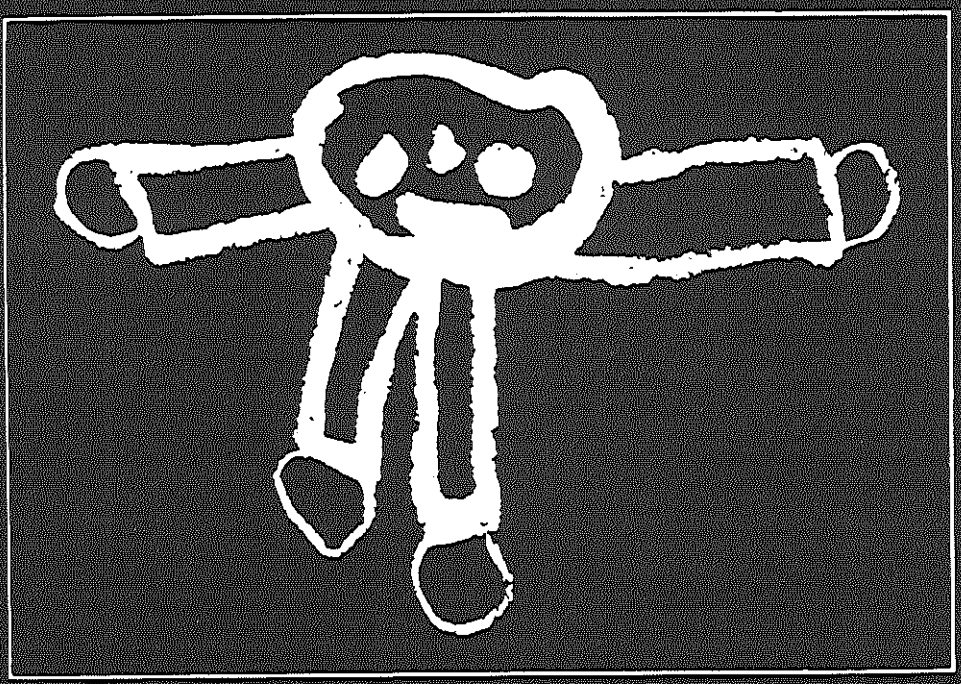
North Dakota Study Group on Evaluation



Selected, Edited, and Introduced by
Bill Browse and Mary Brown

Tony Kallet

FEW ADULTS CRAWL

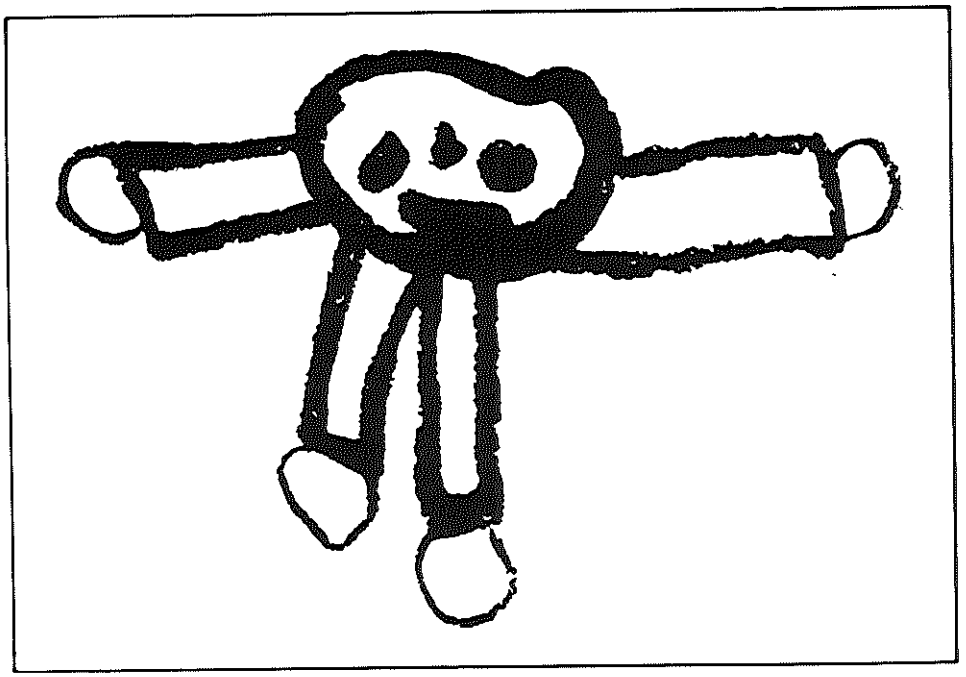
Thoughts on Young Children Learning

In November 1972, educators from several parts of the United States met at the University of North Dakota to discuss some common concerns about the narrow accountability ethos that had begun to dominate schools and to share what many believed to be more sensible means of both documenting and assessing children's learning. Subsequent meetings, much sharing of evaluation information, and financial and moral support from the Rockefeller Brothers Fund have all contributed to keeping together what is now called the North Dakota Study Group on Evaluation. A major goal of the Study Group, beyond support for individual participants and programs, is to provide materials for teachers, parents, school administrators and governmental decision-makers (within State Education Agencies and the U. S. Office of Education) that might encourage re-examination of a range of evaluation issues and perspectives about schools and schooling.

Towards this end, the Study Group has initiated a continuing series of monographs, of which this paper is one. Over time, the series will include material on, among other things, children's thinking, children's language, teacher support systems, inservice training, the school's relationship to the larger community. The intent is that these papers be taken not as final statements–a new ideology, but as working papers, written by people who are acting on, not just thinking about, these problems, whose implications need an active and considered response.

Vito Perrone

North Dakota Study Group on Evaluation



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Center for Teaching and Learning
University of North Dakota
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FOREWORD

Tony Kallet didn't know this book would be produced. It is a selection from the many papers, articles, and memoranda he wrote while he was working in England for the Leicestershire Education Authority and commuting each summer to the United States.

Some people make their mark in print and become widely known because of it. Tony rarely sought to do this. The context for his observations, his questioning, his dialogues with himself and with his colleagues were primary and elementary classrooms on each side of the Atlantic and teacher meetings and workshops where approaches to educating young children were debated and developed.

Each parent, teacher, politician, or any person concerned with young children has a framework of ideas about how children learn and how they grow in stature and in mind. Tony Kallet has cogent and compelling things to say about these matters.

INTRODUCTION

I

Today, as in every historical age, education is in ferment. There have always been men and women who have debated the purposes and the processes of bringing up each new generation. How widespread the debate was in earlier times we can only conjecture. We do know, however, that since Rousseau the arguments and the practical developments have been increasingly detailed, often fiercely contested, and always lengthily documented. Present circumstances reflect these same qualities. The direction of education in England in the 1990s is in a state of turmoil and some of the issues are not only particular to England but common to the concerns of parents, teachers, administrators, and politicians throughout most of Europe, North America, and Asia.

In the primary schools of England in the 1960s emerged the results of a process which had roots in the work of educators several generations before. The ideas which lay behind the approaches which began to spread around the country in that decade originated in the work of Froebel, Piaget, Susan and Nathan Isaacs, and many other teachers, researchers, and thinkers of the preceding hundred years. The practice of primary education at that time was moved substantially from an almost totally pedantic and adult-directed approach to one of greater flexibility which recognized the individuality of the learning process and the need to take account of the uniqueness of each child. This was epitomized in the opening sentences of the 1967 Plowden Report*:

> At the heart of the educational process lies the child. No advances in policy, no acquisitions of new equipment have their desired effect unless they are in harmony with the nature of the child, unless they are fundamentally acceptable to him.

* *Children and Their Primary Schools*, A Report of the Central Advisory Council for Education (England), Volume 1, HMSO, 1967.

Even when the subsequent gathering of reactionary forces seemed intent upon re-establishing the primacy of pedantry, the outcome of the 1988 Education Reform Act (enabling the introduction of a prescribed curriculum linked to rigorous assessment procedures) has

not significantly subverted the approaches to teaching and learning which are the distillation and heritage of the '60s experience. The continued growth of these approaches is not challenged or inhibited by political focus on curriculum content.

It is important to acknowledge the long history of argument and experimental work which preceded the '60s movement. It is often assumed that the changes were "fashionable" and indeed there were many contemporary charges of "bandwagonning." However, contrary to popular descriptions at the time, the "new" approaches were largely introduced by well-established teachers who had qualified immediately before and after the Second World War. These changes were not the outcome of a sudden wave of indoctrination in "progressive" methods by teacher trainers. Experienced teachers, through the very act of teaching hour by hour, day by day, year on year, were motivated to find alternative approaches which might breach the threshold of professional perception which saw teaching as simply telling with learning mainly as memorizing. These teachers began to look for effective ways of changing telling into dialogue and of offering alternative routes to learning which used senses other than hearing and sight and depended on other intellectual skills than memory. It is against this background and in this context that Tony Kallet, whilst working as teacher and adviser, produced the writings collected together in this book.

II

Tony Kallet was born in New York. In his childhood he attended City and Country School and from there he went to the New York High School of Music and Art. After graduation in 1951 he went to Amherst College and subsequently to the University of Michigan, Ann Arbor, where he was awarded a Ph.D. for a comparative study of highly-gifted children. He followed this with further research and a post-doctoral thesis at the University of Chicago.

From Chicago Tony went as an apprentice teacher to Shady Hill School in Cambridge, Massachusetts. Here he met and joined a group of teachers and educators whose working relations extended beyond the school to the Elementary Science Study project of Educational Services Incorporated based at Watertown and with ties to the Harvard School of Education, then through these establishments across the Atlantic to England and specifically to the Leicestershire Education Authority.

The Shady Hill experience, in particular the sustained discussions and the classroom testing of ideas and materials associated with

the work of ESS, undoubtedly shaped Tony's ideas about children's learning. It led to his advocacy of an approach to education which values the needs of young children and places due importance on using their interests, understanding their view of the world, and encouraging their commitment whilst at the same time acquiring relevant and useful skills and knowledge in ways which can be exciting, absorbing, and fun.

This view of teaching and learning Tony took with him when he joined the Leicestershire advisory service for infant and junior schools in 1963. Leicestershire at that time was on the leading edge of a movement in which teachers and educators were probing the validity and practicability of ways of learning and teaching which were increasingly more child-centered, less conventional, and more exploratory. For the best part of two decades the advisory service in Leicestershire encouraged and supported teachers in infant and junior schools to initiate and develop these approaches.

In this context Tony responded with enthusiasm to the thinking and practice of the teachers and advisers with whom he worked and made a major contribution to the work of his colleagues in classrooms and workshops. His observations of children learning, his insights into the processes they were engaged in, his capturing of these in the written word and on film were vital elements in the professional development of many primary teachers in Leicestershire.

After seven years in Leicestershire Tony returned to the United States in 1970 when he joined the faculty of the Mountain View Center at its inauguration within the University of Colorado at Boulder. This Center was established and directed by David and Frances Hawkins with initial funding from the Ford Foundation. It provided a workshop center and advisory service for teachers and student teachers, chiefly but not exclusively promoting approaches to environmental education in the elementary schools. Here Tony once again became part of a group of teachers and advisers who were committed to the notion that children learn in many and diverse ways. Teachers in Boulder County schools and further afield experienced Tony's enthusiasm for active and varied approaches to learning. He encouraged and challenged teachers and children to think adventurously, to follow through and elaborate their ideas, and to experiment and explore.

During the time he worked at the Mountain View Center Tony became known to hundreds of teachers and others working in education across the United States and abroad as the editor of the Center's quarterly magazine "OUTLOOK." From 1981 the Mountain View Center ceased to work directly with teachers but the

magazine received generous help from sponsors and continued in publication under his editorship until 1986. "OUTLOOK" provides one of the finest collections in this century of writings about education, particularly about the education of young children and about education which embraces the notion of childhood in which every waking minute is an opportunity to learn.

There are many teachers on both sides of the Atlantic who would say that Tony never knew how much they learned from him. For some he provided the first opportunity to appear in print and, through his editing skills, taught them to become writers. For others his penetrating questions when working beside them in their classrooms forced them to examine and explain more clearly to themselves and to others what they were doing and why. Whenever Tony was amongst teachers, he was a catalyst for generating ideas and revitalizing practice.

From his childhood when he would go with his father to concerts at Carnegie Hall and when he learned to play the 'cello, music was a constant thread through Tony's life. At high school he had expected to become a professional musician but by the time he went to Amherst he had set aside that idea. During the years in Leicestershire he enjoyed folk music and playing the guitar, and at that time and later at Mountain View he would bring in music whenever it was appropriate to the work he was doing with teachers and children.

When he had settled in Boulder he began to teach music to the children of friends. Then, in the year or so after the closure of the Mountain View Center, he began to build a new career, teaching aspects of music theory, composition, and appreciation, mainly to children but also to any adults who sought his help. Parents could sit in on his lessons and there must be many in Boulder who had their knowledge and appreciation of music extended by watching and listening to Tony teaching their children.

After five or six years living in Boulder Tony took to walking, mainly on the hills to the west of the town, and in the summer with friends he walked in the high country. In an article in "OUTLOOK" in 1977 he wrote,

> Walking and hill-climbing are now so much a part of my life that I find it hard to recall what it felt like not to walk every day; it is almost impossible to project back into the mind of that other me, the one who didn't know what was at the top of the west hill. My walks have become almost as necessary to me as music has always been. And I've begun to notice more and

more, to formulate more questions: Why the acres of quartz fragments on only one side of the west hill near the top? Why the sharply demarcated distribution of some of the wild flowers? Is it true the ants locate the entrances to their hills downwind as I think I've observed? And what happened to those deer whose bleached bones I have twice found high on the west hill?

Those words graphically describe Tony's approach to whatever attracted and absorbed him: he would observe them sharply, he would question and question. Tony never stopped learning and those who were fortunate enough to share some part of his learning also learned–never to stop learning.

– Bill Browse and Mary Brown

1

AUDACITY AND THE NON-EUCLIDEAN CHILD

Should our children grow up audacious? "Bold and daring, spirited, adventurous"? To ask the question is to set the goal. How can we but say, yes, we do want to encourage audacious thinkers who will challenge and test and probe? And yet, I suggest that much of what we do in school hinders the attainment of the goal, hinders the growth of such thinkers.

I propose to examine some of the practices I have seen in good American schools. What I will say is true to some extent of every school I know. I want to raise the question of the relationship of what we do to the development of audacity as a habit of mind. Practicality will not concern me here. In practice, compromise may sometimes be essential, but we should constantly be aware of what the stakes are in our compromises.

We live in a largely Euclidean world. Parallel lines nowhere meet. Parallel minds abound. The process of socializing, educating the young, can be viewed as a massive, concerted effort to transform an infant born with no view of the world, born *un*-Euclidean, into an essentially Euclidean citizen whose view of the world is much like that of the folk around him, very much like that of the people who helped socialize him. To some extent things could not be otherwise for, without shared habits of mind, shared values and conventions, social man could not exist. There are, however, serious dangers in the socializing process and I think we, as teachers, are not always sufficiently aware of these dangers in our classrooms. We seem often to leave precious little room for the development of divergent patterns of thought and behavior, even when such patterns would not be in serious conflict with the goal of a reasonably harmonious social life. We need to give much thought to the encouragement of the non-Euclidean child.

Let's start with simple things. For example, how do we seat our children in the classroom? There seem to be two main plans, parallel rows and concentric semi-circles. Both afford each child a clear view of blackboard and teacher. Both fix the child, put him in a place. But, we don't believe in this any more, do we? We no longer say, "Our job is to put the child in his place." What is his place? We don't know. All of education is a process by which he, and with him

we, find out. I am not merely quibbling about the word "place." When we put the child in a place, physically, we *are* putting him in his place in a broader sense. We cannot afford to be unaware of what we communicate at the unconscious level by what we say and do at the conscious level. We seat our children for efficiency and because of our conception of what is best for them. But I wonder whether putting a child in order physically does not communicate to him a feeling that he should stay in order, that if he moves he is, in many senses, out of order.

"Out of order." To be out of order is dangerous in our complex society where all adjustments, mechanical and social, are so delicate, so deeply interrelated. A small screw works loose in our automatic washer and the machine fails. A small child works loose in our seating plan and the plan is shot. We are upset, put him back, albeit gently. Does the child perceive our act as having no further significance than the putting of a chair and desk into line? Or does he, after the putting has been repeated a hundred times, begin to feel that in some way we are telling *him* to sit in line, to stay in line–to think in line?

Children are notorious for their sensitivity to the unconscious motives of adults. They need to be sensitive, for they are so small and vulnerable. Children are also known for the facility with which they generalize from one situation to another. Are we paying for the convenience and order of the seating plan by informing the child that he has a place, that we know it, that he had better stay in it?

What are the alternatives?

