber beads on her heaving bosom; the clasp of her handbag would burst open, and an overspill of leather spectacle-case, loose cigarettes, cologne-scented handkerchief, powderpuff and mirrored compact, eventually followed by Alice itself, would slowly slither from her lap to the ground. The suddenness, the totality of this collapse from adult responsibility into the childish abandon of wildly infectious laughter made her seem to belong to a third world ruled by magic and jokes. The episode had the arbitrary unreason and challenging glamour of a miraculous transformation scene: it was as if we had gained entry from, privileged to penetrate beyond the mystery of print, and in a wonderland through the looking-glass had been comfortably confronted by a benign domestic monster, familiar as the nursery fender, yet foreign as the sphinx.

From the Reviews of Philosophy for Children Literature. . . .

From the Bulletin of the Center for Children's Literature, October, 1982:

The editors of the Bulletin recommend *Kio and Gus* for readers in grades 3 to 5, note that the book is particularly useful for its treatment of "friendship values and adjustment to handicaps," and add:

"Kio and Gus (Augusta) are friends and neighbors; they alternate in telling some of the events of their summer in chapters that are episodic, family-oriented, and designed to encourage readers to think. The style is direct and casual, it has a good balance of exposition and dialogue, and it incorporates philosophical or provocative issues in a natural way. Kio is motherless, Gus is blind; both facts are handled smoothly and candidly, as are such topics as protection of endangered species or what time is."

From Patricia Hanna, in a review of *Lisa and Ethical Inquiry* in *Teaching Philosophy* 5:3, July, 1982:

"In the hands of competently trained teachers, there is no question but that these materials will stimulate the ethical inquiry which the program is designed to encourage. . . . The IAPC's impressive effort to provide a philosophical approach to moral education represents an extremely important educational innovation. In particular, it contrasts with values clarification programs by contending that good and sound reasons may be given in support of moral judgments. And it differs from stage theory programs by taking children's responses in their own terms, i.e., as distinctive attempts to articulate an individual point of view rather than as manifestations of phases which cannot be taken seriously in themselves. In this way, the IAPC approach reflects the fact that children can make a genuine contribution to moral inquiry and dialogue."

From T. M. Reed, in a review of *Suki, Mark, Writing: How and Why, and Social Inquiry*, in *Teaching Philosophy* 5:3, July, 1982:

"Suki is perhaps the best written and most interesting of the IAPC's novels. *Writing: How and Why* is imaginatively conceived and includes many fine specimens of poetry in addition to philosophical material.

"A major aim of *Suki and Writing: How and Why* is to provide a new direction in the teaching of writing. It might seem *prima facie* implausible that a course in philosophy should contribute directly to effective writing. . . . But it is difficult to read the instructional materials without thinking that writing improvement will be substantial.

"*Mark* has the appearance of being somewhat hastily composed. But it nicely introduces a variety of philosophical topics, including law and punishment, justice and fairness, differing ideas of freedom, and the nature of social institutions. *Social Inquiry* is a remarkable manual; few generalizations from other IAPC materials apply to it. . . . *Social Inquiry* will certainly prove to anyone that an instructional manual can raise subtle and sophisticated questions. Nor could anyone truly competent to teach it be misled by other and possibly less accurate materials. In these and other ways, *Social Inquiry* enhances the potential of the philosophy for children program."

From T. M. Reed and Patricia Hanna, in a review of *Philosophy in the Classroom*, Second Edition, in *Teaching Philosophy* 5:3, July, 1982:

"The IAPC course is the only ongoing program in its field. As we have noticed, the issues it raises for classroom discussion are genuinely philosophical. But we have also confirmed . . . that the program is partisan in certain respects. This partisanship can, however, be eliminated. Moreover, it is in the process of being eliminated, and will finally, of necessity, by altogether removed . . . . The aims of the philosophy for children program deserve the support of philosophers as the IAPC refines and develops its curriculum."

From Michael J. Rockler, in a review of *Mark*, in *Curriculum Review*, Vol. 20, Number 2, April, 1981:

"The content of this program represents an interesting new departure in social inquiry. . . . *Mark* appears to be an excellent program—ideal for gifted and talented classes in social studies in junior high and early high school. It ought to work with more typical students as well. *Mark* 's major strength lies in its approach to social inquiry from the perspective of the discipline of philosophy; it achieves the author's objective of creating a dialogue about the nature of society."


"*Philosophy in the Classroom* is an important book for anyone who seeks innovation in education. While many of the ideas are not new (critical and reflective thinking have long been advocated in educational reform), the proposal to incorporate them into a formal philosophy program does represent a departure. . . . This book serves as an important stimulant for a discussion of how much and under what circumstances philosophy can be valuable at a precollegiate level."

From Anthony Brandt, in "Teaching Kids to Think" *(Ladies Home Journal*, September, 1982:

"... the novels. . . . are realistic and well written. The characters are believable: sometimes difficult, sometimes troubled, sometimes funny and charming. They speak the language kids actually speak. The issues raised in the novels are interesting and up-to-date."


"The characters in the novels are not model students, teachers, administrators, or parents, if by model we mean persons who always do the correct thing. The characters are representative of different life styles and, perhaps more important, different styles of thinking."
P4C as "Pre-Secondary" Philosophy

By Adrian M. Dupuis & A. Gray Thompson

In Latin American countries, the Preparatoria, the equivalent of our college preparatory secondary schools, generally offers a number of philosophy courses to prepare students for the International Baccalaureate, a University entrance examination. One such school in Mexico City, Colegio Olinca, requires all students to take Logic in the first year of the Preparatoria (the equivalent of our Sophomore year); Ethics and Theory of Knowledge in the second year (Junior); and Aesthetics and History of Philosophy in the third year (Senior). These five courses cover approximately the same subject matter as our college level courses with the same or similar titles. (In fact, some U.S. colleges give lower division credit for these courses).

This report covers the planning and implementation of a P4C program in Spanish, specifically as a pre-requisite to an existing secondary school level philosophy program.

Since Olinca offers education from pre-school (for three and four year olds) through the preparatoria, the administration and faculty had been searching for a program for the elementary school level which might serve as the "pre-preparatoria" for the philosophy taught in the preparatoria. Al Thompson and Adrian Dupuis of Marquette University contacted Ma. Carrera and explored two key questions which faced the Olinca faculty:

1. How might the philosophy for children program (for elementary and intermediate students) serve as a preparation for the philosophy taught in the preparatoria and tested in the I.B.?
2. How might the P4C program help in achieving the twin goals of Olinca, namely cognitive and affective development of all learners?

In reference to the first questions, the Directora pointed out the major purposes of the I.B. examination for which the Colegio prepares their students:

1. to promote the development of independent judgment as distinguished from both an unquestioning scepticism and a facile credulity.
2. to broaden the mind of the adolescent and to free it from a too immediately emotional reaction to experience, from hasty judgments and from stock responses.

The philosophical method recommended by the I.B. is:

1. *radical elucidation*—analysis, definition, classification, and the evaluation of experience and ideas formed as a result of experience;
2. *universality*—the attempt to identify the universal elements in all experience, thus making possible an understanding based on something other than individual preference or social ideology;
3. *unity*—the coordination of different modes of thought and the achievement of a coherent pluralism.

The I.B. emphasizes that the beginner should start philosophy by "studying" themes, problems, and ideas, not authors. The study of ideas, problems, or themes should never be replaced by resumes of philosophical doctrines. The development of the philosophical attitude of critical reflection is crucial. "This excludes, in particular, its replacement by a store of specific information about the questions under consideration, even when such information is necessary."

Finally, for I.B., the teaching of philosophy offers, above all, the opportunity for a substantial amount of teacher-student dialogue. "From this will arise, little by little, that free formation of judgment which is the fundamental aim of all education."