Here is another simple thing. We insist that children raise their hands before they speak out, and we have reasons for our insistence; what chaos might result if everyone spoke whenever he felt like it! The traffic cop function of hand-raising is surely essential. But what are we teaching the child by drilling him for twelve long years in the art of hand-raising and waiting his turn? We would say, respect for others, and the recognition that everyone has an equal right to speak. Ah, but this is *our* notion, not that of the child. To the child, his hand up and his body straining at every joint, he has more right to a say than anyone else in the room. And perhaps this is true if what he says is so exciting to him, so important; perhaps at that moment he does have a greater right to be heard than does anyone else in the room and perhaps we, the teachers, are seen by him, unconsciously, as having life and death power over the expression of his thought, as being in charge of the birth of his idea. This is the more serious since young children have little capacity to postpone the expression of their thoughts without them emerging stillborn. Only when one is highly

skilled in the use of symbols can one hold a thought intact, "tape it" for rebroadcast later. Children are not so highly skilled.

If what the child has to contribute is merely the single, correct answer to a discrete problem then perhaps the answer can wait intact. Perhaps too many of our questions demand such answers. But if the thought is substantial, if it comes from a startling perception, a sudden organization, then it probably cannot wait and probably should not wait. And, of course, who is to judge in advance the quality and urgency of the thought? Now, I can see turmoil resulting from what I might suggest, namely that children be allowed, when they are in the "jumping out of the seat" stage of excitement, to proceed without the delay caused by hand-raising, that they even be permitted to interrupt another child, or the teacher. Chaos, yes. Bruised feelings, perhaps. But such freedom may be the only way to get from inside the child the most valuable thing he has to offer–his uniqueness. Could we put up with the disorder to attain the freedom? Or could we perhaps organize our classrooms in a way that would prevent the conflict between freedom and order from occurring?

What are the alternatives?

Next, an even more troublesome matter. In most classrooms, in even the most progressive of schools, the teacher spends a fair amount of time standing in front of the class. There are two relevant concepts here: "standing" and "in front of." In our culture both standing and being in front of someone are often loaded with symbolic meaning. In many contexts to stand, while others are sitting, is to command attention by one's very physical presence, literally "to stand out." To be in front is to be where the assembled eyes are least likely to avoid seeing one. Taken together, standing in front of others who are seated is to assert oneself in strong terms and, by inference, temporarily to assign one's auditors to a subsidiary, or at least passive, role. This would seem especially true when one is confronting people who are young and small. The passive, subsidiary role is one into which children are frequently placed *vis-à-vis* adults. So often things are done to them by someone bigger, of greater status, someone to whom, because of relationships of dependency, they must defer. (We may truthfully say we are doing things *for* the child, but I suspect that his preferred preposition would frequently be "to.")

Would we not do better to strive at every turn to reduce rather than increase the child's sense of littleness, to increase his feeling that we are no more than his equal in thinking and learning, an equal with a little more experience (but perhaps a little less originality)? Is it desirable for the child to see us as an Authority, big and strong, front-standing and Right? Again, asking is answering, but I am sure that to

many children much of the time this is how we appear. And really, when it comes to authority, just what is it we're authorities about? Something really meaningful to the child? Are we the authority on what Billy-in-the-back is thinking–or is Billy? Are we the authority on what is best for Sally-on-the-side to think about next–or is Sally, perhaps with our understanding cooperation when necessary?

What are we communicating to children when we teach, when we set up a schedule and guide our children through it–subtly poking and prodding and nudging the stragglers? If we are not the authority on what the child is thinking–and we are not–and if we are not the authority on what his next thought should be about–and we are not–precisely what claim have we to his respect and attention? I can think of only one legitimate claim, and we share it equally with every child, every human being. It is the claim to respect and attention freely given because what we have to offer seems of value. Any other claim (including that of standing up in front and being bigger) is false, is sure to be sensed as false by the child. He will respect us and pay attention to us only if, being totally ourselves, we seem to him someone valuable.

Some teachers seem to hide their true selves behind a mask, burying themselves within a role based on a conception of an instructing, coaxing, monitory being labeled "Teacher." Acting thus they can never hope to gain the respect and emulation of their pupils, for children seldom have trouble distinguishing between the real and the role, and they cannot emulate or admire a role. They need real people.

To stand in front of a class and instruct is to make some assumptions which are, at the least, dubious. It is to assume that we know where each child is now and where he should be next. It is to assume that the same direction, the same perspective, is best for each child in front of us. It is to assume that for every question there is a correct answer which we know and which the child is to determine. This is true only in the trivial instances, the matters of fact, the calculations which are the least part of learning.

Children are less in need of answers than of paths for exploration and, above all, models of explorers to copy. No matter what we do in the classroom, no matter how we provide the models and suggest some of the paths, much is gained if we are human, alive, a little bold and daring. If we act ourselves, rather than assuming a role, the worst that can happen is that the child will reject us. The right of the child to reject if he cannot accept is easily taken from him, and is a right we should not tamper with. The child cannot reject a role, because it is always coming at him with a changed face; he can accept

or reject only real people. I suggest that we can make him want to accept us if we exhibit some of the audacity of thought and action we would like him to develop, if the model we provide is a true and exciting one set in an environment full of the resources for exploration and discovery. I doubt whether the "Teacher in front, Teaching" classroom provides the optimal setting for human beings to be explorers.

I could spell out here some ideas about alternative ways of organizing an exploring environment, ways which would start with a room full of human beings, including a teacher who, prized away from the front of the room, was one among many participants in the business of learning. For the moment I prefer to leave the matter open and to raise one last time the question:

What are the alternatives?

Many things we do communicate values to children other than those we consciously intend to transmit. Our seating plans, our insistence upon hand-raising, our station in front of the room, our too-frequent lapses into a "role," all of these can inhibit the development of audacity. We are not such fearful, frightened people; we cannot be hurt by the "bold, daring, spirited, adventurous" child. But even with the best of intentions we can hurt him, even *prevent* him. Perhaps the only way to help a child grow up audacious is to be a bit non-Euclidean ourselves.

What might happen if we made parallel lines meet?

Primary School Broadsheet, Leicestershire, Spring 1963

2

NOTES ON A TEACHER'S JOB

There are many things that a teacher does during the day which do not seem to be essential to her job *as a teacher*. They may be things that have to be done, but I suspect it is not while doing them that a teacher feels most like a teacher. (Most of what I will say here refers specifically to teachers of younger children, say up to nine or ten; some of it may apply to those who teach older children but I am thinking primarily about the younger ones here.) We can quickly dispose of the routine of getting children checked in in the morning and getting all the records straight; theoretically a well-trained IBM machine could do this. In practice, perhaps, some child could handle most of it. We can, similarly, treat in cavalier fashion the "char-woman" aspects of the daily routine. Surely the teacher who mops up the spilled paint or scrubs the table tops does not, at that moment, feel she is operating at peak efficiency as a teacher. And, indeed, I have seen here just how much of this part of what has to be done can be handled by children. It may seem unfair to insist that the very young spend some of their time on such mundane tasks but it at least frees the teacher to think about the group as a whole and her job ahead, and it may have other peripheral advantages to the child as well. Let us also pass rapidly over the "baby sitter" functions of the teacher. Again, it may be a part of the job that has to be done, but, again, I have seen ever more signs that children even at age five and six can learn to babysit for themselves in large part, again with probable peripheral advantages to their development. In the vertically-grouped class of the future (or, in some parts of the world, the present) the teacher-cum shoelace tier, or belt-buckler, or mayhem-preventer will be obsolete at least three-fourths of the time.

We have thrown out quite a bit! Let's see if we can dispose of a little more which is not quite so obvious. Is the teacher primarily an information passer? It seems to me not. In the first place, many of us would agree that a lot of the information that teachers have traditionally spent their days passing is not, as a body, necessary to the promotion of good learning and may even get in the way of it. We no longer think, perhaps, that the main job of the teacher is to present to forty receptive minds the accumulated wisdom of the past. Children need information, but much of what they need they can obtain for

themselves or from other children or, later, from books, and certainly the teacher has no way of deciding in advance just what information all her children need. (A different, and crucial, aspect of providing information will be considered below.) On a somewhat lower level than the provision of the dates of the Kings of England or the topography of Mongolia, is it the essence of a teacher's job to provide, to little children, spelling words? At present, of course, this is often necessary but, again, one can envision an IBM machine future in which a child, needing a word for his free writing book, can trot over to a machine, push a button, inquire "How do you spell 'Zlither'," and receive a slip of paper with the letters "Z L I T H E R" on it. Fanciful at present, yes, but I am going to insist vehemently that anything that could theoretically be done (and done better, since, if the teacher is like me, she will often not know how to spell "Zlither") by a machine is not, essentially, part of the teacher's task.

Can the teacher teach children how to be creative? She can provide the conditions of creativity (see below) and, perhaps, a sort of general support of the whole idea. I suspect, however, that, if anything, even the best teacher may sometimes get in the way of the process of getting from inside the child to outside all of the uniqueness which causes us to delight in children. It seems that the older the child, the less spontaneous he tends, generally speaking, to be, and this process of the decay of spontaneity reaches a limit in many adults, who can see everything that passes before them only in terms of the pigeonholes they have laboriously constructed and labeled. If anything, most adults could learn a lesson in creativity from children. I think that we have nothing to teach here, though there are some crucial things we can do, which I will turn to in a moment.

Can the teacher help children to think more clearly? Now here we are getting into the thick of things, and awfully close to home in terms of what I have been about these past months, and I must admit that I have even begun to think through all the ramifications of this issue and am, in fact, quite in a dither about it at the moment. But certain things are beginning to be clearer than they were before and it is important that I share them, if only so that others can help me in my own thinking. First, let me say that unquestionably we can hurry along the process of getting children to think more like adults. To the extent that we take adult thought (even at its best) as the ultimate in clarity and logic the answer to my query must be, yes, we can teach children to think more clearly, more logically. Even here, however, there are certain annoying paradoxes which I've tried, in vain, to brush away for some time. For example, I have yet to discover a task involving pure logic (such things as multiple class membership, working from

premises, etc.) on which there is anything like a clean break in performance between children and adults. Children sometimes need a little more familiarity with the materials. They may have somewhat less highly developed a critical faculty which leads them to stop and re-examine their solutions. It remains true, however, that we have not yet constructed a task on which some children (and not just one or two but quite a few) have not equaled, or bettered, adult performances– and these were, I believe, intelligent adults. Just the other day a six year old completed a city-planning game, which involves an elaborate system of colored rings and cubes and a complicated task of sorting out multiple membership, faster and more accurately than *anyone* I've given the task to before. Last summer an eleven year old solved our "cube matrix" problem with breathtaking speed and accuracy. The examples multiply. And most children, given time, seem capable of matching at least my performance on any of the tasks. Two questions, however, arise. First, are we wise to attempt to speed up the process of "thinking good, like an adult should"? Second, what are we displacing in the child's life when we introduce our adult-based games? (It is not just our materials, of course, which do this; much of what happens when an adult confronts a child seems designed to encourage the latter to perceive and think more like the former.) I am beginning to suspect that we are not so wise in trying to speed things up, and I will return to this in a moment. For now let me simply say that there increasingly appears to be virtues in letting things happen slowly. And as for what we displace, I fear that often it is the creative outpouring that gets displaced. Children play our games (and those which good teachers have employed for years) with pleasure once they are started. But, somehow, I seldom see in this performance the fine edge of enthusiasm, the investment of self, which I see all the time at the easel, the wood bench, the clay table, in the writing corner. We are coming to children, here, with something we can easily get them enthusiastic about. But it is *we* who do the bringing, and we have not got the overwhelming superiority in clear thinking that we may think we do and, anyhow, children will soon enough be as old as we are. Perhaps too soon. I think that the teacher's traditional role of "purveyor of clear thinking to the masses" needs very serious investigation.

I have been negative for two pages now. Have I anything positive to say or am I merely going to strip one function after another from the teacher and emerge with the old idea (which nobody ever *really* believed, judging from practice) that the least teaching is the best teaching? No, I'm not saying this at all, nor would I want to imply it in any way. For it seems to me that there are at least three crucial

functions of a teacher which, if some of the less important, or even ill-advised, tasks were minimized, could receive far more attention. These tasks, which I shall consider in turn are:

1. the preparation of the environment
2. the "binding" of time, space, and ideas
3. the cultivation of misperception.

Children can be unbelievably, even, at times frighteningly, original and creative provided they have the materials on which to operate. Often these materials, at least for older children, may consist of nothing more than pencil and paper, in which case the preparation of the environment is simple, requiring the pencil, the paper, and a more-or-less quiet nook in which to use them. But often creativity needs a jog, and it is this we provide by preparing the environment with as wide a range of possible materials (and ideas) as we can dream up. I am beginning to suspect that there is a "density effect" in learning environments. It appears possible that, if a system of organization prevents all from becoming chaos, it is impossible to have too many different kinds of materials available for use, and a good many of them out in the open so that the child's wandering eye, at nine o'clock in the morning, can land on something which, in some way, relates to what he carried to school with him inside his head. I have been amazed, in the past weeks, to see that preparing an environment does not, basically, involve building a school with lots and lots of space. I used to think it did. But space is largely for the teacher's convenience, it seems to me now. (Not that this should be minimized; a teacher harassed by lack of facilities, by lack of elbow room, is not likely to be efficient in important ways much of the time since, perforce, she needs to spend so much time coping with the environment, not working with the children. To say this, however, is to say nothing about the need for space in order for children to be maximally effective as creators.) I have seen wonderful teaching in large, airy, "nook-filled" rooms in modern schools, with ample cabinets and shelves, with easy access to an attractive out-of-doors. But I have seen equally effective teaching in rooms hardly big enough to turn around in, where the children are working so close together that they need to give a thought, now and then, to whether there is room to step back. Indeed, while I don't in any way wish to romanticize lack of space, there may even be a marginal advantage in a well-prepared environment in a cramped room in that more of the life of the group is within each child's visual (and aural) field at any time, with all the implications this may have for the cross-pollination of ideas. The main thing is that there be all sorts of things available, from the usual art materials and wood and writing books to blocks, to clocks that can be stripped

down, to puzzles, to ... It is an essential part of the teacher's job to prepare this environment and, equally important, to keep it from overwhelming a child. Provided it can be kept manageable (to return to an old phrase of ours which still seems meaningful), the more complexity the better. Not everything needs to be out: this would be a sure way to chaos. But everything needs to be readily bring-outable; this is a possible aid to creativity. Let us agree, then, that the skilled teacher is essential as an environment-preparer and manager. To say this is to say a lot.

The teacher-as-"binder" fascinates me. I am using the term "binding" as the general semanticists have used it to mean "bringing together," or "bringing together in the awareness of the individual." The semanticists have concentrated upon time-binding, the bringing into present focus of *then*, *now*, and (to a much lesser degree but still importantly) *later*. I am also using the term to refer to the binding of space (which, to be sure, has temporal elements), to the bringing together of ideas, concepts which may, if you like, also be spread out in the present, not focused but diffuse and a bit "out there." One can make a pretty strong case that the ability to bind is *the* crucial difference between adults and children. Children, for reasons some of which are too obvious to mention and some of which are too obscure to dare to mention, are notoriously poor binders. It tends so often to be "here yesterday, gone today" with children (though probably not really gone, for if this were so nothing would ever be learned), or "here then, hidden now," or "in mind then but now concealed by a new thought." This is also true of adults, of course, but with age seems to come the ability to retain more, to bring together more, to think of more, consciously, at once. This may be the most important strength a teacher has to offer her children. The teacher can say, "What you are doing now is very much like what you were doing yesterday," or "Have you thought about how this links up with what you were telling me last week?" She can say, "There's something under that pile of papers over there which you might find useful to you here," or "Bobby just said something which I think you ought to listen to." When I look at the best teachers at their best, it seems to me that it is this kind of binding that they are doing constantly. Because of their greater awareness of more–more time, more space, more ideas–they can often bring to the child the element which may be missing from his present activity or thought. It is often unnecessary to make explicit for children just what the connection is, or might be. Often all one needs to do is to present the child with *B* at the moment he is engaged with *A*. Now, of course, it takes a great deal of skill and training and sensitivity to be aware of even a fraction of the possible

bindings which might be related to the work of a child, let alone a class of children. It is possible (and I speak from experience) to barge in like the bull in the ..., and literally deluge a child with associations and connections that may be totally irrelevant to him, which are strictly the adult's, not those which the adult feels may be the proper *B*s for the child's *A*. Indeed, I'm beginning to wonder whether a lot of the less good teaching we do does not consist largely of providing irrelevant *B*s for *A*s which we barely understand. Properly carried out even a small part of the time, however, the binding of which a good teacher is capable seems inextricably a part of the teacher's job. The teacher must be a time-, space-, idea-binder. To say this is to say a lot.

All of what I have said so far about what a teacher does is closely linked to what might be termed "the cultivation of misperception." I began to develop this notion several months ago, and even put a tentative formulation of it on paper. Almost everything I've seen, in the interim, of children learning under the best conditions, has fitted tolerably well with my original conception (which is probably not all that original, but may be merely a restating, in other terms, of what a number of people have been saying for some time and of what even more people may have been doing). The theory runs like this. Children, having more or less limited experience and, consequently, woefully incomplete data, make many arrangements of the world which, from an adult point of view, are incorrect and which, when more experience is in, when more data are available, may even prove incorrect in that they do not accord with the laws of the physical, and social, world. I've been seeing some of these incorrect formulations in the past few days, watching children playing with pendulums. It appears, for example, to be overwhelmingly obvious to children starting out with pendulums that the weight of the bob at the end of the string is related, in some way, to period or amplitude of swing. There is good reason for this initial assumption, since weight is related to other variables in a great many systems. That it is not, here, doesn't make the children's initial hypothesis any the less logical. Let us suppose that we confront a child with a situation which makes it (at least from the adult point of view) inescapable that his initial formulation is incorrect and must give way to a correct one. The nature of the pendulum situation, the various suggestions one can make, does seem to make inescapable the lack of relationship between weight and period. And yet it is amazing how long this lack of relationship escapes children. They deny the obvious. They bring in totally irrelevant factors as explanations. They do anything but surrender their initial hypothesis–up to a point. (Does this sound quite a bit like what often happens in adult thought, too?) They find evidence to

support conclusions which are, from the point of view of "reality," insupportable. The other day a girl arrived at the twin conclusions that weight of the bob *was* related to period and was *not* related to how long the bob would spin on the end of the string.

What has gradually dawned on me is that these misperceptions are not merely part of a stage to be passed through at a certain age and wouldn't it be nice if we could find ways of speeding up the passage. This is often the impression one gets from Piaget, and it is certainly one of the traditional assumptions of teachers. But misperceptions may be an essential mechanism by which the child (and the adult) defends himself against the buffeting of too sharp and too frequent reorganizations of basic beliefs about the world, physical and social. In a study of mental illness, researchers concluded that it was the sheer number of traumatic shocks a person had experienced in his lifetime, rather than the nature of each individual shock, which had the highest predictive value for mental illness. It appeared that the human organism could stand just so much rough treatment. If this is true of traumatic shocks may it not also be true that there is a limit to how much "conceptual shock" the brain can efficiently cope with or, to put the matter somewhat differently, may it be true that shocks must be small ones and well spaced out, the size and the spacing to be determined by the individual in question? Misperception may be a major way in which this size-limiting and spacing out takes place in learning. It allows the child time during which he can gradually (and perhaps largely as the result of unconscious operations) assimilate bits and pieces of a new perception to an old theory, and modify the theory without really even being aware that he is doing so. If we insist on instantaneous reorganization (and this is what traditional teaching does, it seems to me) we are providing a series of more or less major shocks, and more or less all the time. If we allow misperceptions to flourish, allow the child, with the aid of our properly prepared environment (and properly designed equipment) time for gradual assimilation, we may be protecting him from shock and ensuring that he will come back, time and again, for more "fooling around" with our materials. (There is overwhelming evidence, now, that lower organisms, such as rats, thrive on an increase in stimulation of the brain, if it is self-administered and in small doses. Rats and chimpanzees have been shown to prefer visual complexity to a homogeneous visual field–again if the choice is theirs. Whether or not these findings have physiological implications for humans remains open, although work done with so-called "sensory deprivation" situations in which input is drastically reduced seem to suggest that they may.)

Misperception, as one watches children learning, seems to play the role of a delaying action. When I speak of the teacher's role

in cultivating misperception I certainly don't mean that the teacher goes around deliberately planting erroneous notions. But she must allow misperceptions to develop and grow until they have served their function. When they have played their part, they will often clear themselves up, if the environment allows it. It may sometimes happen, of course, that a child will get himself so boxed in by his misperceptions that, although they have provided the necessary time, and although he may have become acutely uncomfortable with his misleading perception or hypothesis, they prevent the child from finding the way out. In such a case the teacher, aware that the need for misperception no longer exists, can, *via* materials or the spoken word, often provide the clue with which the child can work himself free. "Cultivation," in the horticultural sense, I take to mean both the promotion and retardation of growth. We want our roses, but not all over the lawn. Similarly, the good teacher realizes that the child needs his misperception and allows it to flourish but at the same time prevents it from engulfing the child and preventing him from all movement in his thinking.

I have suggested some things which may be less essential in teaching, and some things that may be more essential. Preparation of the environment, binding of time, space, ideas, and the proper respect for misconceptions may be three kinds of things that teachers should concentrate on. Luckily, for those who view "teaching machines" with alarm lest they put the teacher out of work, or relegate her to a secondary role, these things seem totally immune to being "programmed" anywhere outside of a skilled and sensitive human brain.

17 November 1963

3

THE ONE-SIDED CHILD

Is well-roundedness our goal in education? This question is inevitably going to come up in our own thinking as we proceed with an integrated program of teaching, and it is most certainly going to be raised by others who look on. It seems to me that the time has come for an examination of the premise that a desirable goal of education, at least at the Primary level, is to expose every child to a considerable dose of everything. The question is going to arise because, in the integrated program, the decision about what to do at any time is essentially the child's decision, not ours, and there are going to be children (probably a minority but undoubtedly at least a few in every class) who spend most of their time with one, or possibly two, activities to the virtual exclusion of all the other riches we may lay out.

Dr. Joseph Wepman, at the University of Chicago, has done work which is relevant here. Wepman has been studying alexia, the inability to understand written speech. This disorder, neurological in origin, affects a small number of children, but Wepman has been attempting to find ways to permit such children to use their intelligence (and alexia may affect an extremely gifted child) in satisfying and productive ways. One of his methods is to present most of what a child needs to know verbally–the children have no difficulty in understanding what is said to them. From his work with the child suffering from alexia, Wepman has arrived at the not startlingly new notion that if one considers children in general one finds that some are heavily biased toward ear-mindedness while others show a marked predisposition to learning by looking. Most children have both ear-minded and eye-minded tendencies, can profitably learn in both ways. But, Wepman says, for children at the extremes of the distribution one of the worst things we can do is to attempt to employ the "buckshot" theory of teaching–the theory which says that if you provide children with both ear-oriented and eye-oriented materials, those who are ear-minded will take what they need by ear and those who are eye-minded will take what they require by eye. *No*, says Wepman. What happens too frequently is that the ear-minded child in a buckshot situation spends so much time and effort trying to assimilate the visual material that he has little energy or attention left for that which is really more congenial to him, the aural material. The

reverse situation obtains for the eye-minded youngster; he ends up in a muddle because he is trying desperately to attend to the aural presentation.

I suggest that there may be an analogy here to the more normal learning situation we find in the typical classroom. Most children, in a rich, well-prepared environment, will find materials of interest all over the room. Some, however, will show marked preferences for one or two activities, say art and writing, or science and math, or even just one activity. If what Wepman says has any generality, perhaps we would be well advised to let these children follow their natural bent and forget about well-roundedness for them. If we insist, no matter how subtly, that they turn to other pursuits, we may well end up finding them unable to function efficiently and enjoyably at anything, and may find them not one-sided but no-sided. I have seen such children, and it is not a pleasant experience. The urge to explore, to find out, to learn, is so strong a part of the human make-up that, save in cases of exceptional personality disorder, save in the case of the school-phobic child, most children will become interested in *something*, if we are wise enough to provide enough somethings. It may well be that our range of somethings will need to be extended well beyond what is typically found in the classroom. Perhaps we will have to have special materials for just one or two children–but teachers who know what they are about are well aware of the occasional need for this anyhow. And there is virtually nothing a child could conceivably become interested in, from cheese to pasting pictures in a book, from modeling in clay to exploring trigonometry, that the skillful teacher cannot extend in one or more ways. It is important, however, that the child who is interested in one thing does not view the teacher's efforts at extensions as an attempt to woo him away from his heart's delight.

I think we are not wise enough, and cannot be, to say which way any given child should go. I think, instead, we must watch the ways in which he does go and see that in any direction he has as rich an experience as possible. We pay homage to individual differences these days. We say we realize that in any given group of children at a given chronological age there is a wide range of mental ages. We say this and we make provision for it. It makes equally good sense to me that we should see that there is a wide range of interests, and that forcing a change of interest is bound inevitably to fail. If a child, at our prompting, leaves the activity he finds most congenial and takes up one we suggest, I would be suspicious of his motivations; I would suspect that he was now trying to please us, not please himself.

I adopt a rather far-out view of children's interests and abilities. I am quite willing to say that there are children who will

never enjoy mathematics, sense the aesthetic beauty of the system of number. There are children who will *never* be good writers, who will never take pleasure in the written word. We all know that there are children who might as well be considered hopeless in music; it may be that by forcing we can get some of these youngsters to appear to participate, to appear to enjoy. But always there is the thought, "If he was not made to come to music, might he not be painting a wonderfully creative picture or discovering an exciting mathematical relationship?" Many people will say, "But enjoyment of music is part of the richness of life; we owe it to the child to give him musical training." (I choose music as my example because it is perhaps closer to my heart than any other subject and I cannot, therefore, be accused of "writing it off" out of personal prejudice.) It is true that one can derive great pleasure from music. I would not, however, be willing to say that this pleasure is greater than the pleasure a child might derive from learning how to use his imagination in writing, learning how to play a first-rate game of chess, learning how to assemble a Meccano set into elaborate and rigid structures. We may feel that some of these activities have greater scope than others, that some lead up a blind alley while others lead to ever-increasing satisfactions. I am not sure this is true; the measurement of satisfaction, of the sense of accomplishment, is not possible (thank goodness). Further, even if it were true, the sense of extensibility is a purely adult concept and has no relevance to the child's motivation to work and learn. Now, there may be another relevant consideration. If a child has shown great interest and ability in something, but turns away clearly because he has come up against the need to do a bit of distasteful hard work before he can make further progress, we may then be justified in putting some pressure on the child to do the hard work, unless, of course, we can find ways of making the hard work appear attractive. I do not subscribe to the notion that children are basically lazy, but, like all humans, they do, upon occasion, tend to shirk the unpleasant, the difficult. There is no really satisfactory way to handle this problem, I suspect. To turn to personal history, I recall vividly my father saying to me, on the way to a piano lesson when I was six or seven, that he realized I didn't like to practice, but that I would, someday, be glad that I had. This was totally meaningless to me then but, because of my trust in my father (and if children have no trust in, and respect for, parents and teachers, all is lost) I accepted the need to practice and am, now, very glad I was "made" to. I can offer another personal example, if the reader will forgive me, about the uselessness of employing such a stratagem in an area of no interest or aptitude. All through school I was exposed to art teaching which, in retrospect, seems to have been excellent. I was told that if I only

worked hard at it (*it* being painting, clay, drawing) I would come to like it. I did work hard because, to some extent, I trusted and respected my teachers. But the result was a cipher, both of aptitude and enjoyment. I cannot, today, approach art without some dim recollection of all the efforts that were made to bend me toward it. Somebody (and I can say this because, after all, we are dealing in ideal cases) should have perceived that musician I might become but artist never, and, while keeping the activities of other children in art within my general awareness, left me completely alone in this subject. The results could not have been worse than they have been and might well have been better.

I think that the basic directions one is going to follow in life are laid out, perhaps only in outline, quite early, and a skilled observer should be able to detect them. The surest way to get a sense of the outlines is undoubtedly to put a child in a rich, well-rounded environment and see where he tends. If one has good reason to suspect a strong aptitude which is being suppressed because of the natural tendency to take the course of most enjoyment, one may be able to show the child that there is a pot of gold on the other side–perhaps on the other side of the multiplication table, or a year of hard work at an instrument, or a determined effort to translate an outpouring of imaginative words into writing. But we must be careful, and must realize that with few exceptions (perhaps Leonardo is the prime case in point) people are one-sided, or two-sided, or three-sided, not pan-sided. The virtue of a classroom laid out along integrated day lines is precisely that it helps us to see where aptitudes are and permits the child free access to the materials upon which his ability may grow.

What I have said is not necessarily tantamount to saying that the child always knows best. What it does come to is this: that adults may not always know what is best for children, and, in fact, probably know what is best for a given child only on relatively rare occasions. And, when one does not know what is best for someone else with a real degree of certainty, one is ill-advised to start the pushing and shoving process of which so much education consists.

If we are tied to the notion that there are X number of specific skills and facts to be mastered in N areas, and if we are determined to give tests on these skills and facts, tests upon which much depends, then the kind of education I envision is impossible. But here again we must consider motivation. Let us suppose that a child has had integrated day from age five to age fourteen or fifteen and has not brought his mathematics up to the level required for an examination such as that of the GCE or CEED. If he is not going to take the examination, well and good. If he is, and if he is highly enough motivated, if he perceives that worthwhile consequences will ensue if

he passes the examination, I suspect that he will be able and, now, willing, to do the work necessary to bring his mathematics up to snuff. The motivation involved here, however, cannot possibly be brought into play until the child is old enough to have a real "time sense," to be able to govern present acts according to the dictates of future goals. I don't know at what precise age this ability becomes well fixed (and, indeed, for some people it never does) but I am quite sure that it is not at an age which falls within the scope of the Primary school. It seems to me that at earlier ages one must rely either on the intrinsic motivation of the child to explore a challenging situation, or upon his faith that an adult who has come to know him thoroughly can make decisions for him. Motivation stemming from faith in adults should be, I believe, a relatively small component of the child's motivational system.

It is often argued that the various skills we insist upon are necessary for the child. I think that this is seldom true. I doubt that even so "simple" a skill as adding is often necessary in pursuit of something in which the child is truly interested. If it becomes necessary, a built-in motivation to learn to add is created. Similarly, I doubt that children need to learn much about writing in order to lead better lives as children and, again, if the need for writing arises, I suspect that the requisite skill will be quickly developed. The things children are interested in spontaneously too seldom correspond with what we make them do in school, we with our almost totally future-oriented outlook. I think that often we justify our future-bound view of things by saying that the child needs the skill now. Children need lots of skills to be successful children; they are not, primarily, things that we can teach them, and certainly we cannot if they do not wish to learn.

It is possible that for a few children the choice will be between one-sidedness and no-sidedness. Which side shall govern what we do?

30 November 1963

4

CHILDREN AND ADULTS

Children and adults may be more alike than we think. We often tend to think of some sort of qualitative difference between the two species. Increasingly it seems to me that what differences there are are differences in degree, and such a notion, once accepted, puts us in a good position to start, at least, thinking sensibly about the education of the former at the hands of the latter.

At the risk of repeating some of what I have written before, let me summarize the areas in which the differences seem quantitatively great. First, there is our old friend, the ability to time-bind. Children are much less skillful than are adults in relating past and future to present, in finding, in past and future, sources of motivation for the present. Note well that adults often have this difficulty too, especially, it would seem, in bringing the past up to the present moment. We learn but poorly from experience, which is another way of saying that our time-binding sense is often weak. All too often we go on making the same mistakes time and again, or find ourselves in the same uncomfortable situation which a bit of foresight might have avoided. This, of course, is the child's daily lot; it is an adult failing as well. As to the future, we adults often find that it requires a real act of will to set our present course by referring to future goals. We do it, but it is not always comfortable and we often find shortcuts. To be fair, I should say that adults, much more frequently than children, are at least aware of the future, whether or not they bind it to the present. This often leads to uncomfortable conflicts. When we debate with ourselves the question of getting up on a cold morning out of a warm bed because we have many obligations during the day we are in such conflict. Such a conflict is much less likely to afflict the younger child–though it does on occasion. Much greater is his ability to live in the present with no thought at all for the *laters* and the *somedays* which govern, in large part, adult life.

A second quantitative difference between the adult and the child is the relative lack of experience of the child which often leads him into formulations which are, from the point of view of correspondence with "reality," from the point of view of the ability to predict consequences, nothing short of catastrophic. Here again, of course,

adults are not living in clover. All the incorrect stereotypes and prejudices which cause so much trouble in the world and have led to wars and tensions may, ultimately, be laid at the door of lack of the relevant experience--or of the ability to bring that experience into play at a given time; this leads us back to time-binding, of course, and the two, time-binding and lack of experience (or the appearance of it) are inextricably interwoven. But the adult usually has more experience than the child, at least in the realm of the laws man has created to explain the universe and to govern his relationships with his fellows. Whether he uses his experience wisely or not is a time-binding problem; that age brings, shall we say, the potential for experience cannot be doubted.

A third difference between the garden-variety adult and the typical child is the ability (sometimes of rather dubious advantage) of the adult to refrain from acting upon his deep-down-inside feelings and perceptions. A veneer of control and repression comes with age to the normal human and prevents him from acting out the impulses which children express unselfconsciously. I want to insist, however, that the self-control of the adult is but a masking and that if he is honest he can frequently find within himself the same intensity of feeling, the same impulse to act-out, which we find in children. Recently, I needed a document I knew to be in my room (which is in perpetual chaos). I spent the better part of half an hour searching through stacks of papers and debris, to no avail. I felt myself getting angrier and angrier, more and more frustrated, until, when I finally gave up, I would gladly have thrown a brick, uttered a glorious string of profanities, and set fire to the whole mess. Of course I didn't (though the air took on a bluish cast). But I felt like it. A child, similarly frustrated about something of importance to him, might have acted. Whether or not he would have been psychologically healthier to so do is a moot point. One of the things we learn as we grow out of childhood is how to refrain from acting upon impulse. There is even a cliché to this effect; the child leaps, then surveys the results. The adult looks, looks again, and decides to build a bridge or take a detour. Much of the highly cherished spontaneity of children comes from their "devil may care" attitude, an attitude they adopt unreflectively out of a lack of experience with consequences. Life would be too chaotic and uncontrollable if we did not learn, with age, some sort of self-control. Social life might well be impossible. But I doubt that self-control comes naturally and I further doubt that it is an unmixed blessing to be entered for each of us in some celestial register. When we gain control we inevitably lose spontaneity. It may be a necessary swap, but it is certainly nothing to take undue pride in.