Regular readers of the journal Thinking and other I.A.P.C. materials will detect a high level of compatibility between the stated aims of the I.B. and those of P4C; for example:

- improvement of reasoning ability
- development of creativity
- personal development
- discovering alternatives
- discovering impartiality
- discovering consistency
- discovering the feasibility of giving reasons for beliefs
- discovering comprehensiveness
- discovering situations

Some other ideas connected to P4C in one manner or another were discussed with the directora to help provide a context for the objectives:

- Children are natural philosophers, always asking, "why?"
- Encouraging children to think philosophically is not the same as teaching them to think.
- One does not teach philosophy to children (nor to anyone).
- The primary task for the teacher is
in stimulating children to reason about their own problems through classroom discussion.

—The stress is on the process of discussion.

—Encourage philosophizing by children rather than the "teaching" of philosophy as in another content subject.

—Children need appropriate philosophical skills before asking them to come up with solutions to moral problems.

—It is a nonauthoritarian and anti-doctrinal method in that it encourages alternative modes of thought and imagination.

—Just as the characters in the novels enter into dialogues about the way they think by talking about thinking, so also do students enter into dialogue with peers and teachers.

From a brief review of the ideas stated above, Directora Carrera stated that not only was P4C compatible with the purpose of the philosophy component of the I.B., but she also sensed that the P4C could become the unifying thread which could help bring together both the cognitive and affective development of students in Colegio Olinca.

Since Al Thompson had planned to be in Mexico in early January 1981, arrangements were made to present a two-day seminar for the coordinators and faculty of the Colegio. During these sessions the same questions were under discussion:

1) How might the P4C prepare students for the secondary school philosophy courses and to meet the requirements of I.B. in the area of philosophy?

2) How might P4C aid the Colegio in achieving its dual goal of academic excellence and high level of affective development?

After these discussion sessions the faculty of seventy-five teachers were receptive to the possibility of initiating P4C at the Colegia and a two week workshop was scheduled for August 1981.

During the first days of the workshop Thompson and Dupuis spent several sessions discussing: 1) the theoretical underlying of the P4C program; 2) the changes needed in teaching method—i.e., moving from the didactic to dialogue method; 3) use and misuse of teaching manuals; 4) explanation and discussion of philosophical "content" of the novels; 5) the relations of P4C materials to the existing elementary program; 6) the relation of P4C program to a newly inaugurated "human relations" program.

Although most of the faculty were satisfied with the responses given by the Marquette faculty, they clamored for "demonstrations" of the effectiveness of the P4C approach. Al Thompson gave demonstration lessons with 5th and 6th graders from the school using the first chapter of Harry. The children returned three days in succession so that some sequence of activities might be observed. These sessions lasted much longer than regular elementary classes in other subjects, but the children's interest did not lag nor did that of the faculty observing the sessions.

After each demonstration, the faculty would participate in a discussion of what happened and soon demanded that they "be a P4C class." For this class Adrian Dupuis chose the chapter from Lisa which addresses the ethical issues involved in game or sports hunting. As a member of the class, Dupuis soon noted that this large group of adults was not role playing. Their personal beliefs were coming to the fore; now they must present reasons for their beliefs; they had to listen to others with opposing views, etc. The session had to be terminated—it had run well over the scheduled period. It might be worth noting that these Mexican teachers had touched upon the same questions, arguments, etc., as a class of 7th and 8th graders in Milwaukee, Wisconsin had done a few weeks before. The teachers in Mexico and Milwaukee said that they had learned much about the P4C program by "doing it" themselves. They recognized how their own "teaching style" would have to change in their content area for students with experiences in the P4C classes. Science, social studies, and literature teaching will need modification to cope with the questioning minds of the P4C students. In fact this was to become a major concern of some of the teachers.

The second week of the workshop consisted of many demonstrations with 5th - 6th graders for the parents of Olinca children. Since there are four sections for each level enrolled at the Colegio Olinca, many demonstration sessions had to be scheduled. But parents attending were much impressed by the children's competency and gave their support to the program. Thus in the school year 1981-1982 all 5th and 6th graders used Harry. In fall 1982 the same group will move into Lisa. Other novels will be chosen to fill the years up to the sophomore year where the first required course in secondary philosophy is offered.

Summary

Nearly two years work with the administration and faculty of Colegio Olinca seems to have established that the P4C program is an ideal preparation for required secondary school philosophy. Also, the aims and activities of the P4C program are compatible with those of the International Baccalaureate Examinations.

An examination of materials and activities in the P4C program gives adequate evidence that the program looks to the affective development of the student as well as the cognitive.

It will be several years before the first P4C Olinca students will be taking the I.B. exams. In the meantime, however, the faculty will be able to observe the effects of the philosophy the children are taking in grades 5 - 9 on their performance in the required preparatory philosophy classes.

Footnotes

1The International Baccalaureate, with headquarters in Geneva, Switzerland, is an attempt to assist multinational secondary schools (and preparatories) throughout the world by providing a common program and providing valid examinations which will serve as a university entrance qualification. It is recognized by universities in more than forty countries including all major universities in the United States with College Entrance Examination Board advanced placement.


3Ibid, p. 66.

4Ibid.
Philosophy for Children and the Improvement of Thinking Skills in Queens, New York

by Mark L. Weinstein and John F. Martin

During the 1981-1982 school year, twelve teachers in N.Y.C. District 24 participated in a Philosophy for Children workshop. They were asked, along with a similarly constituted control group of twelve other teachers, to administer the Thinking Skills Test, Q4, along with an index of their perception of their pupils' ability to function rationally during classroom discussions. Both of these instruments had been designed especially for the Philosophy for Children Program by the Educational Testing Service at Princeton, New Jersey. The latter instrument, the Child Description Checklist (CDC), was presented to the teachers as a vehicle for obtaining descriptions of their pupils' classroom performance. It is, however, a measure of teacher attitudes toward the pupils' performance and an attempt to determine the teachers' awareness and, presumably, reinforcement of desirable cognitive traits. The test scores were analyzed by the workshop director and an independent analyst associated with Teachers College, Columbia University.

The sample consisted of 724 third-, fourth-, and fifth-grade pupils in I.G.C., homogeneous, heterogeneous, and H.C.30 classes. The 349 boys and 375 girls were categorized according to their apparent command of spoken English and reading ability. There were 353 above-grade, 203 on-grade, and 168 below-grade readers in the sample. Choice of text was governed by grade-level appropriateness: 25 percent of the pupils used the *Pixie* program and 75 percent used *Harry Stottlemeier's Discovery*. Pre-tests for both Q4 and CDC were given in October, 1981. Post-tests were administered during May, 1982.

The performance of target children on the test of critical thinking skills, Q4, improved significantly: beyond the .001 level of confidence, according to SPSS t-tests. The control group, on the contrary, showed no significant difference between pre- and post-test scores.

An analysis of variance was performed on the Q4 post-test, comparing target and control groups. It was found that there was a significant improvement in target group scores beyond the .001 level of confidence. T-tests and analyses of variance were also performed on the pre- and post-CDC indices with equally significant results. Teachers of target population classes perceived their pupils to have improved radically in classroom discussion skills. An analysis of covariance, holding pre-test constant, reinforced these findings and also revealed an interaction between independent variables and their effect on the dependent variable.

Multiple regression analyses were done on the difference between pre- and post-tests of critical thinking skills (Q4) as the dependent variable and combinations of independent variables, including the demographics described above. Sixteen percent of the variation in gain of critical thinking skills can be explained by a number of independent variables. The two largest contributors to the correlation were the teachers' estimation of each child's cognitive abilities as measured by the CDC post-test score and an informal rating of individual teacher effectiveness assigned by the workshop teacher trainer. Surprisingly, reading level, language competence, and class exponent had little effect (.01%, 1.5%, and .97%, respectively).