What does all this mean for the teacher, or the parent? For one thing, far from diminishing his ability to help children learn, it gives him a much surer ground from which to operate. For, if it is true as I have suggested that the major differences between children and adults are differences in degree, not in kind, the adult has a much more reliable guide for acting with respect to children. If he is in doubt about a given course, he has merely (if he is really honest and self-perceptive) to refer to himself and ask the question, "How would I like it?" or "How would I respond?" If we set for children a learning environment in which an adult would feel constrained, uncomfortable, we can be quite sure that children will feel this way. Ironically, they may show their unhappiness in an indirect way, in the kind of way we would expect to find an adult showing his unhappiness. For the sad fact is that children, for whom so much is new and unstructured, look to us for guidance and reassurance, and if we tell them, in words and actions, that a given course is good for them, they may well follow that course blindly, more out of a desire to please us (or, if you will, a fear of what will happen if they fail to please us) than out of a conviction that this is the way to go. In general, though, what we would not like, children will not like, nor will they thrive in it. If we dislike continually being interrupted and having our attention diverted we can be pretty sure that interruption and diversion is not a good basis for organizing learning. If we find ourselves shaken when a new fact inexorably forces us to modify our view of things, we can be pretty sure that children will not profit from forced restructuring. If we frequently have difficulty in governing the present in light of the past and the future, we can just about rule out motivation stemming from sophisticated time-binding as a basis for getting children to do what we wish. Yet look at the typical schoolroom, and examine the premises upon which its daily life rests. In it, children are constantly being pushed and pulled from one "activity," from one "experience," to another, usually according to a timetable worked out in advance and on file in the main office. In it, children are constantly being forced to make reorganizations of their thinking at a speed and with a frequency which far surpasses that which most adults find necessary. And in it, perhaps worst of all, the over-riding basis for motivating the children may be what will happen (or what we think will happen) in days to come. We tell children that they will "need to know" this or that. We set an examination which governs most of the learning that takes place before it. We hold up to the child a golden vista of "later life," of "out in the world" as though somehow, children, not being adults, were not living fully now or were, somehow, not in the world.

It could be, and must be, so different. We *must* let children choose the moment at which their attention will shift–this must unquestionably be a first principle of creating a good learning situation. We *must* let children assimilate the world at their own pace, giving them as much time as they need (and it will vary from child to child just as it does from one adult to another) to make the reorganizations which will bring their mental models of the world, physical and social, into greater harmony with "reality." And we must *not* rely so heavily upon future-orientation as a source of present motivation, for it is not relevant. The child does not live *later*, and only to a relatively moderate degree does he live according to *then*. We must make our *now* so exciting to the child that he will want to reach out, to bind time, to make the more accurate predictions which time-binding may permit; to reorganize his perceptions to create a better fit with what happens around him; to develop gradually a sense that what he does today is not likely to be unrelated to what happens tomorrow.

8 December 1963

5

CHILDREN AND ADULTS: PART TWO

In the first part of "Children and Adults," I discussed the basic similarities between adults and children; I made the point that adults seemed to me to be only quantitatively different from children, but that they were essentially similar in some important ways, and that, by allowing us to refer to ourselves in determining what is good for children, the lack of a distinct break between children and adults could be seen as a powerful aid to the teacher or parent. Now I want to relate this notion to some ideas concerning the threat that many adults feel in the presence of children.

That many adults do feel threatened by children seems beyond questioning. Children tend often to be open and frank, to be easily able to express their under-lying animality, to have easy access to the unconscious, to be highly expressive in their behavior in general and, somehow, to convey the notion that they are very much alive and continually experiencing the world immediately. They are, to a far lesser extent than are adults, bound by behavioral conventions, by the need to cover up and disguise. Many adults, on the other hand, seem almost deliberately to have rooted out of their grown-up selves tendencies toward spontaneity. For many reasons they adopt behavioral conventions which, while not changing the fundamental nature of their perceptions of and reactions to the world, do markedly alter their behavior–and ultimately, no doubt, alter the perceptions themselves or, rather, consign them to a purely unconscious level.

When threatened, animals take defensive measures. I submit that much of what we see some teachers and parents doing to children can be viewed as defensive. The "open-ness" of the child, his closeness to direct and forceful expression of his feelings, is intolerable to an adult who has exorcised from his consciousness similar tendencies. The adult, therefore, being often in a position of dominance (through no virtue of his own, but merely because of size and status) attempts to structure the forms of the child's life so that free expression, the natural condition of childhood, is precluded or minimized. We all know the teacher who cannot stand disorder or noise, who attempts to minimize the child's movement and expression, to hedge him about with restrictions and prohibitions. Indeed, much of traditional teaching seems unwittingly to have adopted this

repressive viewpoint as its touchstone. How else explain the ordered rows of desks, the unnatural silence and lack of movement, the artificial modes of expression, which too often typify the school child in school?

This threat reaction on the part of some adults seems to me the most conclusive evidence available that children and adults are basically alike. It seems to me evidence that the adult is, at some level of consciousness, aware of this underlying alikeness. I also suspect that most children, unconsciously, are aware of it.

I believe that many insecure adults are afraid of slipping back into the naturalness and the animality (I return again and again to this word because too much of our thinking about human development seems to deny man's status as an animal–whereas in reality it is not only constantly a part of his makeup, but most probably, properly channeled, a healthy and useful part) of the child. But to slip back implies a basic continuity of experience. One slips and slides–or progresses–along a continuum; if there were clean, qualitative breaks in development sliding back would not be an issue, since one would have remade oneself into a new creature quite unlike that which went before. This fear stems from a belief that, in growing up, one has been improved, traded in, remade into a new article. It is the rare person who, having purchased a new car, would willingly go back to driving the old one, although both are cars, the difference being a minimal one of speed and power. Similarly, it is the rare adult who can see the child within him and cherish this child for what it can add to his life–for much is lost in the process of becoming an adult, although much may also be gained. The insecure, threatened adult cannot have the best of both worlds. He must choose between them and, in so doing, becomes really only half a person.

So, there is little question in my mind now that adults may be threatened by children and, at some level of consciousness, are fully aware of the fundamental similarities between the child and the man and often adopt defensive measures to thrust thoughts of this similarity from mind. What may this mean?

As I have suggested previously, a most serious consequence of the failure of adults to perceive their communality with children is that they cut themselves off from many channels of communication, from the ability to look within oneself to judge the reactions of the other. Communication is predicated upon the ability of the broadcaster to put himself in the place of the other (to use a happy phrase of the social psychologist, T. H. Mead) and imagine the effects of one's communication on the other. To the extent that we deny our similarity in kind to the child, we preclude successful communication,

we cannot put ourselves in the child's place and anticipate his reactions by reference to our own. This is serious enough since teachers and parents are communicating continually (and not always verbally), are constantly sending out messages to children upon which they expect the child to act.

But let us consider, for a moment, this question from the other possible vantage point, that of the child. I believe that children, much more than most adults, are fully (though again largely unconsciously) aware of the similarities between themselves and the big people. Such an assumption explains much. It explains why children are so often capable of the most acute (and therefore often painful) evaluations of the adults. Somewhere in mind the child has a model of what an adult should be, and what the adult should be, to the child, is a grown-up child–with skills and experience and a wider view of the world essential to the child if he is to survive–but a grown-up child nonetheless, with more similarities than differences. When an adult "puts it on," when he strives to project an image devoid of these childish components, when he hides from the child manifestations of his childishness, the child is quick to see that reality and model disagree–and with the saving egocentricity of the child, he accepts as valid his model and rejects reality, the reality of the projected but false image. The child needs to perceive the similarities between himself and a significant adult, for one of the mechanisms by which the child becomes an adult is identification. The child wants to become adult (watch children at play for confirmation of this, or read Freud as a second-best alternative to watching children) and to do so he must perceive the adult model as being within reach. It would be hard for us to identify with the Man from Mars, should he appear on the scene, because he would likely be different in kind, in important ways. It is similarly hard for the child to identify with an adult who has rejected the child within him and who projects continually a false image which suggests the pedestal; who can identify with a statue?

It thus appears that the child has everything to gain, nothing to lose, by perceiving the adult accurately, as a large scale child with certain characteristics, heightened by experience, which are desirable to move toward. If he but realized it, the adult too has nothing to lose and everything to gain by, as it were, a reverse process of identification with the child. If one could but regain childhood, say the poets and, as often happens, they are not too wide of the mark. If one could but regain something of the child while retaining the crucial feature of adulthood, the more mature ability to time-bind, one would be in some sense in the best of both worlds; something, indeed, that is denied the child because he cannot, owing to his lack of ability to

time-bind and his lack of experience, anticipate the really crucial features of the adult.

Identification is undoubtedly the most powerful stimulus to growth. Children naturally take as their models older children and adults. Anything which facilitates identification is probably to that extent valuable, and a realization by the adult that he has much in common with the child he once was can be powerfully facilitating. Conversely, one can make it next to impossible to identify by projecting to the child a picture of a being that one is, basically, not. What I have said is perhaps more important to the teacher than to the parent–though it is important to both. For the parent is always with the child, through periods of tranquillity and of stress. Continuous exposure is, in many ways, the best guarantee that something of the true make-up of the individual will come through. Few people can play-act all the time, though some do, it must be admitted, try. The teacher, on the other hand, is in a better position to conceal. He or she is on view for a limited time only and, most important, in an environment strictly of his own choosing. He can, if he wishes, avail himself of every prop to bolster an essentially untenable, but in the short run often attractive, false image. If children are to learn, are to take advantage of what the teacher has to offer, the teacher must not rely upon these props. He must be truly human–that is, part child and part adult. He must not hide his weaknesses (if that they be) in a vain attempt to make his strengths appear Herculean. Is he annoyed and frustrated? He must let children see him as such, just as they will see him confident and pleased. Is he tired and, temporarily, unable to cope? No matter; the children will understand, since they are also at times out of sorts.

Many teachers, out of a fear of "regressing" to childhood and of letting children in on the true picture, spend more time and effort trying to project an image of omnipotence than they do on the essentials of teaching. Their attempt is bound to fail, and a good thing too. Only when they are secure enough to allow themselves to be fully human will they truly succeed as teachers. Teaching is hard enough under the best of conditions. We should not make it impossible.

I am aware of the debt this formulation owes to the Freudian theory of identification and its later modifications. That it has not seemed profitable, in this short space, to pursue the many connections between what I have said and identification theory, should not be construed to mean that I consider this theory unimportant–although the process of reverse identification does not seem to have been stressed in the past.

15 December 1963

6

EXPRESSION AND FUNCTION

... Thursday I stood, for ten or fifteen minutes, outside the main entrance of Thurmaston School, watching children return to the school from dinner. As I have been so often in the past, I was struck by the way the children carried out the simple task of getting from A to B. Children do not, left alone, typically walk. They dance. In these few minutes, thus, I saw children skipping, running, hopping, kicking a stone, swinging around the metal gate, climbing on and over the stone edging to the stairs, walking in top-like fashion, spinning around and around ... and so many other ways of moving. These children were, for the moment, totally free, and they were being children–that is to say, they were being expressive.

... This week I also read a crucially important article by Jules Henry, the anthropologist-sociologist, entitled, *American School-rooms: Learning the Nightmare* (*Columbia University Forum*, Spring 1963). In this treatise, brilliant in many ways, Henry makes the point that the really important learning that takes place in the classroom is, to use the terminology of communications theory, *noise* in the system, cultural noise which reinforces the drives of the culture, particularly the drive toward competitiveness. I would like to suggest that another cultural drive at least as potent, at least as deeply rooted in the American tradition as competitiveness (and inextricably linked with it) is the drive toward what might be called *functionality*. I would like to suggest that functionality (let's call it simply function to make things easier on the ears), that function is in many ways antithetical to expression; that too often expressive activities we allow children in school have a concept of ultimate function underlying them; that the criterion for the inclusion of something within the confines of the school day is often, indeed usually, that of whether, in some way, it is functional. The concept of function often enters through the front door; we teach mathematics, spelling, science, because the child will "need" these skills later. We teach the child how to think because thinking is important in life (an assumption which, looked at in one light, is dubious). Function enters through the back door too, as when we justify the inclusion of music, art, free writing on the grounds that they will lead to a better-rounded child, will make him a happier, healthier individual later in life.

Another way of looking at the tension between expression and function is to say that it is a tension between *being* and *doing*. How much of what young children are which we treasure in them is either pure *being*, pure expression, or is so tangentially related to any sort of motivation to *do* that this motivation may, perhaps, be ignored? Is there a reason for the children to swing on the gate or to kick a stone, or to hop and skip? Is there a reason why a four year old I know was recently contemplating fog, and announced that it was "ghost water air"? In different ways these are expressive acts. We treasure them, yes, but only up to a point. At some age, we tend to feel, children must learn to walk in line. At some age we will most certainly teach them that fog is little droplets of water. We will pin expressiveness, as a butterfly to a board, and file it away in the baby books and get down to business. All of us do this to some extent, even the best of us. Given the task of bringing children up able to function within our society, it is inevitable that we will do this–just as Jules Henry points out that it is inevitable that we will, one way or another, teach children to be competitive, to "learn the nightmare." We should never confuse the inevitable with the desirable. If we are the best kind of realists, we will, better, temper the inevitable with the desirable. We will realize that what we do is in many ways harmful, but settle for a compromise. How much we should compromise is open to question. That something is almost always given up in a swap which would better be retained, if it were but possible, is inevitable.

Our intuitive feeling, confronted with the very young child, is that expression is good. Arguing along by now familiar lines that there are no qualitative breaks in children's development, no points on one side of which they are this and on the other they are thus, could we not make a case for the cultivation of untrammeled expression throughout life, even at the expense of function? Novelists have done this. In a powerful, though unfortunately almost unknown (in the United States, at least) book, *Shadows Move Among Them*, Edgar Mittelholzer portrays a society in which expression, uncoupled almost completely from function, gives rise to a way of life strangely appealing. One reads the book and says, "Now these people are really alive." Here we find the cultivation of fantasy for its own sake, the belief that free expression, so long as it does not harm others, is a good throughout life. Without romanticizing, can we not also point to "real" societies in which expression, almost completely divorced from function, is a major goal of the society? How else explain the decoration of Greek vases, the proliferation, among primitive people, of fold-art in all areas of the culture? Does not religion, even in our own society but perhaps more strikingly in some "primitive"

societies, serve a largely expressive function–although it may double as an attempt to explain, and make manageable, a hostile world? The tendency, the drive, to express is, it seems, too powerful a part of the human character to be totally denied. It often seems, alas, that we try our best to deny it, and perhaps the most powerful denying agency, in Western society, is the school.

Expression seems a largely present-oriented activity (though it may be coupled with a future orientation by the more sophisticated who, unless they are Picasso, will not be the better for this coupling), an act of almost pure *being*. This is generally recognized among people who are gifted at expression. The composer, the artist, does well to put out of mind thoughts of his audience at the moment of creating. Expression is the translation of a private idiosyncrasy into public form and, as any semanticist will tell you, that which is purely idiosyncratic is uncommunicable, since communication relies upon shared symbols, agreed upon meanings, standard frames of reference. Communication as such is a functional act. It is designed to produce an effect upon the "receiver," to get him to act thus, or to see things thus. True expression, therefore, must inevitably be "noise" in a communication system. We can none of us refrain from asking, at least upon occasion, "What is that?" when confronted by a painting, especially a child's painting, perhaps. In so asking we are attempting to render functional something which may have been purely expressive. Aside from the futility of the attempt, it is probably a confounding of two totally irrelevant issues. Expression was never designed to communicate. What we take from an expressive act in the way of "message" is something that we introduce, not something intended by the artist, the expressor.

We can push this point just a trifle farther. Suppose we do not ask the artist (let us say the child, since he is our central character here) "What is it?" We are still likely to say to ourselves, "Isn't he developing wonderfully well?" No, he isn't. He may be expressing wonderfully well. Any development is *our* perception of things. It may, often, be a useful perception. But we should not confuse it with something the *child* is doing. "Development," no less than any of our concepts which try to explain the physical world, is a concept we impose upon reality, not a property of reality. The distinction is important.

When one finds that a characteristic is virtually universal among human societies the presumption is that this characteristic is important, is integrally related to the nature of the human animal. Expression is important. I think it is highly probable that there is a need, quite as real as the need for food, for humans to bring into the

open that which is essentially private. The uniqueness of each of us, our basic differentness within a context of sameness, may well be too much to bear unless it is expressed. The expression is not, as I have suggested, an attempt to communicate. It is, rather, an attempt to validate. Only when we have brought from inside our minds into daylight some fragments of idiosyncrasy can we compare the fact of our uniqueness with the fact of the uniqueness of everyone else. We bring out what we have. We see (perhaps totally uncomprehendingly) that others also have uniqueness. We may not care a jot for what they are–and if we did it might not do us any good since, as mentioned earlier, the truly unique is the truly incomprehensible by another–but we care terribly *that* they are. One of the goals of good psychotherapy is to show the patient that the impulses and compulsions to which he is enthralled are not his alone. Their expression may be, yes, but everyone else has these dark and frightening goads within him or, if not these very same ones, others equally uncomfortable. Man is a social animal, but there is a frightening tension between uniqueness and being social. By bringing into the open our uniquenesses, and by seeing those of others, we reassure ourselves that we are, despite it all, still members of a community, that we still have in common with others some of the basic drives which lead us to express. It is instructive to watch a group of young children painting. They will work intensely, totally oblivious to their surroundings, often for the longest time. But then, suddenly, they will make an excursion around the easel or the table and glance quickly at what other children are doing. They often could not care less precisely what it is that other children are painting. But they could not care more *that* other children are painting. The very incomprehensibility of the others' painting probably reassures the child that his painting is acceptable, that he need not be concerned about *its* comprehensibility, that he can continue with pure expression. (Children often do try to communicate in their art work but I suspect that often what has happened in these instances is that other sources of motivation, for example, the motivation to please a teacher, have entered the picture–quite literally–and are, to a greater or lesser extent, contaminating pure expression.)

We should not say things we don't mean. If we do not really want children to be expressive, creative, we should not pretend that we do. I disagree slightly with Jules Henry when he implies that there is a basic incompatibility between creativity in meaningful areas and culture, the preservation of the species. I think that many people, wishing to maintain some vestiges of order in the social system, also truly desire that children be creative, truly believe that childhood is a time for experimentation. And yet so often these people (and I can

speak from personal experience here as in so many other instances) act in such a way that the order of the system takes priority over expression; function overrides expression. In a subtle but real sense our acting thus is more dishonest than are the actions of the out-and-out expression killers who are so prevalent in our schools. They, at least, say what they mean, or act it out in full view–and saying what one means, if possible, is always desirable. Others of us, however, have a tendency to say one thing (and mean it sincerely, like as not) and do another.

The infusion of natural expression with adult-oriented, adult-inspired attempts to force function is, in some ways, the most stifling act we, as teachers, perform. It makes children cautious and gives them extraneous reasons for acting. School is, for children, primarily a social situation, as Jules Henry points out, a situation in which child and society meet. One can make an extremely powerful case for the proposition that "school" and "expressiveness" are inevitable, implacable enemies and that if we want to raise children who are really expressive we should keep them out of school as long as possible. But, granted that children need to go to school, if only because the law says they must, what can we do to make the best of a bad situation? (It may well be that everything we do in school, even in the ideal school, is basically doing little more than making the best of a bad situation. It is hard to believe that better settings than the classroom could not be devised, or allowed to arise, even for the important task of teaching function.)

For one thing, we can drop the attitude that everything that happens in school should be, even tangentially, related to function. We could, I suspect, run a fine school on the premise that we will be happy if function is being encouraged *some* of the time. In Henry's communication theory terms, such a shift in our orientation would turn a good deal of noise into message. I have suggested that expression is inevitably noise in a function-directed situation. We can, if we wish, create an environment in which, part of the time, no attempt is made to assess the value of what children do, no attempt is made to rationalize expression in terms of function. We can refrain from seizing the earliest possible occasion upon which to tell a child, "That's a lovely poetic thing you've just said about fog. Do you know what fog really is, scientifically?" One does not want to argue that we should wait for the last possible moment to tell a child this–or does one? May it not be that the longer we delay the contamination of expression with function the better off the child will be? This is not to say that, concomitant with the encouragement of pure expression (and let's hope that we really mean it), we cannot also be sending, as

message, skills pertaining to function, although even if we are completely clear, and the children are completely clear, that there is a distinction, expression may suffer. (It may also benefit, under truly optimal conditions, since almost anything we help the child learn which is functional can also be translated by the child into expression.) We must teach function; if we do not, our schools will be closed. It is significant that those cultures in which expressiveness is considered one of the greatest goods also tend to be, in "modern" terms, backwater cultures. We cannot neglect function, but we can, perhaps, find ways of divorcing it from expression–or at least of allowing children to find what connections they will.

Ideally we should not have to set the stage for children to be as expressive in school as they are walking to school. But things are not ideal at the moment, children have a lot to unlearn, and teachers have even more to unlearn. There may be some specific, concrete things we can do, as starters, to change, over time, the nature of our classrooms. I am willing to argue, at least for now, that one thing that we should do is introduce occasions for pure fantasy to match all occasions for pure function. Coming close to home, this might mean that at the same time we are letting children explore the natural world with the guidance of well designed scientific apparatus and in the context of a rich experience with ways in which children can learn to do science, we should give an equal priority to having children try to explain the same phenomena expressively. This should not be too hard to do. Children love fairy tales, folk tales, myths, and legends. I suspect they have a natural affinity for some of the "primitive" societies, and their "primitive" schemes. Can we not be inventive enough to find ways of encouraging children to create "folk" explanations of some of our scientific phenomena–and honest enough to communicate, at the same time, the essential notion that the scientific way of looking at the world is only one of many ways, and that it is "best" only in the sense (quite limited, perhaps, if one considers human development from all points of view) that it allows maximum predictability? There would be no point in encouraging children to develop idiosyncratic explanations parallel with scientific explanations if we unconsciously communicated the sense that, of course, the former were just fun while the latter were real. And perhaps we can find other spheres in which similar attempts to permit and legitimate expression could parallel the cultivation of function. Since man is a communicator we must necessarily be concerned with ways of making children more effective communicators. Few issues exercise teachers more than that of spelling. Well, let us frankly admit that we must teach children to spell (though for heaven sake let's not go back

to the old days when our emphasis on spelling threw writing, expression, completely out the window). But can't we, at the same time, encourage children to develop, individually or in groups, private languages in which they can invent whatever spelling rules they want–or, going further, could we not suggest to children that it might be fun to devise a way of writing which could be understood only by one person–the writer? (Children are fond of codes and this would simply be an extension, and legitimation, of code-making, with the possible difference that the child need not feel compelled to consider an external receiver.)

Since we cannot say, or feel, "Society, the hell with you," we can probably never, at some level of consciousness, feel completely at ease assigning to pure expression a status at least equal with that of pure function. I have never seen a teacher who was doing this with young children all the time. That we cannot do it does not mean it would not be nice if we could. Here is our compromise again. But there is a nice bit of jargon floating around the world of psychology which may prove relevant here. It is the terrifying term, "functional autonomy." This notion, stripped of all complications and elaborations, is that things that start out being done for one reason often end up being done for another, that the original motivations for doing something may be, with time, lost, and that which is done may be continued for reasons intrinsic to it. Perhaps if we *talk* the quality of expression and function, and deliberately find ways to promote such equality, with time we will be able to forget what we are doing and why, and do it naturally because it is right and feels good.

22 December 1963

7

SCIENCE AND OTHER WAYS OF SEEING THINGS

I want to amplify somewhat a point raised more or less in passing in my chapter "Expression and Function." I suggested there that in keeping with the idea that perhaps functionality weighed too heavily upon us as we plan school activities for children one might want to introduce occasions for fantasy to match occasions on which function was stressed. I suggested that it might serve useful purposes to encourage children, at the same time that they are arriving at scientific explanations of the world, to develop "folk" explanations. This would be of value only if we could truly communicate the belief that science was only one way of looking at the world, the "best" way on strictly functional grounds, on the basis that it leads to maximum predictability. I think one can make a much stronger case for this point of view than I did in passing.

I find that for myself it is possible both to accept a scientific explanation and to feel that in many ways it is not totally satisfying (unless I am setting about using it for further scientific thinking or application). A good case in point is the principle by which the airfoil works. I've pretty well convinced myself, over the years, that Bernoulli's law holds true and holds airplanes up; I think I understand the principle about as well as I understand anything in physics (which is to say, imperfectly). When I fly, I examine the wing next to which I'm sitting and, in one of those surprising revelations which shouldn't surprise but continually do, I find that it is designed pretty much the way it has to be designed for me to be where I am, looking down. And yet, somehow, it doesn't suffice. There is an intangible but very real sense in which the laws of physics in this instance don't explain anything. The whole process of flight is unbelievable. Do you mean to tell me that it's the difference in airspeeds over and under that monstrous heavy wing that is lifting this gigantic machine, and *me*, all the way up here? Nonsense. That's only air out there, and anyone can see that air barely exists at all, is insubstantial. You say that there are many proofs of the existence of air, and that my being up here is one of them? What's that–a candle and water in an inverted tube? The wind? That has nothing to do with it. No, I choose to explain flight in terms of a theory of threads, slender to the point of invisibility but terribly strong and attached at the far end to ... well, it's much too far

away to see, but I think that it may be on the moon, where the flight gods have it all under control, even to the point of cutting the strings once in a while and letting the plane crash just so we remember they're there.

This is a poor attempt at creating an alternative explanation of flight, but perhaps it illustrates my point, which is that it is entirely believable that one could find a certain satisfaction in letting one's mind play with a phenomenon and create a myth about it. Done by the ancients, or the "primitives," or by children, such a myth is, to almost all of us, terribly appealing. We don't for a minute believe it, but it has a poetry to it, conjures up a series of images, makes us feel that we've had a hand in the creation of a world we can understand, or that people not unlike us in many ways have taken a part in creating such a world. And what about this not believing it? As I've said, I can believe in the principles of aerodynamics only with part of my mind, the functional, rational, self-critical part. Would it be good to have something for the other part of the mind to deal with? Is the other part of the mind valuable, too valuable for us to allow it to be totally subjected to rationality and analysis?

If adults may at times have trouble fully accepting something that they "know" to be true, scientifically, consider how much more serious the plight of the child is. He does not even have our poor and limited experience with those cases in which the physical law is useful–or, more accurately, does not have our experience in analyzing what happens so that we can "see" it in terms of a principle. We provide him with experiences which, if they are good ones, make it difficult for him to fly in the face of the principle over a long period of time, or at least (and I wonder how often this is a more valid way of looking at the matter) we create in him an uneasy feeling, if he does try to deny the law. It is entirely possible that we are asking far too much. We may be asking children to do on the basis of a severely restricted universe of experiences what we ourselves may never fully have accomplished in decades; the acceptance, as totally adequate, of a scientific principle. And we so seldom leave the child any way out. No matter what he does with the pendulums, no matter how hard he tries, there just doesn't seem to be any way to rig things so that the weight of the bob does affect the period. And yet here is another case in which I suspect many people find the "correct" principle hard to accept fully, simply because it does not make common sense. Oh yes, it makes good sense in that we can explain, or, better, make the child explain to himself, just why weight isn't related to period. But it still *should* be, and if one voices this opinion he is in a no-man's land of raised eyebrows or tolerant "acceptance" of an idiosyncrasy.

Piaget finds that children at a certain age firmly believe that the wind comes from the trees. They really do believe this. A four year old of my acquaintance asked her father one day if they couldn't have a tree in the living room so that they could have a breeze. This is "cute" but she wasn't being cute, she was being a very accurate observer and drawing a logical conclusion from what she saw. Now, we expect children to move away from this kind of "pre-logical" thinking, and, of course, if they are ever to deal with the world in terms of prediction they need to move away from it, with part of their minds; it would be the poor sailor who tried to navigate his craft on the theory that the more sail he put up the more wind there would be. (Although, as I write this, I can see a sense in which one could arrive at this conclusion quite as readily, and through no less accurate a perception of a limited range of phenomena, as does the child thinking about the wind and the trees.) A very good question may be: "Is it worth moving away from?" In some ways the explanation of wind as coming from the waving boughs of a tree has much more validity than the explanation of wind in terms of such things as temperature differentials. (Have you ever seen a temperature differential? No, I'm not being facetious. You may have measured it, but you've never seen it. But you *have* seen the leaves of trees kicking up a windstorm.) The answer, of course, is that the explanation of wind in terms of leaves has a totally different kind of validity than does the explanation of wind in terms of temperature differentials. One might say that the former explanation has perceptual validity, while the latter has conceptual validity. Now, the "trouble" with perceptual validity is that perceptions change from one situation to another, and one may end up with conflicting validities. But this will only happen when one is analytic enough to see beyond perceptions; it isn't likely to happen on the perceptual level alone, spontaneously, except in the case of accidents, which have so often been the windows through which more analytically correct explanations have flown in.

Perceptual validity is poetic validity, and I can't believe we do anyone a service in wooing him away from poetry. On the other hand, I think we may do children a service by showing them ways to arrive at alternatives which may also be exciting. There does not seem to me a good reason why science and poetry must be mutually exclusive, but there is no question in my mind that in our current thinking about the teaching of science we are doing little to prevent this happening, if we are not actually encouraging it to happen. There is no value in presenting science elaborately, allowing children every opportunity to discover the pleasures of doing what scientists do, and then saying, at the end of the period, "Of course you might want to write a story

about this too." We will have to think of much better ways than that of setting the stage for poetry, because if it is an also-ran, if myth is tolerated, even enjoyed, while science is the beneficiary of all our most concentrated and determined efforts, then there is no question which is going to take over most of the child's mind–and leave him, like as not, always a little bit uncomfortable.

I wonder; are there things that we could do, the same "we" who present the things of science, which would convince children that we were sincere in our belief that science is only one way, and not necessarily the best way in all instances? Could we design, with all the care that goes into our units of science, some sort of non-science unit? I can't see clearly what this would be, and perhaps any such self-conscious attempt would be bound to fail, since poetry tends to be purely expression, hence incommunicable, unlike science, which, being functional, is highly communicable. But if the people who present to children the basis for sciencing, who make it inevitable that children will accept the scientifically correct explanation for the phenomena they handle, who show children that there is a rigor and an elegance in a parsimony of concepts, if these people could also throw themselves concurrently into non-science, could myth with the children, could fantasy with them, could bring to the surface and into the open their own lack of complete satisfaction with the science they had been presenting, could communicate to children, not the substance of their own, often semi-unconscious magical thinking about the world (which will probably lose in the telling) so much as the fact of it, then children would, perhaps, feel free to bring out their own myths and fantasies. Young children will do this anyhow. Our problem is to keep all children young part of the time. If we do find the way to achieve this goal, I suspect we will find that children are learning how to science more readily.

24 December 1963

8

PRIORITIES IN THE PRIMARY SCHOOL

Growth implies change. Biological development and transactions with the physical and social world ensure that the growing child is not the same creature at any two moments. The continuity of change means that the day-to-day differences may not be spectacular and may, in the short run, escape our attention. There are, nevertheless, a number of points during childhood at which change is dramatic, points at which the quality of the child's relationships with the world may change suddenly, points at which the child, whether we can see it in his outward form and manner or not, is significantly different today compared with yesterday. Some of these stages are reached through maturation, mediated by environment, while some are arbitrarily marked out for the child. Examples of the former are the beginnings of walking and talking; locomotion and the ability to communicate in symbols alter profoundly the child's commerce with his surroundings. Puberty is another stage in the maturational process. Examples of stages arbitrarily defined for the child, usually without reference to his individual rate of maturation, are the beginning of school and the points of transfer from one type of school to another.

Not all changes can be seen acted out in the child's behavior, even over a period of time. There comes a point in the development of the baby, for example, when he discovers, unreflectively to be sure but meaningfully, the physical discontinuity between himself and that which is not himself; he learns, as it were, where his body leaves off and his environment begins. This does not happen all at once, but occurs through numerous encounters of the baby with his body and that which is not his body. Most babies seem to attain a good, usable sense of this distinction by the age of one year. Another significant change occurs when the child discovers that he is not merely a passive creature being acted upon but is himself an actor who can produce meaningful alterations in the behavior of people and the order of things.

A third change which may occur much later is my main concern here. At this time the child is a master of myriad complex physical, social, and symbolic relationships, is well in command of many aspects of his own behavior, is rapidly becoming skilled in

observing and predicting the effects of his behavior on the people and things among which he moves. He may now discover, suddenly and explicitly or more slowly and implicitly, that he is not only a distinct physical being, but that he is psychologically unique, a being with an identity different from that of any other human. He may long have known that he was different from others in ways X, Y, and Z, but it seems that for some children this knowledge crystallizes into heightened awareness of a total, distinct, differentiated self. This may be a time at which the child becomes most adept at "taking the role of the other," to use the phrase of George Herbert Mead, becomes able to view himself from without, to see himself with new objectivity as one among the many and as different from all. It is now when all the discoveries the child has made about himself from the earliest days may add up to an integrated whole. Some children at about ten or eleven begin to act as though they were newly able to stand outside themselves and watch. (Some teachers report that it is at about this age that children are first able to appreciate irony, a form of humor which would seem to demand just this ability to survey one's situation from another vantage point, to take the role of the other and infer his motives in making a statement.)