Given a preliminary analysis of these results, we may conjecture that Philosophy for Children is effective with a wide variety of students in many class categories and at different levels of language competence and reading ability. Moreover, by sensitizing teachers to pupils' cognitive efforts, the program enables teachers to reinforce children's tendencies towards rationality of thought and coherence of expression.

We are preparing an exhaustive analysis of these provocative findings that will be forthcoming shortly.
Introduction

Ever since Heraclitus, philosophers have been aware of their kinship with children. Philosophers could identify themselves better with children who involved themselves in play and discovery than with adults who busied themselves with everyday routine. The image of the philosopher as a young child stemmed from the endless questioning of young children (particularly by why-questions), a practice which no longer exists for many an adult.

Questions like: “How do I know that when I wake up tomorrow the small hand of the clock will have gone around only once?” or “How come the last car of the train is always at the back?” always seem disregarded. Moreover, there is almost always a feeling of embarrassment about not knowing how to answer such questions appropriately. For example, an elementary school student had learned in a class on religion that God had created the universe, and he had learned in another class that the universe is infinite. His problem, that if God had made the universe it could not be infinite, because there would not be any room left for God (to create the universe), was not considered relevant. Moreover, there is a feeling of embarrassment about not knowing how to answer such questions appropriately.

Philosophy courses at the HBO (an institution for higher education in the Netherlands) are more closely related to the students’ childhood experiences than to the experiences of their later high school years. An interesting illustration of this close relation are the two latest novels by K. Schippers, Bewijsmateriaal (Evidence; Amsterdam, 1978) and Eerste Indrukken (First Impressions; Amsterdam, 1979).

P4C: A Remedy for Education?

by Pieter Mostert

In Bewijsmateriaal, the author in the role of detective is scrutinizing the peculiar traits of language, and comes up with questions like: “Does a piece of paper with writing on it weigh more than one without writing?” and “Does the river become wetter when it rains?” In Schipper’s later book, these questions lead him to his “first impressions,” as well as to his first endeavors to tie up these impressions and give them meaning.

Philosophy in School

Philosophy seems to be the only discipline which is limited to college-level academic circles. All other disciplines have an elementary or high school curriculum of their own. Philosophy alone preserves its image of being accessible only to the scholarly few. Therefore, the following is an experiment of thought, not a description of a real situation:

Let us suppose the existence of an elementary school at which the 5th and 6th grade teachers do not wish to disregard such questions as mentioned above. On the contrary, they wish to stimulate the children in their endeavor to learn how to ask such questions more accurately, how to reformulate them, and how to go about answering them. Suppose also that these teachers turn to philosophy to acquire a way by which such questions can be dealt with fruitfully. Would there be any philosophers who would take these teachers seriously? Or would they say, “No, we cannot be of any help to you. We can attempt to give you a simplified version of what we ourselves are doing, but it is impossible to develop a clear and comprehensible curriculum even for senior high school students.” Would philosophers, with the best of intentions, propose to write a book called Kant for Toddlers? The question, however, is not a question of rewriting university level Kant for the Nursery School level. The question is:

—Can you philosophers (supposedly trained in posing and dealing with such basic questions) assist us adult teachers (who have unlearned to ask such questions) in keeping these children’s questions alive, and help them grow?

Such a supposed situation has not, if I am correct, yet occurred in The Netherlands. All disciplines have their more or less stable position in the hierarchical educational system, and the position of philosophy is clearly: “at the top.” In the meantime, however, much has changed with respect to teaching in a number of disciplines. In Math, for example, an evolution—if not a revolution for some—has taken place: what not so long ago was called modern or “new” math and was presented only to a select group of university students is now integrated into the elementary school system. It is not a simplified and yet comprehensible summary of a university curriculum, but an independent and well-developed program.

Are children ready to do philosophy?

It is not uncommon to view philosophy as a discipline which, if children can
do it, cannot be philosophy, and if it is philosophy, well then, children cannot be ready to do it. Much of the material written on children's philosophy stresses a radically different viewpoint, not only with respect to philosophy, but also with respect to what children are and what education should entail: philosophy is meant to encourage and strengthen the respect to what children are and what they are not ready to do it. Much of the material cannot be philosophy, and if it is philosophy, well then, children cannot be ready to do it. Much of the material term "philosophy," much of what is called "philosophy" at the university level is, I feel, also not worthy of that term.

Some even prefer to discard the distinction between childrens' philosophy and university level philosophy altogether, and state that the wonder which children experience and express already reveals the classic issues in metaphysics (see Norton in: Lipman and Sharp, 1978:122). It is rather remarkable, though, that this posing of metaphysical questions is often interpreted as an indication of the child's inability to understand our adult, abstract framework of perceiving, thinking and communicating: "Children ask questions because they do not understand; that they do not understand, is because they are not ready for it (mature enough) developmentally." But what should we think when we hear a young girl, nine years old, say to her father, "Daddy, I guess God exists, 'cause he's got a name"? Is she not ready to perceive the difference between things and names, or is she showing an awareness of the philosophical question concerning the truth-issue as in statements like: "The king of France is bald"? (see Matthews in: Lipman and Sharp, 1978:235 and Haas in: Metaphilosophy, 1976:70-75).

Are we encouraging children?

Apart from the argument (mentioned above) against childrens' philosophy to the effect that children are not yet prepared to deal with such questions, there is another counter-argument which claims that children need stable convictions, and are not helped by relativism or scepticism. It is also alleged that childrens' philosophy merely encourages them to be rebellious. On the other hand, some writers are of the opinion that the P,C projects are not critical enough, in that they lack a social-political background (see Martin in: Lipman and Sharp, 1978:188-191). In their opinion, the critical thinking in Harry Stottlemeier's Discovery is limited to the uncovering of crooked thinking among parents and neighbors.

Childrens' philosophy: its goal and effect:

On the one hand we see the aim of philosophy for children to be to offer children a critical tool by which they can make the philosophical dimension in education their own, and that way make more sense out of their lives. On the other hand, it is the aim of these P,C projects to develop "thinking skills" by means of thinking about thinking. Both aspects, the philosophical and the logical, are developed in Harry Stottlemeier's Discovery. But whoever reads HSD cannot but conclude that the structure of the syllogism is the main theme throughout the book. The philosophical content of HSD in the form of questions on thinking, mind, and culture is present, but limited to its applicable value in the development of logical skills.

It is Moore's criticism, that in Harry Stottlemeier's Discovery, we are teaching skill without content, which he compares to a ship without a rudder (Teaching Philosophy, II/3&4:393-395). The results of these projects have been measured thoroughly, and have also been measured in terms of their effect on other subjects taught in school. But isn't it too bad, if these results are only expressed in terms of "dramatic gains" in reading and math (in comparison to the control group). Isn't it too bad if childrens' philosophy is only promoted on the basis that "it teaches children to read quicker," or "it teaches children to be more advanced in math after a year"? Childrens' philosophy will then become a new teaching method—presumably more effective than its predecessors (which in and of itself could be of great value and importance), but whereby it then also loses its meaningfulness in the field of philosophy. The original childrens' questions which I brought up in the beginning of this article, are then lost.

Philosophy as a story:

The IAPC textbooks have all been written as stories. These stories are written with given situations already in mind in order to get the "message" across. However, these "given situations" do not seem to fit the structural content of the stories themselves. If children comment that stories which are not specifically written for educational use can start them thinking, then it does seem worthwhile to attempt to initiate childrens' philosophy by way of already existing childrens' literature (also not specifically written for childrens' philosophy). In the journal Thinking, G. Matthews (in: Thinking in Stories) shows some very nice illustrations in this respect. (See also his article in: Metaphilosophy, 1976:7-16).

Childrens' philosophy in The Netherlands:

Childrens' philosophy is not a remedy for problems in education. To expect that childrens' philosophy will give children a meaning for going to school is an idle notion. But I do think it meaningful to integrate philosophical issues, in origin so familiar to children and so directly related to their prime interests, into the elementary school system. This should not be initially introduced in the form of a new discipline, but as part of the already existing curriculum. In Europe, initiatives from educators and philosophers in this direction are to be encouraged; mainly for the purpose of preventing the loss of these important and valuable childrens' questions.