I doubt that this stage can be reached much earlier than ten or eleven; there may be a "critical mass" of experiences of the self necessary for its attainment. On the other hand, cultural forces toward conformity, toward repression of that which is unique, come into play in our society most powerfully at adolescence and may make attainment of the first awareness of a differentiated self difficult if it has not already occurred before adolescence. (*Cultural* adolescence, as distinct from the adolescence we associate with puberty, seems to have been occurring earlier and earlier for many children over a period of years owing, in part, perhaps, to the saturating influence of a mass culture. There is also evidence that at least for girls puberty itself is occurring earlier. These factors may restrict the span of years in which the first experience of self-awareness is likely to occur.) Once a child has first seen himself as a unique being, his image of himself will be continuously modified by what he does and what is done to him; his self-consciousness, using the term in its most literal sense, will be more acute at some times than at others.

The development of this self-awareness in a child of ten or eleven or twelve may be considered counterpart to the growing although unreflective awareness in a young baby of the distinction between that which is physically part of himself and that which is not. Virtually all normal babies come to make the physical differentiation; that not all children attain a workable sense of the psychological self

at the later age is, or should be, profoundly disturbing. In the course of normal, unhindered human growth the second stage should be attained as inexorably as the first. I shall point out many factors which can hinder the movement toward psychological differentiation.

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What experience must a child have had in order to become aware of the unique "I"? A basic precondition is prolonged immersion in a complex environment of things and people. A child cannot develop self-awareness if he is effectively isolated from his surroundings, for the self is perceived against a background of non-self, just as the physical body is. The most extreme case of deprivation is that described by Spitz in his study of "hospitalism." Here were babies reared in the most hygienic, antiseptic surroundings in which every physical need was catered to, but almost mechanically, by nurses dressed in white in a white ward. There were few objects, physical or human, against which the baby might project and test himself. These children often became totally withdrawn, and frequently died despite what was thought to be the best of care. Those who survived were often not even able to make the distinction between physical self and non-self and could not form even the most rudimentary social relationships. A rich physical environment and the presence of persons with whom meaningful, stable relationships can be established are, it can thus be seen, essential for all psychological development.

Beyond these minimal conditions there must be the opportunity, the "permission," for the child to bring out from inside his perceptions, imaginative creations, fears, fantasies. Equally important, he must have the opportunity to work alone and with others to modify parts of his environment, for such experience may lead to an awareness of similarities and differences between himself and others. Two children painting at easels side by side with identical brushes and paints produce different paintings. Repeated experiences of this kind bring home to the child a sense of his uniqueness. The child's success in a particular form of expression may differentiate him from his neighbor. So may his failure. All the while he is amassing a set of perceptions and attitudes toward himself–the raw material out of which the psychologiclly unique, pereceived self may be constructed.

Nothing is more striking in watching children of all ages than their overwhelming need to express what is inside them and to express and test their potency in the world they live in. The urge is too strong to be confined to what seem the likely materials and situations, those

we label "For Expression." Children will use any material, any situation:

> ... Two eight-year-old girls in a classroom are working at the science table with magnets and a tray full of tiny steel ball-bearings. They turn the magnets into teachers and the balls into pupils whom they line up and lead to and from school. A ball drops onto the floor and one of the girls says, "Another little pupil has run away from school."
>
> ... Two sisters, seven and five, are sitting back to back in a bathtub piled high with suds. The older is the mother, and is sending the bubbles, children, off to the other, the teacher who must get them into school.
>
> ... A small group of ten-year-old girls creates a social microcosm out of colored wooden shapes; cones are the girls, "prisms" are the boys, cylinders are the adults.

Again and again in every possible setting out pour children's feelings, fears, attempts at control. We may associate the process of free expression mainly with the early years of childhood. We often seem to think that gradually the need for such expression tapers off and that as it does we need make less provision for it. We seem almost to believe that there is a finite amount of self to express and that once this expression is achieved the growing child can turn his full attention to other tasks. I suggest that this is a totally fallacious view. The need to express is undiminished through all of childhood and is a need which persists throughout life. The form of expression may, of course, change. Above all, what may well diminish is the child's confidence that it is permissible to express. By the time the child is an adult he is usually quite sure that it is not permissible.

Self-discovery is a process fraught with difficulties. The movement through expression and control toward differentiation may be hindered at many stages. One danger is that the child may, because of things said and done to him, come to see himself typified not by actions, not by *process*, but by *products*, by results. Most of us have met the child who, having poured himself into an activity, approaches us with the result wearing a hang-dog expression, saying or implying, "This isn't much good, but ..." When this happens we may infer that at some point, at many points along the way, the child has been judged on his products and has, as a consequence, lost confidence in the process.

Judgment of products is dangerous if they are seen apart from process, because the results of a creative act are never satisfactory to

the creator, whose essential joy is in the act of creation. This dissatisfaction is true of children just as it is true of the adult artist or composer or writer who, after the first wave of exhilaration in the act of creation has passed, is never content that the result fully embodies the impulse. To become identified with products is to become identified with failures. Sufficient instances of being judged by and identified with his products, with his failures, may make it too painful for a child to see himself consciously as the sum total of all that has gone before, and he may then repress all attempts to define himself. If this happens he may fail, in the most meaningful sense, to become an individual.

It is sad to catalogue the ways in which schools make judgments of products, often simultaneously protesting a concern with "the whole child." It seems that we are often determined to fasten each new production to the child for him to drag around like a can on a puppy's tail. We assign children a grade, often competitively; we tag them with IQ scores and achievement scores; we judge which of their paintings are most pleasing and put them on the wall. More subtly we may praise each new product, thus again emphasizing our conviction that it is the product which should be of prime interest. Seldom do we do the one thing which is truly desirable–to create a working atmosphere in which underlying everything that goes on there is the understanding that it is the process of creation, of expression, of exploration, which is valued. Products should be important to us only as they are important to the child, as tokens that the process of learning is underway.

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I suggest that there are two important tasks which must be undertaken in the primary school. The first task is to ligitimate expression, to encourage the child to bring out from inside that which is unique, to meet and deal with the outside world in accordance with his unique perception of it, to come to terms with both the inner and the outer world in a manner expressive of his own individual self; above all to have confidence in himself. A considerable part of the job of legitimation is done by making it possible for children to see other children being expressive, shaping their own worlds to their own ends. A child may well not understand *what* the others are doing, and he may not much care, but it is of concern to him *that* they are doing it, because this means that while the impulses underlying creation and exploration may be baffling, and even frightening in their intensity, at least others seem to have equally strong impulses which are accepted

within a social context. I have seen infants who will paint for twenty minutes, totally absorbed in what they are doing, and who then suddenly "emerge," walk around, see what others are doing, and then return to their own easel and continue working. It seems to me that they have looked for, and found, reassurance. (Acceptance of impulses of all sorts in a social situation, even though their overt expression may have to be curbed for social reasons, is essential if the child is to remain in contact with himself. To the extent that acceptance of impulses underlies good teaching, good teaching is similar to psychotherapy and can have many of the same beneficial results for the individual.)

A second task of the primary school is to provide the child, when he is ready for it, with help in developing the techniques needed to shape and control expression of his inner experience and to manage more satisfactorily the process of discovering himself in relation to the physical and social world. Technical skills imposed too early can stifle the urge to explore a medium. No less, however, the failure to provide technical assistance at the right moment can impair the child's ability and willingness to continue to express and explore, for at a certain point he will become more and more critical of his own productions and effects; if they often fall too short of the underlying impulse–for lack of the proper technical skills–he may begin to doubt the validity or worthiness of the processes of creation and exploration. While in a sense all our creations may be failures, they must not too often be disaster because of lack of technique. What may at least partially satisfy a five year old may not at all satisfy a ten year old. One of the things which makes teaching esentially impossible is that the teacher must always guess about the timing of technical assistance. It is as unfortunate to be too early, to proffer help in solving a problem which has yet to be experienced as a problem, as it is to be too late. One cannot be sure of being just on time, but I am continually amazed at the frequency with which good teachers guess correctly. One infers a correct guess not from the resulting product but from the manner, the confidence with which the child goes about further creation and exploration. (It might well be a cardinal rule in school that nothing be inferred from products alone.)

It should be clear what the necessary technical skills are. In art these might comprise knowledge of mixing colors, of working a piece of clay to the right consistency, of preparing a glaze, and so forth. In music, early technical skills might involve coordination of movement and music and the ability to produce and combine measured rhythmic effects. Many techniques will be learned in the process of free exploration, without outside intervention. No

techniques should be introduced until the child has had a chance to make discoveries, and to make mistakes which the technique might have prevented. We are not, perhaps, too frequently guilty of prematurely introducing technical skills in art and music. We are more frequently guilty of undue haste when it comes to writing. Writing involves an overlay of editorial skills on the desire to communicate in written symbols, with the former designed to serve the latter. Correct spelling, punctuation, grammar, and syntax are all editorial skills which can dampen the urge to write if they are imposed from outside before that urge is well established. Perhaps our haste in introducing such skills results from our general high anxiety about writing, and about reading. Certainly we are anxious about mathematics where, as I shall point out later, we are more than anywhere else in too great a hurry to move on to formalization.

The mistake of insisting on premature formalization is sometimes made by teachers working with children in dramatics. Simultaneously confining and freeing theatrical conventions may be imposed before children have had a chance to experiment at will with the raw materials of dramatics–relationships between human beings. Dramatics may occupy a pivotal position among the expressive media, a position not, for the most part, recognized at present. Once a "free play" stage has been fully entered upon (it will never be passed through), dramatics can provide a controlled framework within which children can experiment with making and taking roles, with "taking the role of the other." In the earliest years children continually create roles. This can be seen in any Play House. Experience in bending oneself to the requirements of a role, even if self-chosen, may facilitate the later process of putting oneself in another person's position in a wide range of social situations. The techniques which need to be introduced into the free acting-out process as the child grows are those which encourage him to examine carefully the internal logic of the role he is creating, to discover the premises upon which his character is acting, to explore the syntax by which various facets of the character are related, and ultimately to be able to explore a character widely at variance with his own. All of these skills will be needed when the play moves into the wider world.

At least two other kinds of expressive, exploratory behavior need legitimating in the primary years. One is the behavior of the individual in his personal relationships with others. A vital task of the growing child is to define himself in relation not only to himself and to the physical world but in relation to the world of other people. Yet school, at least after the earliest years, so grudgingly legitimates social intercourse. Before school, yes, during break, yes, but seldom is the

need to build and check upon their status as social creatures recognized as one which children will feel continuously throughout the school day even as they engage upon other tasks. The need is so pressing that until it is filled attention is not likely to be focused fully on anything else. While observing ten year olds in a relatively free classroom situation, one of the most striking things I noticed was how seldom children moved directly from one school task to another without stopping for conversation with their friends. One sees this, of course, in infant rooms. One even sees it among adults! If school during the primary years is to be a place for self-discovery then it must be a place where many selves can meet freely. This happens, of course, outside of school. But it needs legitimating inside the school building unless school is to be perceived by children as an interruption in the business of living.

Then there are games. We are not, I think, sufficiently aware of the expressive component in formal and informal games; we tend to see them as providing a chance to develop skills and to let off steam. This they do, but games, quite as much as art or writing, music or dramatics, may provide a chance for the child to assert himself as an individual.

Part of the attraction children find in games may be that of being able to remain an individual in a context which would seem, superficially, to demand the obliteration of individuality. Soon as a functional, goal-oriented activity, a game requires only automata to fill its many roles. The truest pleasure for the player may come not from the lure of competition (unless the external pressure for victory is great) but from proving that within this framework he can retain and develop his own personal style and can, when the necessary techniques are mastered, improve upon an automaton precisely because of the idiosyncracies of his performance. It seems beyond question that games, free and organized, should be accorded status among the expressive media which is equal to the status enjoyed by music, art, writing. For children who are limited in their ability to use symbols or to express themselves in other media, the importance of games of all sorts in providing expressive opportunities may be great indeed.

The question might be asked at this point, are there any activities in or out of school which cannot serve an expressive function? In a real sense the answer must be no; children can bend any activity to expressive ends, given the freedom to do so. Recall the girls turning magnets and ball bearings into teachers and pupils. We should avoid making an *a priori* judgment that a given activity cannot serve or should not serve expressive needs for a particular child. In choosing where to place our emphasis in the primary years, however,

in choosing the types of activities which may be most appropriate to bring within the schoolroom, we can perhaps be governed by a general principle which I shall suggest a bit later.

It is useful, first, to recall that Whitehead, in *The Aims of Education*, outlines three stages in the learning process, the first two of which are the stages of romance and of precision. I view the primary years as a time when romance should be infused with precision at the right moment. Romance, in Whitehead's words, is "... the stage of first apprehension; the subject matter has the vividness of novelty; it holds within itself unexplored connexions with possibilities half disclosed by glimpses and half concealed by the wealth of material." The best infant teachers explicitly design their rooms and schools as arenas for the romantic discovery of self in a romantic world of things and others. The later primary years must, it follows, set an arena in which romance can continue to flourish but into which may be introduced precision, involving the subordination of "width of relationship ... to exactness of formulation." Precision there should be, but first and indeed at many points throughout there must be width, and there must be the impulse for subordination.

Exploration of the self and of the external world are inextricably linked. The self is set in the external world and the external world is probed in accordance with the needs of the self. I fear, however, that at present we are distorting this process by forcing an analytic precision upon the exploration of the outer world before sufficient free experience of it has been obtained. In too many primary schools the arrangement of the timetable or the teachers' manifest expectations indicate that formalization of the study of the outside world supersedes the task of gradually infusing self-exploration with precision. In many schools today, for example, mathematics seems to have become the touchstone by which the entire curriculum is judged, and the mastery of formal operations in mathematics seems the goal of highest priority. Granted, our mathematical house is in much better repair than it was previously. Given the premise that young children need to develop precision techniques in manipulating number, Dienes* is a vast improvement over the workbook. Granted also that for some children self-discovery may proceed most smoothly when attention is turned early toward mastery of an impersonal, external system of relationships. For many children, nevertheless, there may be a conflict between the mental set, the general orientation, required for expression of self and free exploration of the environment and the mental set required for the study of formal systems of relationships. The use of structural materials does not disguise the goal-focused nature of systematic mathematics. (I am using the term "systematic

* Z. P. Dienes devised Multibase Arithmetic Blocks and Algebraic Experience Material which were widely used in the U.K. from 1958.

mathematics" to point up the contrast between such activities as, say, learning to manipulate various bases of numeration or arriving at a conception of the distributive law, and the more open-ended, more exploratory mathematics of measurement, estimation, ordering, which characterizes a good infant program.) In systematic mathematics there is a goal to be attained and, today, a set of materials designed to lead to that goal. There are correct and incorrect responses, appropriate and inappropriate paths the signposts for which are fairly carefully lettered. The emphasis is inevitably upon objectivity, replicability, and ultimately upon analysis. Of all the "subjects" we set before children mathematics seems inevitably to be the most programmed, the least *bendable*, the least likely to appear to most children relevant to their immediate, felt needs. Systematic mathematics looks to be like an activity which might better be expected of older children who have had more experience with more malleable materials than have the sevens, eights, and nines of whom we now expect so much in mathematics.

In discovering oneself and one's personal world it is essential that one's orientation does not lead to the premature closing of pathways. "Rightness" and "wrongness" should be no part of the child's mental set toward his impulses (although, as I have pointed out, certain forms of outward expression may have to be curbed without judgment of the impulse). Idiosyncracies must be accepted and exploited as doorways to the unknown. If children sense, as I believe many do now, that we attach special importance to a relatively closed, rules-bounded system of thought such as mathematics, they may infer that we hold in lesser esteem freer and more personal activities. They will certainly infer this if we always schedule mathematics in the morning and art, music, dramatics, and games in the afternoon. An integration of the more disciplined and the freer modes of thinking is possible–one sees evidence of such integration in the reports of the personal styles of some of the great mathematicians. But I suspect that such an integration is not possible for most younger children.

The same objections could be raised against the formal study of science, but in science we are more easily able, if we are so inclined, to allow and encourage the romantic to shade almost imperceptibly into the precise. Magnets may represent people but an essential quality of magnetism is being exploited and perhaps unconsciously absorbed. After a while attention may shift to a study of magnetism *per se*. There is also this; we have to set out consciously to contrive situations in which mathematical concepts may be discovered, whereas the raw material of science is everywhere and some

fundamental scientific skills are learned as the very young child becomes better able to cope with his environment.