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Sharp, Ann Margaret, see Matthew Lipman


Recent adoptions of philosophy programs

These are some of the schools and school districts which have recently begun offering philosophy courses to one or more classrooms of students:

Martin Elementary School, Alief, TX
J. Graham Brown School, Louisville, KY
Sea Girt Elementary School, Sea Girt, NJ
Tempe Elementary School, Tempe, AZ
Orchard School, Ridgewood, NJ
Laytonville Elementary School, Laytonville, CA
Colorado Academy, Denver, CO
Quirk Middle School, Hartford Public Schools, Hartford, CT
Maplewood Elementary School, Puyallup, WA
Middle School, St. Mary's Hall, San Antonio, TX
Copeland Elementary School, Dobson, NC
Nitschman Middle School, Bethlehem, PA
Fillmore Unified School District, Fillmore, CA
Ethical Culture School, New York, NY
City School District of New Rochelle, New Rochelle, NY
Ortega Elementary School, Austin, TX
Green Mountain High School, Lakewood, CO
Pentiac Junior Academy, Pentiac, MI
Sterret School, Pittsburgh Board of Education, Pittsburgh, PA
South Elementary School, Lander, WY
Board of Education, Caldwell, NJ
The Tower School, Marblehead, MA
Thomas Jefferson School, Yorktown Heights, NY
Putnam City School District, Oklahoma City, OK
Petrosky Elementary School, Alief, TX
Monongalia County Schools, Morgantown, WV
Board of Education, East Maries, NY
Excelsior Junior High School, Littleton, CO
Lebanon Public Schools, Lebanon, OR
Swarthmore High School, Swarthmore, PA
Lynbrook Public Schools, Lynbrook, NY
The Teacher's Room, White Plains, NY
Cider Mill School, Wilton, CT
Walker Elementary School, Flint, MI
Bauerswood Elementary School, Jenison, MI
Canadian Int. School District, Canadian, TX
Rushmore School, Carle Place, NY
District 8, Board of Education, Bronx, NY
Edgar School, Metuchen, NJ
Three Village Central School District, St. James, NY
Bangor Union Elementary School, Bangor, CA
Mekoryuk School, Mekoryuk, Alaska
Keating Learning Center, Austin, TX
Later Elementary School, Ypsilanti, MI
Lassenger Elementary School, Oak Park, MI
Los Alamos School Board, Los Alamos, NM
Woodland Elementary School, Lacey, WA
Lloyd H. Bugbee School, West Hartford, CT
Maine Endwell Central School District, Endwell, NY
Westbury Public Schools, Westbury, NY
University Hills Elementary School, Rochester, MN
Community Unit School District 9, Granite City, IL
Corvalis School District, Corvalis, OR
San Jose Junior High School, Novato, CA
Burton School, Huntington Woods, MI
Brooklands Elementary School, Rochester, MI
Kilbourn Middle School, Houston, TX
Laupahoehoe High and Elementary School, Laupahoehoe, HI
Watchung School, Montclair Public Schools, Montclair, NJ
Learning Program, Worcester State College, Worcester, MA
Syracuse City School District, Syracuse, NY
Gifted Program, Fayette County Board of Education, Fayetteville, WV
Alexander Street School, Newark, NJ
Dr. William Horton School, Newark, NJ
Demarest Middle School, Demarest, NJ
Akiva Hebrew Day School, Lakewood Village, MI
Montgomery County Public Schools, Dayton, OH
Haworth Board of Education, Haworth, NJ
Westridge School for Girls, Pasadena, CA
Mount Vernon School, Newark, NJ
Abington School, Newark, NJ
Brookside Learning Center, Lewis Cass I.S.D., Cassopolis, MI
Breuer Elementary School, Rochester, MI
Putnam City School District, Oklahoma City, OK
Mcracken Middle School, Aurora, CO
St. Joseph County I.S.D., Centerville, MI
Temiski School, Closter, NJ
Sussex Avenue School, Newark, NJ
All Saints Episcopal School, Lubbock, TX
Campbell Elementary School, Milwaukee, WI
Alder School, Portland, OR
Special Education Center, Board of Education, Toronto, Canada
Vetter School, Eaton, NJ
Greensfield School, Wilson, NC
Newton Public Schools, Newtonville, MA
F. W. Cook School, Plainfield, NJ
Delta Junction School, Delta Junction, AR
Wylie Public Schools, Wylie, TX
Fillmore Unified School District, Fillmore, CA
Harrington Park School, Harrington Park, NJ
A Budget of Unreliable Corollaries

Anthony's Law of Force
Don't force it, get a larger hammer.

Barber's Laws of Backpacking
1) The integral of the gravitational potential taken around any loop trail you choose to hike always comes out positive.
2) Any stone in your boot always migrates against the pressure gradient to exactly the point of most pressure.
3) The weight of your pack increases in direct proportion to the amount of food you consume from it. If you run out of food, the pack weight goes on increasing anyway.
4) The number of stones in your boot is directly proportional to the number of hours you have been on the trail.
5) The difficulty of finding any given trail marker is directly proportional to the number of hours you have been on the trail.
6) The size of each of the stones in your boot is directly proportional to the number of hours you have been on the trail.
7) The remaining distance to your chosen campsite remains constant as twilight approaches.
8) The net weight of your boots is proportional to the cube of the number of hours you have been on the trail.
9) When you arrive at your chosen campsite, it is full.
10) If you take your boots off, you'll never get them back on again.
11) The local density of mosquitos is inversely proportional to your remaining repellent.
Brooks's Law
Adding manpower to a late software project makes it later.

Cann's Axiom
When all else fails, read the instructions.

Clark's Third Law
Any sufficiently advanced technology is indistinguishable from magic.

Finagle's Rules
Ever since the first scientific experiment, man has been plagued by the increasing antagonism of nature. It seems only right that nature should be logical and neat, but experience has shown that this is not the case. A further series of rules has been formulated, designed to help man accept the pigheadedness of nature.

Rule 1: To study a subject best, understand it thoroughly before you start.
Rule 2: Always keep a record of data. It indicates you've been working.
Rule 3: Always draw your curves, then plot the reading.
Rule 4: In case of doubt, make it sound convincing.
Rule 5: Experiments should be reproducible. They should all fail in the same way.
Rule 6: Do not believe in miracles. Rely on them.

Murphy's Fourth Law
If there is a possibility of several things going wrong, the one that will cause the most damage will be the one to go wrong.

Franklin's Rule
Blessed is he who expects nothing, for he shall not be disappointed.

Ginsberg's Theorem
1) You can't win.
2) You can't break even.
3) You can't even quit the game.

Gummidge's Law
The amount of expertise varies in inverse proportion to the number of statements understood by the general public.

Harvard Law
Under the most rigorously controlled conditions of pressure, temperature, volume, humidity, and other variables, the organism will do as it damn well pleases.

Gilb's Laws of Unreliability
1) Computers are unreliable, but humans are even more unreliable.
   Corollary: At the source of every error which is blamed on the computer you will find at least two human errors, including the error of blaming it on the computer.
2) Any system which depends on human reliability is unreliable.
3) The only difference between the fool and the criminal who attacks a system is that the fool attacks unpredictably and on a broader front.
   7) Undetectable errors are infinite in variety, in contrast to detectable errors, which by definition are limited.
9) Investment in reliability will increase until it exceeds the probable cost of errors, or until someone insists on getting some useful work done.

Heller's Law
The first myth of management is that it exists.

Hoare's Law of Large Programs
Inside every large program is a small program struggling to get out.

John's Collateral Corollary
In order to get a loan you must first prove you don't need it.

Johnson-Laird's Law
Toothaches tend to start on Saturday night.