Current attempts to discover what kinds of scientific activities are most appropriate for children in school seem to be leading to the following conclusion; in a situation rich in scientific potential and one which is open-ended and adaptable for expressive use and for free exploration, children can move, in their own time, toward whatever degree of scientific precision they feel compelled to attain, just as they move toward precision in art, writing, dramatics, and music.

At the moment mathematics seems to be the main trouble spot in the primary school, the one sphere in which we are not making possible a self-motivated journey from romance to precision. The Dienes materials are a clean break from infant mathematics, are a way of getting children to move steadily toward *our* goal, and at present we expect all children to move toward this goal in the primary school. As I have indicated, the mental set required for this movement may not accord with that need to attain other goals more important, at this age, for most children. I might mention one other point. Since mathematical progress is not largely self-motivated the amount of time it takes for a teacher to ensure that children are making satisfactory progress along the systematically arranged mathematical paths is entirely disproportionate to the importance of such progress in the primary years. To be "on top" of Dienes mathematics seems to require at least a quarter to a third of the teacher's time and, this being the case, other important activities may easily be slighted.

The general principles to which I referred earlier for governing our priorities in the primary school might be stated in this way; we should emphasize those activities which permit the greatest range of expressive use by children and which facilitate the self-motivated exploration of the world. Within these activities, our major task as teachers should be to look at what children do freely and spontaneously in order to determine to the best of our ability the points at which each individual child needs assistance in shaping expression and exploration by the tools of precision. The best teaching starts with a careful examination of what the child is doing in an environment which we have structured loosely enough for him to restructure it. Good teaching does not, at the primary level at least, consist of bringing to the child precision tasks which we deem it appropriate that he should master. It goes without saying that we ourselves should, ideally, have a good command of the technical skills involved in a wide range of activities, including mathematics, for there is no telling in advance what direction a particular child may choose or at what point he will need our help.

Children are pliable and adaptable. Today we are being shown on every side that, given the right materials and methods, tools of precision can be employed by children surprisingly early for the systematic exploration of the world around them. There is a danger that the romantic exploration of that world and of the child himself in that world, may be undervalued. The very adaptability of children means that we must not allow our knowledge of what is possible to dictate our decisions about what is desirable.

There are two directions in which we can choose to help children move in the primary school. One direction leads through an indeterminately long period of self-expression and essentially self-guided exploration of the world to a gradual mastery of relevant precision techniques. The other direction leads to an ever-earlier imposition of precision techniques for their own sake, simply because we have discovered that they can be mastered. If we follow this second path an increasing number of children are going to emerge from the primary years without having had a chance to lay down, at their own speed, the foundations upon which a truly unique self can be built. The laying of such foundations should be the highest priority in the primary school.

13 April 1965

9

SOME THOUGHTS ON INTEGRITY

The highly gifted children I know share, among other characteristics, a relentless intellectual honesty. These children, imaginative and capable of ranging widely in their explorations of themselves and the world in which they live, seem to have sensed the integrity of the process of discovery. They appear to realize that knowing and not knowing are closely related. They have discovered many paths along which they can move from not knowing to knowing and back to not knowing. Aware that answers are problems, they can tolerate and admit incomplete knowledge. Because their explorations have often led them to the discovery of interesting new problems they are motivated to explore further. Through exploration they gradually gain a sense of the directions which are most rewarding for them. For all these children there are many such directions.

I seldom find these gifted children engaging in word-juggling to cover up lack of knowledge. If they are not sure they do not hesitate to qualify what they say. "I think," "It seems to me," "In my experience," are phrases with which they are quite at home. Such honesty may be a major component of an important kind of giftedness. Most young children have such an honesty; they will ask any question that comes to mind, share any perception, make any comment, openly, even proudly–at least until they begin to sense that not all their questions, perceptions, and comments are considered to be "in order." Can it be the manifestation of this fundamental integrity in young children which leads us to feel that there are so many more alive, intelligent five year olds than there are ten year olds?

This may be a useful way of looking at intelligence. Perhaps the intelligent-appearing ten year old is different from his mates less in terms of an innate capacity to think about his experience than in terms of his willingness to face honestly its complexity, to ask and follow up the questions that flow from his uncertainties and wonderings. Such a child will habitually follow each answer with a new question and will feel free to ask questions of people, of things, and of himself. He will appear to be a continuously curious, searching creature. For him the process of finding out is more important than the results which emerge. It would be over-simplifying to say that he is a child for whom questions are more important than answers. It would be more

accurate to describe him as a child for whom the art of exploration is the source of greatest satisfaction. Such a child may appear to have considerable confidence in his own style of thinking, confidence less in what he knows than in the ways in which he learns.

School is not typically the place for unfettered exploration. It is not the place for sharing personal perceptions of the world and of oneself in the world. It is a place where answers take primacy, where value judgments about questions are habitually made and where questions which seem not to have answers are implicitly ruled out. It is a place where children learn that some thoughts are acceptable and others are not. This kind of evaluation of the thinking process, which leads to categories such as "right" and "wrong," "good" and "bad," is foreign to the child until it is introduced from outside. His own self-evaluation may be more in terms of whether his movement towards new uncertainties pleases him, or in terms of whether the world, as it becomes more differentiated in his own mind, is characterized by a still greater complexity with which he feels increasingly able to cope.

Until the child is told that question A is better than question B he may be equally likely to pursue both, or to pursue the one which seems to offer the most hope of an interesting reorganization. He may come spontaneously to an ability to evaluate his own questions; he will begin to explore in some directions and not in others because of the experiences he has along the way.

It is not easy for children to remain gifted. The child who is going to retain his sense of wonder, his sense of the legitimacy of his questions, will have to learn early to be quite self-reliant, and such self-reliance must be encouraged by those around him. This is essential because it is difficult for an outsider, no matter how sensitive, to deal with a child's questions and perceptions without making explicit or implicit value judgments. Such judgments may be introduced merely by following a child's question with one of the many which it may suggest to the outsider. Only with luck will the outsider's question be the one which is most relevant to the thinking the child has initiated.

A second characteristic of the gifted children I am speaking of, equally as striking as their honesty, is their capacity to resist redirection unless it accords with a sense they have of a personally relevant direction. If there is such accord it is not, of course, redirection, but is the essence of good teaching. Self-reliance is important, but also important is an awareness that other people, outsiders, can be of value when difficulties are encountered. If, upon occasion, the questions they ask or the leads they suggest are not quite right, in the child's view, the child is free to reject them. The

outsider's task, the teacher's task, is twofold. First, he must decide whether the child needs help. Often he has merely to wait for the child to approach him, but sometimes a child may be so caught in a problem that he is not able to make the approach and the teacher must take the initiative. The second task is to determine what kind of intervention would be most useful. The child's first task, following intervention by an outsider, should not be immediately to follow up what has been suggested, but to evaluate it. This evaluation is, after all, something that only the person doing the learning can carry out meaningfully.

A third characteristic of the children I know who have retained their early giftedness is their apparent realization (whether it is conscious or not) of the futility and danger of drawing artificial boundaries within the domain of human experience. There is no clear demarcation between the child's exploration of his surroundings and the gradual process of uncovering his inner world and discovering how it is related to the world outside. One trouble with most schools is that they try to compartmentalize learning, to segregate expressive and exploratory activities from those designed to lead to mastery of the symbol systems which stand for reality. The gifted children seem to realize that exploration of things and of symbols is fundamentally an act of expression, an act of assertion. They use fantasy as an aid to exploring reality and, conversely, they use reality as the raw material for fantasy. They are comfortable with their own creations, they are able to accept fantasy-making as intrinsically worthwhile, and they are able to test fantasy against experience and to reconstruct each in terms of the other.

I am not sure what learning situations these speculations lead to. I do know that much of what I see happening in schools does not follow from them. Most classrooms, for example, are virtually barren of raw materials, of things and are overloaded with prepared materials, materials heavily scored with predetermined routes which allow only bogus exploration. The raw materials component of the environment is extremely important. The human components must make possible uses of the materials in accordance with the child's intent and perceptions of the inherent properties of the materials. By raw materials I mean all kinds of *things*, from pencils and paper to books and string and magnets and bottles and boxes and paint and clay and mirrors and animals and ...

Free access to a rich environment of things may help the child become less dependent upon outsiders. He may be led to ask questions directly of things, and things will suggest new questions. Things as well as people can, of course, lead him off on tangents, some of which may be irrelevant to his immediate purpose. Things are,

however, less likely than are people to drag him away unwillingly. Things, as they react to, and are regrouped by, the learner, may imply rightness or wrongness because of their intrinsic nature; certain impositions the learner makes are valid (a thick steel rod will suppose considerable weight) and others are not (it cannot be bent by hand). Unlike people, things do not make judgments about the intent of the learner.

Perhaps, then, in order for more children to retain their integrity and to remain gifted, we must create classrooms in which they can question freely in a setting so varied that many materials, relationships, and uses can be investigated. In these classrooms children must be easily able to approach others, adults or children, who can help them. They must always be able to approach, however, with the confidence that they, the learners, can ask and listen without being forced, as so many children are today, to abdicate their responsibility for–and their joy in–the learning which results.

14 June 1965

Primary Schools Broadsheet, Leicestershire, Spring 1966

10

SOME THOUGHTS ON IMITATION AND OTHER MATTERS

Let me proceed from the specific to the more general. I've recently been trying what is for me a new approach to teaching one aspect of musical notation to an eight year old. The context is ostensibly that of a recorder lesson, but in fact the lessons have ranged much further. I first had Alison do a lot of playing–copying what I played, making up one, two, and three note tunes. As she learned three or four notes I wrote them down on the staff–not before but after she was able to play them. There came a point, fairly early, when I encouraged a fairly major effort on her part to learn the names of lines and spaces in the treble clef, and this was easy. The hard part of reading musical notation, it has always seemed to me, is learning rhythms. One gets into semantic difficulties whenever one tries to use words to make the distinction between tempo and rhythm–to communicate the *relationship* quality of rhythm. So in this instance I decided to try a strictly non-verbal approach. First we did a lot of clapping and beating of rhythms, à la Orff. Then I would play a tune and Alison would copy it. If she copied it incorrectly I would play it again. When she knew the tune I would write it down. If she knew a song to start with I would write this down and she would play it. Now, she was playing most of the time either by listening to me or listening to her own mental construction of the music; that is, she was playing by ear. When we started with rhythmic notation, I simply put the notes down and pointed to them as she played or, sometimes, played along with her as she looked at the notes. At this point she volunteered the information that she had no idea what the various kinds of notes (halfs, quarters, etc.) meant–but quite quickly she was learning to hold the half twice as long as the quarter, and so forth. It was a kind of conditioning process, I suppose, starting with a sound she knew and then, without being told *about* the symbol, simply coming to associate one aspect of the sound, its duration, with the symbol. We have not proceeded yet to formalize this, to give names to the notes (except that I may refer to them in passing). We also have not discussed the fact that music is broken up by bar lines into measure, or how many beats there are per measure in different kinds of music, etc. I have the clear and encouraging feeling that all of this is being learned, and that eventually it will be the work of minutes to formalize it. Before doing

so, I'm going to try rhythmic dictation, to see if Alison can write down a rhythm before knowing what the notes are called or how long they are *supposed* to last.

This all sounds very much like the teaching of reading, when reading is done in a commonsense way. You don't talk about the words before the child has the words–you use his words, you introduce your own words. After a while you begin to pass along some phonetic aids, but not in the earliest stages. Now, as for reading, I would like to get reactions to what I think I've observed, most recently last weekend in reading aloud to a seven year old who already reads a bit. He read, haltingly, the first page and wanted to continue, but this was a new book and I wanted him to get the sense of it, more than the words, so I said that I would read the rest. I could tell he was watching the page closely and sometimes, I believe (not sure of my memory on this) he would make a move to turn the page, whether in response to my stopping, to his recognizing the last word, or whatever. (Probably the former, since the pictures absorbed a fair amount of his attention.) Could it be that one thing that happens when you read aloud to a child is that he has a model of a reader to imitate? He may learn when to turn the page, may even be able to recite the story word for word, after many repetitions, turning the page as he goes. This might be thought of as helping to provide the framework for the non-imitatable act of more creative reading. He first learns the forms that the adult reader observes (perhaps noticing periods, certainly noticing rhythm, the end of the page, etc.) and then, later, or perhaps simultaneously and as the result of many activities of his own and of others, learns some content. Robin would gladly have read the whole book to me, and would have needed help on, say, one tenth of the words. I felt at the time (but thought about this only later) that after he had demonstrated his ability on the first page, it was more useful for him to listen, to concentrate on the form, the rhythm, the general approach, and the story, of course with its pictures, than for him to do what he certainly could have done and wanted to do, read for himself. Perhaps a lot of the early reading children do for themselves should be from books which have been read to them, with them looking over the reader's shoulder, turning pages, etc.

More generally, I suspect (not terribly originally) that this kind of imitation is going to prove to be very important, and perhaps providing a model to be imitated is a crucial function of the teacher. If the activity the child initiates is reading (and I assume that largely we follow the children's lead), perhaps the adult needs to step in now and then and read the book for the child, even if not specifically requested to. If bits and pieces of science apparatus are at hand,

perhaps the most useful thing for the teacher to do is to play himself, in the room, alongside the children. In the art corner, perhaps children should often find the teacher experimenting, painting, trying new ideas. Some direct copying may take place but I have a feeling that in trying to imitate children often introduce enough new elements so that the production they emerge with is their own, *provided* that the general atmosphere is one in which children set out mainly to do something which feels good to them, not to do something which will please the teacher.

I keep having to refer to my own experience in teaching music. At the risk of being repetitious I must say again that all the evidence points to the fact that it doesn't much matter what the child and I do during a music lesson; there seems to be something about my doing things, about the child's doing things, whether his own or mine, all kinds of things, which communicates far more about music than any specific bit of instruction. Last summer when Lucy got her dulcimer we had a series of "lessons" in addition to her formal lessons. I knew nothing specific about the dulcimer, but was able to pick it up, try things, discover interesting effects, be reasonably free with it. I like to think that this helped her, although I certainly can't prove it. I like to think that when Alison and I, in the course of twenty minutes, move almost aimlessly from recorder to clapping to tone bars to the dulcimer to the guitar and back to the tone bars (from which she derived great pleasure; I "discovered" with her the exciting effect of striking a bar, then moving it quick to and away from the ear–and you can get a fine Doppler effect!) music is being learned, and by both of us. I've long since given up planning music lessons in advance, but am more and more convinced that what I need is an interested child, lots of musical *things*, and a certain freedom of spirit.

What all this implies for classroom learning situations frightens me, because I have a feeling that one adult stretched 40 ways is not able to do important kinds of *modeling* for children. You can read to four or 40, but I suspect that the two who will "get" the most will be the one on the right arm and the one on the left. And, while there are many musical activities which demand a group, and some which are basically individual but can be done in a group, there are many things I do with individual children I couldn't conceive of doing with a group–the main thing being to move as the child seems to be moving. Perhaps this is just my limitation, but I suspect that it plays a considerable role in learning and teaching.

There is something akin to apprenticeship here, using the word loosely but I think relevantly. Complex skills, as Polanyi points out, are learned in a kind of apprenticeship relationship. Sailing, I

recall Bill Hull pointing out, is best learned by being on the boat and more or less absorbing what it is that wind, sea, and sail do. The apprentice watches the "master" moving freely and creatively in a complex situation. Perhaps what he learns first is not the detail but the style of movement, the sense of creative problem-facing which the master, the one who already knows the details, can communicate. Perhaps once this style is absorbed into the bones, the details simply take care of themselves.

16 March 1966

11

SOME RESTRICTIVE PRACTICES IN PRIMARY EDUCATION

Individuals learn, groups do not. Often, of course, the learner benefits from being a member of a group or from having a group serve as the background for his own work, and many kinds of learning require a group at some stage. The group can extend the range of possibilities open to its members. It can reassure them that many kinds of learning are legitimate by providing examples of many kinds of learners. Those not part of a group at a particular moment can often find a powerful stimulant in the feeling of density created when many people are working in the same place–although there should always be the opportunity to escape into solitude. The group can provide companions for those who may wish to interrupt or discontinue what they have been doing and, before turning to other tasks, simply relax and be with people. In short, the group can do much to facilitate learning by its members but it remains the individual members who learn.

The class should not be considered the unit of instruction. The classroom should be a place within which children can either work alone or form groups of all kinds; stable groups, temporary alliances, partnerships, groups which form and re-form according to the changing needs of their members as they learn.

If the class is seen as a pool from which groups may emerge or as a background for the work of individuals, then the danger of restrictive practices in forming classes becomes apparent. Such practices impoverish the class. They limit the members' freedom to draw upon resources they need as they learn. Streaming is one of the most restrictive of these practices but it must be viewed together with other attempts to reduce the human and material diversity of the classroom and other attempts to restrict the development of individual styles of learning. Under the rubric "restrictive practices" I mean to include at least the following:

1. Streaming,
2. Our attempt to divide the world and the sum of all previous human learning into "subjects,"
3. Our efforts to control children's use of their own time and attention,

4. Our attempt to replace *things* by the symbols for things,
5. The subtle form of streaming represented by horizontal age-grouping.