Jones' Law
The man who can smile when things go wrong has thought of someone he can blame it on.

Jones' Motto
Friends may come and go, but enemies accumulate.

Kitman's Law
Pure drivel tends to drive ordinary drivel off the TV screen.
Laws of Computer Programming
1) Any given program, when running, is obsolete.
2) Any given program costs more and takes longer.
3) If a program is useful, it will have to be changed.
4) If a program is useless, it will have to be documented.
5) Any given program will expand to fill all available memory.
6) The value of a program is proportional to the weight of its output.
7) Program complexity grows until it exceeds the capability of the programmer who must maintain it.
8) Make it possible for programmers to write programs in English, and you will find that programmers cannot write in English.

Law of Selective Gravity
(The Buttered Side Down Law)
An object will fall so as to do the most damage.

Lowery's Law
If it jams — force it. If it breaks, it needed replacing anyway.

Dean Martin's Definition of Drunkenness
You're not drunk if you can lie on the floor without holding on.

Meskimen's Law
There's never time to do it right, but always time to do it over.

Murphy's Third Law
In any field of scientific endeavour, anything that can go wrong will go wrong.

Murphy's Law of Thermodynamics
Things get worse under pressure.

Law of the Perversity of Nature
(Mrs. Murphy's Corollary)
You cannot successfully determine beforehand which side of the bread to butter.

Ninety-ninety Rule of Project Schedules
The first ninety percent of the task takes ninety percent of the time, and the last ten percent takes the other ninety percent.

Osborn's law
Variables won't, constants aren't.

O'Tooles's Commentary on Murphy's Laws
Murphy was an optimist.

Peers' Law
The solution to a problem changes the problem.

Peter's Placebo
An ounce of image is worth a pound of performance.

Pudder's Law
Anything that begins well ends badly. Anything that begins badly ends worse.

Rule of Accuracy
When working toward the solution of a problem it always helps you to know the answer.

Sattinger's Law
It works better if you plug it in.

Sevarenid's Law
The chief cause of problems is solutions.

Shaw's Principle
Build a system that even a fool can use, and only a fool will want to use it.

Vonnegut's Corollary
Beauty may be only skin deep, but ugliness goes right to the core.

Weinberg's Law
If builders built buildings the way programmers wrote programs, then the first woodpecker that came along would destroy civilization.

Zymurgy's First Law of Evolving System Dynamics
Once you open a can of worms, the only way to recan them is to use a larger can. (Old worms never die, they just worm their way into larger cans.)

Snafu Equations
1) Given any problem containing n equations, there will be n + 1 unknowns.
2) An object or bit of information most needed will be least available.
3) Any device requiring service or adjustment will be least accessible.
4) Interchangeable devices won't.
5) In any human endeavor, once you have exhausted all possibilities and fail, there will be one solution, simple and obvious, highly visible to everyone else.
6) Badness comes in waves.
The association of wonder with childhood is so automatic it has become a cliché. The innocent freshness with which children approach the world has long been held up as an ideal state from which the adult is exiled by the relentless tyranny of passing time. Christianity has suggested that salvation involves becoming like a little child; educators and artists have sought means to awaken in adults the spontaneity, curiosity, and sense of delight that seem to be the rule of childish existence. There is almost universal feeling that some of the patterns of perception which are characteristic of childhood must be recaptured if man is to live an authentic life. Such is the conviction that lies in back of the association we automatically make between childhood and the state of wonder.

What exactly do we mean when we speak of the wonder of the child? What does the experience look and taste like? Wonder, in the child, is the capacity for sustained and continued delight, marvel, amazement, and enjoyment. It is the capacity of the child to approach the world as if it were a smorgasbord of potential delights, waiting to be tasted. It is the sense of freshness, anticipation, and openness that rules the life of a healthy child. The world is a surprise party, planned just for me, and my one vocation in life is to enjoy it to the fullest—such is the implicit creed of the wondering child. Reality is a gift, a delight, a surprise—in fact, a toy; it is an excessive, superabundant cafeteria of delights, and should any experience begin to be jaded by boredom and staleness, all one has to do is move on to the next. To wonder is to live in the world of novelty rather than law, of delight rather than obligation, and of the present rather than the future.

In this chapter we shall undertake the exacting task of understanding the structure of childish reasoning and experience which makes the attitude of wonder a possibility. Until this is accomplished we are in no position to discover whether wonder is the same experience in the child as in the adult, or only analogous, and whether or not there is the possibility of a mature type of wonder.
As Cameron suggests, "Each of us has had to build up his own world of reality, and at the same time tie it in functionally with the realities that other persons experience. The apparent firmness and permanence of the external world are in part the projections of our own firm, enduring personality organization."

The motivating factor in the earliest experience of the child is the pleasure principle. He seeks pleasure and avoids discomfort. If mechanistic exactitude is preferred, one may say that the neonate is a bundle of basic instincts seeking satisfaction. Or, with equal accuracy but more poetry, one may say that the quest for delight is the motivating factor in the developing experience of the child. Rooting after a milk-covered nipple may be viewed as an instinctual response to stimulus or as the anticipation and searching out of delight. The child builds up a wider world of reality as he uses his developing reason to explore new pleasurable experiences and to retain the habitual sources of pleasure. The development of reason thus arises out of the quest for pleasure.

The Construction of Reality—The Growth of Reason

The Meaning of Reason

The aim of reason is to bring order out of chaos—to create a manageable cosmos of meaning out of the multiverse of raw experience. The discovery and creation of order are necessities for human life. Man can live with only so much chaos. Reason constructs a world which is manageable and understood, one from which a measure of strangeness and unpredictability has been banished. It humanizes the world, makes a home out of an environment, and domesticates nature.

This is accomplished by distinguishing, structuring, creating schemata, observing patterns, applying categories, and making judgments. At the heart of reason lies the seeing and/or creation of relations between facts and ideas which are seemingly unconnected in initial experience. Deduction and induction are no more than this. Induction is the art of seeing relations between facts, and deduction is the art of seeing relations between ideas . . . .

Increasing Complexification

As the child grows, his world becomes increasingly complex and demanding. Life is no longer merely milk, cuddling, sleep, and crying. As he becomes more aware of the exterior world, he comes into conflict. He finds that some forms of delight are mutually exclusive. It is not, for instance, possible to have the delight of free bowel action and the delight of Mother’s good pleasure at the same time. So the child learns to control himself, to distinguish between situations in which it is “right” to perform an act and those in which it is “wrong.” In learning this, he begins to establish a hierarchy of delights, and he learns to control his world to insure the superior ones. His world grows increasingly complex, increasingly structured, but it also offers a wider range of possible delights.

This process of seeing and inventing richer and more comprehensive structures, of apprehending and creating a universe which will satisfy a wide range of desires, is slow indeed. Piaget distinguishes four stages:

1. Up until the age of two or three, reality for the child is solely what is desired.

2. The second stage lasts from two to three until seven to eight. During this time the child lives in two different worlds, one of observation and the other of fantasy and play, and neither world is tested by the criteria of the other. Rather, they are juxtaposed in such a way that the five-year-old can know by observation that cowboys in the contemporary West are ordinary mortals, and yet, in his world of play, “know” equally well that they (and he) kill Indians and bad guys and live romantic lives.

3. Between the ages of seven to twelve these two worlds of play and observation begin to take on a hierarchical arrangement and structure. Imagination and “reality” are more strictly distinguished.

4. From eleven to twelve on, the hierarchy is completed as formal thought and logical rigor begin to develop.

This process is synonymous with the development of reason.

Juxtaposition and Syncretism

As distinguished from adult reasoning, which is either inductive or deductive (leaving aside for the moment the question of pure and practical reason), childish reason has been characterized as transduction. Transduction is constituted by an alternation between the tendency of the child merely to juxtapose facts and judgments which would be seen by the adult as related causally or logically and the alternate tendency to synthesize and homogenize data and judgments which should be separated.

More concrete illustrations of these tendencies might be helpful. Empty the pockets of a five-year-old boy, and you have a mirror of the thought world of the child. His pockets reveal a collection of items—some useful, some merely delightful, and all valuable—with no one item seeming to have anything to do with the next. There are string, a burned-out fuse, a bit of candy (unwrapped and covered with lint—now inedible), two small pine cones, and a genuine imitation sheriff’s badge. The thought world of the child is composed of a similar collection of items of experience and knowledge and of feelings and desires which, like a poorly-run museum, lacks any obvious principle of hierarchical organization. New items are added daily without being catalogued, classified, or related to the other items in the collection. The child juxtaposes items of experience and knowledge which, to the adult mind, involve logical contradiction.

Juxtaposition implies that the child does not see clearly the relations between things or understand the implications of ideas. He sees details but not the whole that is composed of the inter-related details. Piaget illustrates this from the drawings of children.

The child’s style and even his thought are therefore comparable to his drawing. A number of details are correctly indicated. The drawing of a bicycle by a child of six, for example, will show, in addition to the frame and the two wheels, the pedals, a chain, a cog-wheel, and a gear. But these details are juxtaposed without any order; the chain is drawn alongside of the cog-wheel instead of being correctly inserted, and the pedals are suspended in mid-air instead of being fixed. Thus everything happens as though the child really felt
the relations in question. . . . But this is as far as
his consciousness of relations goes.

What, to the adult, looks like disorder
in the juxtaposed world of the child has
no such meaning for the child. On
the contrary, he feels that everything is
connected with everything else; he feels
not a deficiency of relations but a superfluity. Piaget defines syncretism as
. . . the spontaneous tendency on the part of
children to take things in by mean of a compre­
hensive act of perception instead of by the detec­
tion of details, to find immediately and without
analysis analogies between words or objects that
have nothing to do with each other, to find a
reason for every chance event; in a word, it is the
tendency to connect everything with everything
else.

Syncretism initially appears to run
counter to juxtaposition, but it does not,
in fact. Insufficient attention to in­
dividual items, to details and their rela­
tions, leaves the childish mind without a
knowledge of the general laws of nature
and of thought. "A child knows nothing
either of physical necessity (the fact that
nature obeys laws) or of logical necessity
(the fact that such a proposition neces­
sarily involves such another." Lacking
these general laws which provide adult
reason with integrating and ordering
principles for dealing with the multi­
plicity of experienced items, the child
must forge ordering principles on the
basis of his subjective experience. Thus,
the connections he forges between items
of experience, the schemata he uses,
result from connections that are con­
tingent, fortuitous, and accidental.
Things experienced at the same time
become associated in the child's mind,
and when asked about one of the things,
he will explain it in terms of the other.
Piaget found that when he asked
children of five to six "why the sun did
not fall down," their answers merely in­
voked other features that they associated
with the sun—"Because it's hot" or
"Because it's yellow." They tended to
substitute a description of some quality
they associated with the thing for an
explanation. The rule of childish reason
seems to be this: when two things are
given simultaneously in perception, they
are fused into a single schema, and this
acquires the strength of reciprocal im­

The Alternating Rhythm

The tendencies toward juxtaposing
and syncretizing alternate as the child
grows. As Piaget notes,
Syncretism and juxtaposition constitute two
phases alternating over indefinite periods in the
mind of the child . . . . Sometimes the child
builds up new general schemas, tries to connect
everything, and tries to incorporate the new and
unexpected elements into the old, accustomed
framework. At other times the discovery or the
sudden emergence of unclassifiable and incompre­
hensible phenomena will burst these frameworks
and dissolve the schemas until new systems are
formed, only to be destroyed in turn.

As this rhythmic process continues
throughout childhood, there is a pro­
gressive clarification both of the nature
of the individual items of experience and
of the tissue of relationships that join
them. Greater attention to detail reveals
more accurately the objective relations­
ships that exist between individual ob­
jects, and as more objective schemata of
interpretation are built up the child is
less captive to his subjective, unsocializ­
ed feelings about things.

It is crucial that this process of the
deepening and widening of experience
be recognized, for it suggests that the in­
dividual atoms which compose ex­
perience of the world of nature, society,
and personality are seen clearly and ob­
jectively only as general patterns of
interpretation are developed. The growth of reason, the patterning and
structuring principle, coincides with
deeper and clearer immersion in the
world of individuals. The implications
of this for wonder will be seen shortly.

This continual oscillation between the
individual atomic units of experience
and the schemata that organize these
units into a meaningful totality is the
normal process of development in the
child. Indeed, in the healthy and open
adult this same process continues to
operate at a diminishing rate of fre­
quency as the schemata grow more ade­
quate to interpret the kaleidoscope of ex­
perienced reality. It is all too common,
however, for the patterns and schemata
which have been created as means to
understand individual atoms of ex­
perience to solidify and become
substitutes for experience of concrete
reality. When this happens, the child (or
the adult) stagnates and closes his mind
against the intrusion of wonder. Instead
of using reason to interpret experience,
he uses it to prevent the inbreaking of new experiences. The attitude is too well known to need much comment—"Don't confuse me with the facts; my mind is made up."

When this essential rhythm of thought breaks down, the wonder-producing contact with the strange and the novel ceases, and thought then proceeds not on the basis of present experience but on past formulations of experience.

This tendency to alternate between juxtaposing and syncretizing is rooted in the egocentric character of childish thought, which lacks awareness of the viewpoints of others. The child is as unconscious of his own thought as he is of the thought of others. He does not reflect upon his own thought processes; he does not look at himself from the point of view of others; his mind is not yet socialized. Self-consciousness always arises in dialogue with other-consciousness, the knowledge of the I with the knowledge of the thou. The child only gradually grows out of the state of immediacy into self-consciousness. It is contact with the world and with other persons that gives birth to reflective self-consciousness. In immediacy there is absolute certainty. Only when the mind has undergone the abrasive intercourse with other minds and viewpoints does doubt arise. It is then forced to verify and defend its conclusions.

**SOME IMPLICATIONS OF CHILDISH REASON FOR WONDER**

Although I have given only the barest outline of the structures of childish thought, we have seen enough to get some clues about the meaning of the phenomenon of wonder in children.

**IMMEDIACY**

There is an old Chinese proverb which captures the immediate character of childish thought: "Only to a child is pure happiness possible. Later it is always tainted with the knowledge that it will not last." The child accepts what is given in the moment with little thought of what it implies. His enjoyment is not burdened with the awareness that no good thing or bad thing lasts forever. For the adult the awareness of the passage of time casts a veil of reluctance, of hesitation, over the experience of immediate enjoyment. Certainly the child does have some remembrance of the past and some anticipation of the future, but the primary mode of time in which he lives is the present. Immediate enjoyment, delight in the presence of ___________, is but another way of describing the experience of wonder in one of its aspects.

When we speak of the innocence of a child, it is this quality of immediacy, of spontaneous enjoyment, that we signify. No adult can be innocent in this sense, for the immediacy of the child results from his relative lack of experience and from the small number of past connotations and future expectations which brings to burden new experience. In encountering a dog for the first time, a child approaches the experience with neutral expectations (unless his parents have created a sense of anxiety in him about novelty); he is ready to meet the dog on its own terms. Later, when his experience of dogs is greater, he will approach each new dog with fears or expectations arising out of his previous encounters. For better or for worse, the adult can never go back to the type of wonder that arises on first seeing a thing. Even if it proves possible to revivify jaded vision, to learn to see things freshly, it is not possible for the adult to recapture the innocence of first sight.

**LACK OF NECESSITY**

In looking at the foundational tendencies of childish thought, juxtaposition and syncretism, we saw that the child does not see his world as law-governed. Piaget sums this up: "Juxtaposition is after all the sign of the complete absence of necessity from the thought of the child." This means the child lives in a world that is contingent; anything can happen, as far as he is concerned, because he is not yet aware of the law-abiding character of nature or the logical necessity involved in thought and language. In his loose-jointed world, the wildest type of novelty is possible. It would not be wide of the mark to say that the child's vision of the world is like Sartre's, with the exception that the child experiences contingency with delight rather than nausea. It is conceivable in the child's world that when he opens his mouth a snake rather than a tongue will appear, but the child's reaction is to relish the possibility of such novelty—not to resent it.

We might make the same point by saying that the world of the child is one of imagination rather than logic, of fantasy rather than fact, of play rather than work. In imagination and play, the rules of the game can change. The only laws governing play are those that are made up and adhered to as long as the game gives delight. Thus, the laws of the world of the child can all be broken. Necessity is created only to provide a structure within which delight may be experienced. When the delight wanes, the necessity is destroyed. When it gets boring to follow the rule that all prisoners must stay in jail until somebody from their side touches base, then the rules are changed. The child tends to think in terms of the logic of play about the whole world. If a pet dies, Daddy can bring it back to life, or the doctor can. If no child is allowed up when the company arrives (understood to be an inflexible rule, of the same order as the rule of death and other laws of nature), this, the child thinks, does not really apply to "me." There is, for the child, no necessary law that cannot be changed to fit the deepest desires and demands of the heart.

Because the idea of necessity is lacking from the child's world orientation, he escapes much of the sense of staledness that arises in the law-governed and necessary world of the adult. A strange reaction sets in when the adult mind is confronted with law-governed regularity. Those "natural" sequences which we come to think of as law-abiding (the rising and setting of the sun, the rhythm of the seasons, the cycle of birth, maturation, and death, and so on—that is, those things that occur with regularity) soon lose their marvelous character for the adult. What is regular (literally rule-governed or rule-abiding) comes to be familiar, and what is familiar, contemptible. It is a strange and tragic fact that we grow bored with what is familiar, with what can be calculated, measured, and predicted—with what seems to be the jaded mind as inevitable
and necessary. The specter of necessity throws a pall over the adult mind.

Each year I anticipate the arrival of the violets in the spring, knowing they will come because they always have—because the regularity of natural processes will bring them forth this year as it did last year. When they bloom I look at them with some sense of pleasure, my anticipation satisfied. The reaction of my daughter is entirely of another kind. The surprise of first finding violets is repeated each year, the discovery remade, and delight produced anew by the surprising discovery that suddenly, apart from any expectation—without being compelled to bloom by necessity of nature—unannounced, the violets have arrived.

It is perhaps this lack of a sense of necessity that allows the child to enjoy again and again a game, a song, a story, or merely the repetition of a word. The child is familiar without being bored. Chesterton observes,

A child kicks his legs rhythmically through excess, not absence of life. Because children have abounding vitality, because they are in spirit fierce and free, therefore they want things repeated and unchanged. They always say, “Do it again”; and the grown-up person does it again until he is nearly dead. For grown-up people are not strong enough to exult in monoton.

A world where succeeding similar experiences are juxtaposed allows each of the experiences to be savored for itself rather than being subsumed under some general category. The thought world of the child does not show an inner synthesis in which the elements are necessarily related to each other.

CONCRETENESS

Piaget observes that when a seven-year-old is asked why he knows the sun is alive he answers, “Because it moves,” but he never appeals to some general proposition, such as “All things that move are alive.” He concludes that the reasoning of a child (up to eleven to twelve) is concerned with particulars, with individual cases, and does not reach the level of generality. The juxtaposed world of the child is a world of particulars bound together by only the most tenuous and subjective feelings of relationship. Violets are more real than flowers, robins than birds, and the concrete than the abstract.

This characteristic of childish thought links it up with wonder. One type of wonder is the reaction to a particular experienced in its uniqueness and singularity. As long as I remain in an attitude in which I greet each dappled-brown bird by identifying it as merely another English sparrow, I miss seeing the marvel that any particular sparrow is.

INTIMACY

Just as the distinction between subject and object, inside and outside, is not clearly made in the world of childish thought, likewise there is an indistinct border between the personal and the impersonal. The child’s world is highly personalized and intimate; it is more like him than unlike him. Thus, feelings may be attributed to objects. Landscapes may be happy or sad and animals good or bad. Milk that spills may be scolded for its malevolent intent and chairs kicked for their propensity to trip innocent toddlers. The neutrality and impersonality of objects becomes obvious only as the child passes into the closing phases of transductive thought.

We may also note that a child is a natural existentialist. His world is perceived more as a utensil than an object, more as *zuhanden* than as *vorhanden* in Heidegger’s terms. It is seen primarily in terms of its immediate relevance: a chair is for sitting; marbles are for shooting; and other children are either friends or enemies, depending upon how they fit into the game being played at the moment.

The similarity of the child’s experience of the intimate and personal character of the world and the experience of wonder is clear. While the adult has passed through the stage of abstraction and objectification, in wonder he receives the world back as a gift that is presented to him in a quasi-personal matter. It is only degraded intelligence that completely depersonalizes the world and deals with it solely as an it.
MASTERY, ACTION, AND WONDER

The developing world of the child is not primarily one of contemplation and thought but one of action. The development of reason, the ability to structure and distinguish, is primarily the outcome of the child's effort to cope with the world—to master it. Hence, it is important to isolate the relation between activity and wonder in the child.

For the healthy child, novelty presents a challenge to mastery. Much of the process of getting experience of an ever widening world consists of learning to cope with strange objects and novel situations. The child's world is one which is constantly being invaded by novelty—a strange, furry beast that barks and wags its tail, new toys, new playmates, new neighborhoods, and so on. Each of these new situations presents a challenge to the child. In order to be comfortable in the presence of novelty he must know what he is to do and how he is to act in the new situation—how he is to cope with it.

Novel objects and situations are experienced as delightful by the child only when he is convinced there is some appropriate form of action he can take or when he understands that no action on his part is called for. A novel situation with which the child feels impotent to cope is experienced as frightful and paralyzing and not as delightful. In her study of normal children, Lois Murphy, in regard to novel situations, says:

At first the response of the majority was simply to stand and stare . . . then to an initial exploration to collect data for appraisal of the scope of the opportunity. The most daring children explored their own capacities and limits by trying things out; when they found themselves involved in something they could not manage, they shifted to something which was within their ability. The paralysis in new situations shown by some children suggested that the stress involved not knowing what to do.

The child who meets a new situation with which he feels unable to cope, either because his parents have trained him to be anxious in the presence of novelty or because the situation is realistically beyond the range of his powers of mastery, tends to withdraw either with a feeling of defeat or one of unconcern. The normal child will merely turn his attention to some other source of enjoyment with which he can cope. The autistic child, on the other hand, will tend to become detached and defeated, and in time will be unable to find anything to give him delight. Continued impotence to cope, either real or imaginary, produces listlessness and drives out the sense of wonder and delight. In fact the autistic child, like the sociopath, seems to experience neither end of the emotional spectrum—neither wonder nor disgust, and neither delight nor fear.

The range within which novelty is experienced as delightful is limited, on the one hand, by a challenge to action which the child feels he cannot handle and, on the other hand, by a situation he feels he has completely mastered. Lois Murphy reports the following sequence in the child's dealing with newness:

Anxiety about the new stimulus-situation or demand gives way to interest as familiarization begins. Increasing mastery is accompanied by increasing zest and gratifying repetition. As the activity and object become totally mastered—where there is nothing more that is new, nothing new at all—interest wanes. The child's attention turns to a new challenge.

Both the completely unfamiliar (hence, unmanageable) and the unchallenging (hence uninteresting) fall outside the range of wonder for the child.

III. CONCLUSIONS

The process of the development of reason proceeds from the initial condition of loose-jointed categorical poverty, in which the world is interpreted largely in terms of feeling and desire, to a state of relative objectivity about the age of eleven to twelve, at which time the child becomes capable of formal reasoning. At no time is the child's mind a tabula rasa upon which experience imprints itself. The gaining of experience is inseparable from experimentation, structuring, categorizing, and judging. Thus, the intuiting of an ever widening world, the delight of new experience, is bound up with the growth of reason.

It has been widely suggested by romanticism and some forms of existentialism that the process of abstracting, judging, reasoning, is somehow the villain responsible for the loss of wonder. If the child's experience of wonder and delight is any criterion, nothing could be further from the truth.

For the child, the growing ability to reason is correlated with a growing sense of wonder about the world that reason enables him to discover. Wonder is no more dissolved by reason than freedom by law or enjoyment by discipline. We must look for the causes underlying the loss of a sense of wonder and delight, not in the activity of reasoning, but rather in the attitude in which the activity is carried out.

Nothing in the normal process of the development of reason in a child automatically leads to the eclipse of wonder. Children in whom reason does not develop—the so-called "wolf children," for instance—evidence bafflement and a low degree of delight and wonder. We shall also see that in primitive society there is growth into socialized maturity without the high degree of loss of wonder that we find in Western technological society. Even in our complex society we find that some adults have retained the sense of wonder and tend to live highly creative lives, yet have a better-than-average grasp of reality. All of these facts suggest that, contrary to the romantic assumption, there is nothing in increasing knowledge that makes inevitable the eclipse of wonder.

The sense of delight in the child is bound up with the possibility of action, mastery, and control. The mastery of novelty is one of the most constant sources of childhood delight and wonder. One might almost measure the psychic health of a child by the number of times his eyes sparkle with the triumphant affirmation: "I did it! I did it!"

This fact of childish experience runs contrary to many of the suggestions which locate the causes of the loss of wonder in the activity of controlling, mastering, and manipulating the world. Technology, utilization, and the effort to control—these have all been widely indicted and pronounced guilty of destroying wonder. D. H. Lawrence might be singled out as an example of this antitechnological attitude. Yet the experience of children points to the link-
ing of mastery and wonder. It is not the effort to control but the assumption that one has completely mastered that leads to the loss of zest and delight.

If, as I have suggested, nothing intrinsic to the growth of reason or the ability to act appropriately necessitates an eclipse of the attitude of wonder, why does the end of wonder so often coincide with the beginning of adult life in our culture? Why does the child stop wondering?

It may be extremely difficult to explain the eclipse of wonder. It is not difficult to describe how it happens.

Unlike some varieties of bees who come into the world to find that the previous generation has disappeared and left them only a store of food, human infants are raised by parents. And parents very often have ceased to wonder. Parents who are anxious about novelty communicate this attitude to their children: the world is to be suspected of being guilty and hostile until it proves itself otherwise. Needless to say, when a child adopts this attitude, the world seldom has a chance to prove its innocence.

In like manner, many parents create in the child a sense of impotence to cope with novelty because of their own timidity and sense of failure. A child who reflects his parents’ impotent judgment of themselves will approach experience with a built-in attitude of defeat and timidity. Novelty will be experienced not primarily as something promising delight, but as something that threatens the limited coping powers in which the child feels secure.

Another way parents force an eclipse of wonder is by forcing children too rapidly out of the world of play into the world of work. Children who are pushed to succeed in the utilitarian world too quickly are prematurely forced out of the natural environment of childhood—play, imagination, and leisure. In the world of total utility, curiosity is cultivated because of its pragmatic value in posing problems that can be given definite answers. On the other hand, wonder may appear pointless and impractical. It seems sensible and useful to wonder how a bear finds a honey tree, for such curiosity might lead to a budding interest in nature and a career as a naturalist. But what sense does it make to wonder that a bear likes honey, as Pooh does:

Isn’t it funny
How a bear likes honey.
Buz, buz, buz.
I wonder why he does?

To wonder that there should be such things as honey and bears—and people to delight in them—is a strange and unproductive attitude in a strictly utilitarian world.

The underlying reason for the eclipse of wonder must be sought in the basic attitudes toward life and the fundamental models of man adopted by those who educate the wonder out of children. The explanation for the loss does not lie in a genetic approach to the experience of children, but will be found, rather, in study of the pathology of adult experience.
News Briefs

The Montgomery County (Ohio) school system has obtained a modest grant from the Martha Holden Jennings Foundation which has enabled it to train twenty 5th and 6th grade teachers in Harry Stottlemeier's Discovery. The series of weekend workshops was taught by Dr. Philip Guin, who flew in from New Jersey.

A grant has been made by the Michigan Council on the Humanities to a three-county consortium of Intermediate School Districts (St. Joseph’s County, Van Buren County and Cass County), thereby enabling Prof. Michael Pritchard, Chairman of the Philosophy Department at Western Michigan University, in Kalamazoo, and Professor Marie Hungerman, Philosophy Department, Nazareth College, Nazareth, Michigan, to provide the teacher-training during 1982-83.

The first edition of Ethical Inquiry, the instructional manual to accompany Lisa, is now out of stock. It is being replaced by a temporary version of the forthcoming second edition, which is expected to surface in or around 1984.

The Division of Education Programs, National Endowment for the Humanities, has just released its new guidelines for “Humanities Instruction in Elementary and Secondary School” grant applications. The guidelines state that “projects must demonstrate a commitment to enhance both students' knowledge in fields of the humanities and the critical skills which effective study of the humanities imparts—reasoning, analysis, logic and coherent oral and written expression.” Proposals for the next cycle (cycles are at 6-month intervals) must be postmarked no later than January 6, 1983. Parties wishing further details should call Dr. Francis Roberts or John Hale at 202-724-0373.

Particular attention should be given to the “Collaborative Projects” portion of the guidelines. It is our understanding that NEH is not eager to fund routine implementations of a curriculum, but would be supportive of innovative projects which introduce a humanities discipline into elementary and secondary education with the collaboration of a college or university. The IAPC is generally able to provide such collaboration, either directly or through affiliated organizations.

Dr. Mark Weinstein, who is on the faculty of Hunter College, is this year offering a teacher-training program at District 8, N.Y.C. Board of Education, which is on White Plains Road in the Bronx. The teachers, who are in grades 5-7, are receiving graduate credits supplied by the CUNY Graduate Center.

The Wallingford-Swarthmore school district, in Swarthmore, Pa., has received a grant from the National Endowment for the Humanities, as a result of which a group of teachers is being prepared to use Lisa in courses in ethical inquiry. The workshop director is Dr. Ruth Silver, of Philadelphia. Graduate credits are being provided by the University of Scranton.

Another National Endowment for the Humanities grant will enable Prof. Miriam Minkowitz, of Coppin State College, Baltimore Maryland, to hold a conference on the use of philosophy in early childhood education.

Dr. Richard Morehouse, of Viterbo College, La Crosse, Wisconsin, has obtained a grant from the Wisconsin Humanities Commission to further his work in philosophy for children. Likewise Peter Shea, a member of the faculty at Metro State University, has now organized a “Working Group in Philosophy for Children” which is active in schools in St. Paul, Maplewood and Annandale, and has obtained a start-up grant from the Minnesota Humanities Commission.

The Schumann Foundation has awarded Montclair State College a three-year grant of $117,399, in support of the in-service teacher education and other Institute for the Advancement of Philosophy for Children activities.

Holger Scheibel, who two years ago was a principal in a Danish school and who attended a workshop in the Poconos, reports that excellent progress is being made in moving the Philosophy for Children curriculum towards publication, and in conducting teacher-training in the school district in which he is now administrator.

Prof. Ronald Reed, of Texas Wesleyan University in Fort Worth, informs us that the Analytic Teaching Program which he heads has received a grant of $30,000 from Mr. and Mrs. Howard Walsh, through the Fleming Foundation, to support the teaching of philosophy for children in 1982-1983.