All of these measures contribute towards segregating children from the complexity of their surroundings. They may also tend to isolate children from their own experience.

1. Streaming reduces the diversity of learning styles permitted in the classroom.
2. Fragmentation into subjects blunts children's sense of the interconnectedness of the elements of their experience. Far from helping them to order the world it may lead them to doubt their intuition that its components can ultimately be related to one another.
3. Our attempt to control children's use of their time and attention prevents them from becoming aware of the rhythm of their own learning. It prevents them from being able to take advantage of the shifts from intense involvement to relaxed contemplation to idleness and back to involvement.
4. Our limitation of raw materials readily at hand delays the children's discovery, in school, that the physical world has rules of its own. These rules are often less systematic than the rules governing symbols, but they are often richer in suggesting new lines of investigation and are more likely to lead children in good time to a creative use of symbols.
5. Horizontal age-grouping seems designed to keep children from the awareness of where they have been and where they may go which can develop out of watching and working with younger and older children. This attempt to isolate children from their past and future seems to me a particularly insidious form of segregation. It is possible that traditional education manages to keep children focused on a narrow and often sterile range of goals by preventing them from facing the more immediate challenges which emerge from their own growth and that of others. By horizontal age-grouping quite as much as by streaming we deprive children of a wide range of models of learners at many stages of development and of widely differing interests and accomplishments.

Why, when it is obvious that good learning requires maximum diversity of all kinds, do we deliberately set out to eliminate diversity from the classroom? Why, for all that we have been taught to say by Rousseau, Froebel, Dewey, and others about the continuity of learning inside and outside school, do so many schoolrooms seem barren compared with the world teachers and children alike live in outside the school? These questions are worth considering before continuing the discussion of specific restrictive practices.

Our traditional expectations of the school and the teacher set them an impossible task. We impose upon them a rigid conception of what the child must know when he leaves school. We expect that the child will be prepared to show us in examinations that he has learned what we wish. In the classroom pressure for results leads the teacher, partly in self-defense, to forget what he may know about learning and to replace it by teaching. As part of this self-defense he employs a host of measures to reduce the variability of the physical and intellectual behavior with which he must cope. Behavior quite acceptable in a *learning* situation may lead to chaos in a *teaching* situation.

The word "teacher" itself gives the game away. A teacher teaches, directing and controlling, trying to manage the process of education. If the emphasis is on teaching instead of on learning it may be possible to specify and even attain goals, to turn out products. But these products may have little relation to significant learning. Children readily adopt strategies which allow them to give us the results which they sense we prize even though they may have little or no insight into what they are doing.

Visible results, products, are not always valid indices of the learning which has led to them. It is quite possible that a good learning process will not give rise to anything tangible enough to be called a result. Results, when they do emerge freely, are only occasionally neatly labeled with the kinds of learning which have led to them. They may appear messy and uninteresting except to those who produce them. Above all, the results of a natural learning process are unpredictable. For these reasons schools traditionally have settled for a narrow range of products and have generally insisted upon supervising each step in their manufacture. This may be a kind of quality control but it is only *our* concept of quality which is involved. If we are limited in our vision we will limit the vision of our children.

Looking over my experience in primary classrooms in the past few years it seems to me that spontaneous activity, perhaps starting out with no specific goal and ending in unexpected places, occurs more often in infant than in junior classrooms. This seems true even where the latter are beginning to provide more materials for daily use

and are beginning to introduce enough flexibility into the timetable so that unplanned, unmanaged learning may take place. Perhaps the relative freedom of the infant schools depends upon their being further removed from some of the principal sources of pressure for results. It is good to see a few junior schools beginning to realize the learning potential of children from whom some of the pressure is removed.

I recall watching two ten-year-old girls playing with magnets and steel ball-bearings in a wooden tray. At first they did the usual kinds of things, seeing how many balls could be suspended from the magnets, putting a magnet under the tray to move the balls around and make patterns with them, and so forth. I wandered away and when I came back a few minutes later a ball-bearing had just dropped onto the floor. I heard one of the girls exclaim, "Oh, dear, another little pupil has run away from school," whereupon the magnetic teacher retrieved him and put him in line with the other ball-bearing children. Play continued from there. Here was fantasy, based on ostensibly scientific materials but obviously rooted in a need the children felt to work out in play a social situation important to them. Children will, if allowed, base this kind of fantasy play on almost anything that comes along, from ball-bearings to bricks to soapsuds and to other children. What were the girls learning? Perhaps something about magnetism, just as the boys I found on the floor of another classroom signaling around a corner with bulbs and mirrors might have been learning something about electricity, reflection, or even information theory. It is possible, however, that in both situations more general attitudes were being absorbed quite unconsciously. The children may have been learning that there is a place in school for fantasy, for unplanned adventure; they may have been learning to take initiative in using materials in novel ways and in drawing upon each other's skills and interests; they may have been learning to abandon dead-end trails and to search for paths crossing more fertile terrain. Are these the kinds of learning we wish to restrict?

People, adults as well as children, often develop remarkable flexibility and boldness in what they let themselves do after even a short period of working freely, alone or with others, in an environment well stocked with raw materials. At a recent residential workshop for young teachers the high point of the final day, figuratively and literally, was provided by two teachers who went, with two visiting children, to the top of a twenty-one story building and dropped plasticine onto the pavement below in order to find its rate of fall and to see what it looked like after impact! During the first day of this workshop most people had used materials conventionally,

even timidly. They sampled widely, kept to themselves, and did not settle long at any activity. On the second day they began to relax, began to combine seemingly unrelated pieces of equipment in novel ways, began to talk with one another and to work together. There was an explosion of art of all kinds. By the end of the workshop most of the teachers seemed to have realized that within the limits of common sense and safety nothing was out of bounds.

Experienced teachers have reported much the same pattern after moving from formal, tightly-controlled classrooms to more open ones in which children have a meaningful say in what they do, how they do it, and with whom they do it. There is an initial unsettled exploratory period in which the children sample what is available and seem to test the limits of their freedom to see if it is real. There is then a period in which new ideas come flooding out, new uses are discovered for equipment, new lines of inquiry are pursued. Goals arise spontaneously in such a situation and in order to provide a wide range of appropriate materials and to be ready with suggestions as they are needed the teacher clearly must anticipate some of the directions which may be taken. But his knowledge of a range of possibilities must not be limiting, must not dictate the ways in which children work or prevent unexpected goals from arising. The teacher should realize that any goals, whether his or the other children's, may well prove starting points for activities very different from those which led to them.

Everything the teacher does should create choices, not limit them. This may lead to classrooms which by traditional standards are untidy. It may lead to what by traditional standards appears to be wasted time, energy, and materials. But it may also lead to the variety of learning I have tried to suggest provided the teacher is able to hold in abeyance the question, "Yes, but exactly what are they learning?" *That* they are learning, that they are learning how to learn for themselves and with each other, these are the important points.

Although teachers may find it reassuring to note how often more limited, conventional goals such as reading, writing, and number proficiency are subsumed under the more compelling objectives children set for themselves, it would be a mistake to move towards a more open classroom simply in order to attain these specific goals. If this is the motivation for change the emphasis will inevitably shift from process to product. Children are quick to detect true motives. They will soon discover whether they have a real sphere of freedom or whether their "freedom" extends only to doing what the teacher has in mind.

I have spoken at some length about learning situations in which opportunities are created, not destroyed. I think it should be clear that restrictive practices such as streaming, horizontal age grouping, time-tabling, and the imposition of subject-boundaries are antithetical to this objective. Traditionally our efforts have been directed towards improving the technology needed for taking children on guided tours. We should now turn our thoughts towards devising circumstances in which they can explore even where we ourselves may not have been.

—oOo—

Given the traditional brief, restrictive practices may be useful. If you know the goal and how you wish it to be reached, streaming may prevent the appearance in the classroom of the painfully obvious laggards, of children who do not wish to move with the others or who wish to move in their own fashion. If there is little time, then children must be discouraged from developing their own style of doing things and their own things to do, and the fixed timetable and the absence of materials to work with may serve to discourage initiative. Horizontal age-grouping may impose useful blinkers to keep children focused on the teacher's goals. Subject divisions may help reduce the need to think and the temptation to think about things not instrumental in achieving the desired results.

The restrictive practices cannot well be attacked on the traditional ground in which they are rooted. If one senses that free children in an open classroom can achieve far more real learning in honest ways than can fettered children, one must persuade the restrictionists to look at free children and then defend, if they can, their own frighteningly limited objectives.

All the restrictions communicate to children our distrust, perhaps even our fear, our insistence upon uniformity and upon appearances. Consider what streaming says to the streamed child: "You have been judged in comparison with your mates on your ability to attain objectives which we think are appropriate for you. You are considered essentially the same, in the ways that matter to us, as Johnny, Thomas and Susan, or at least we hope that your differences won't show up in the classroom. You are considered fundamentally different, in the ways that matter to us, from Billy, Jane and Peter, and we will provide programs for you and for them so different that any similarities will be unlikely to appear." This last point is important. Having classified children, having given them any label, we tend to treat them in such a way that our label is proved correct. It is well

known that anticipating a behavior increases the chance that it will occur. The dog who looks as though he expects to be kicked invites kicking. The child who accepts his place in the company of those held most likely to fail (relative, of course, to the success of those deemed most likely to succeed) is more likely to fail than if we had not communicated to him our expectations. This is especially true if we give him little chance to attempt anything which might prove him competitive with those who are expected to do well.

The C-stream child is demeaned no more than is the A-stream child, although he will probably be more aware of an insult. The A-streamer, fully as much as the C-streamer, has his mental scope narrowed in school, not only by streaming but by the other restrictions which typically accompany it. He will have his range of associates limited and will be limited in the ways he relates to them. Ultimately the only thoughts he will feel comfortable with in school will be those which have been pre-thought for him and the only children he will feel comfortable with in school will be those pre-selected for him to mingle with.

To produce children whose thoughts are not their own, whose style of friends are not their own, whose time is not their own, whose style is not their own–should this be our objective?

—oOo—

To summarize:

Restrictive practices seem to me to be founded upon three assumptions:

1. That the class is the unit of teaching and of learning,
2. That specific goals can be defined in advance for groups of children,
3. That the schools' function is to limit the choices each child must make at a given moment

In place of these assumptions I suggest that we adopt the following working hypotheses:

1. That the individual child is the learner and that he differs significantly from all other learners,
2. That the goals for any particular child cannot be defined in the abstract but must be allowed to emerge from his transactions with the social and material environment as he deals with it in

the present and extends his awareness of it to include its past and its future,

3. That the function of the school must be to create human and material environments so rich in possibilities that a large number of choices is available to the child who is free to explore, alone and with others, in directions relevant to him and in ways reflecting his unique style of learning.

Easter 1966

12

THOUGHTS ON COMPETENCY

In the past few years I have given occasional informal music lessons to children working at instruments I do not play, including violin, flute, and clarinet. All these children were taking lessons on their instruments, and what I did with them was supplementary. While I was not able to be of much assistance with technical problems involved in playing the instruments I was able to help the children listen more carefully to the sounds they were producing and to indicate to them the kind of sound I thought they were capable of producing. I was able to encourage them to search among their various technical skills to find ways of producing a better sound than that which they were normally achieving. Part of what was involved was listening to them play and identifying and pointing out to them their own best sounds so that they could focus on what they were doing that was working so well. I discovered that there were ways of communicating the kind of sound I wanted without being able to produce it on the instrument myself. Verbal descriptions ("a pear-shaped sound," "a harder, thinner sound") sometimes were useful; sometimes I could produce an analogous sound vocally or on another instrument. Now and then I could make a technical suggestion based on my knowledge of other instruments: "See what happens if you use the entire bow," "Blow more gently and more steadily."

What I have said about music may be relevant to other learning situations. I should think that a teacher would not need to have personal mastery of a great many areas of scientific exploration, for example, in order to know and to be able to communicate what good "sciencing" feels like. He must, of course, have considerable first-hand experience in some kinds of scientific activities, the more the better. He should feel comfortable with the kinds of uncertainties and partial answers which may follow from any starting point. Once a teacher has this feeling for science as a way of looking and thinking, rather than as a body of facts or specific techniques, then there will be many things he can do, extending beyond his own specific competences, to provide situations and materials, to ask questions which can lead to good observation, experimentation, and formulation.

I wonder how extensive a teacher's own immersion in a "subject" needs to be for him to operate in areas which are initially unknown to him? I suspect, based on my own experience, that he must have a very considerable background of perceiving and thinking along the lines of a particular discipline before he will be comfortable in working with others in *their* unknowns. It probably needs to be second nature for the teacher to consider his own perceptions of the world in terms of the kinds of questions which are askable and the lines of inquiry which may be pursued. To return to science, "sciencing" probably needs to be a way of life for the teacher who would work with others in a scientific way.

To what extent is it possible for one person to develop the depth of insight needed to work as I have suggested in many different spheres–science, mathematics, writing, art, music, and so forth? I think it is probably unlikely that any given person will be able to develop the requisite technical skills and sensitivity, the essential mental "set," in more than a relatively few fields. But it does seem possible that if he has real competence in one or two fields he will have some basis for sensing what good thinking and working involve in areas beyond his own personal competence. While I don't have much idea what to do to help children look at the world visually or plastically and translate their experience into paint or clay, perhaps I am better able at least to keep out of their way if they seem to be doing something worthwhile than I would be if I had no idea about what constituted good musical activity.

It may be that it is less profitable to try to make each teacher a generalist than it would be to try to get him thoroughly involved in the one or two areas which are most congenial to him. (The same, of course, must also be said of children in school, where the idea of "the universal child" has little to commend itself, provided each child has a wide universe of possibilities from which to choose his specialties.)

7 September 1966

13

OLD CONCEPTS DON'T DIE

Intelligence, as a trait of human beings which can be reflected in an IQ score, is a concept which we have been led reluctantly but rightly to call into serious question in the past decade or so. It no longer seems as useful as it formerly did to invoke the IQ and its related terminology, words such as "bright" and "dull," to categorize real people. Or perhaps it would be more accurate to say that it has been found all too useful to make such distinctions but the uses are increasingly suspect. We have also begun to be aware of the extent to which "bright" children are "bright" and "dull" children "dull" less as a result of what they are or might be than as a consequence of our psychological name-calling.

It is often true, however, that old concepts don't die, they are simply turned into new concepts. In the case of intelligence, a wonderous alchemy has transmuted the base old idea into the golden new concept of Creativity. Some alchemists have gone so far that here and there one now finds the child who scores high on an old-fashioned IQ test being pejoratively dismissed as "convergent" because of his ability to define accurately a brick–definitions being a favorite item in the test batteries of yore. At the same time a new breed of children has emerged with the right to march under a banner inscribed with the device "divergent" because they can provide not one or two but eight or ten different uses for a brick–finding uses for things being a favorite task in the test arsenal of the new generation. By the kind of word magic which abounds nowadays "divergent" and "creative" have quickly become synonymous and thus the diverger has mounted an unassailable pedestal, for how can anyone not be one hundred percent in favor of creativity?

Many people will undoubtedly find it the work of many years to determine the correct mixture of convergent and divergent thinking skills and to devise teaching materials and methods suitable for the education of children whose minds are properly attuned. Now, it is certainly true that the ability to approach problems in a variety of ways is desirable. There are times for letting one's mind shoot off in a dozen directions and there are times for focusing rigorously on one aspect of a problem. The most productive and satisfying thinking probably involves constant interspersing of scanning and focusing, although it

would be the arrogant soul who would presume to determine in advance for another person how the scanning and focusing should fit together. To the extent that recent research has made us aware of the limitations of a view which holds that only the mind which can focus on "right" answers is worth cultivating, to the extent that we are made increasingly aware of the power of minds which generate as many questions as they do answers and which discover in answers new questions, to this extent have we gained something of value.

The danger comes, however, if we continue to mistake labels which are so easy to apply (Intelligent! Creative! Convergent! Divergent!), but so difficult to see beyond, for reality. It seems almost impossible to gain a new perception without being seduced by the labels it quickly assumes, labels which invariably seem to promise access to the tidy life. We should approach concepts, old and new, with caution if they invite us to apply labels too facilely. Labeling, lumping together unlike human beings for the sake of convenience, makes more difficult the teacher's hardest task, which is to retain his perception of each pupil as unique and to find in differences, not in apparent likenesses, a basis for considering education.

29 September 1966

14

ONE BLUE JAY ...

On a cold January morning Sabra and I hurry down the street toward the bus stop. I'm an experienced hurrier but Sabra isn't; like many children she is not convinced that another time and place can surpass the present moment. Just as I hear the bus coming and start to run, Sabra stops, having noticed in a puddle a feathery ice crystal. As often happens, my adult point of view prevails, we catch the bus and leave the crystal to the sun.

After a busy day for both of us I have dinner with Sabra and her family. In no context except her own Sabra suddenly says, "If you're walking along and you see some blue jays, you say, 'Oh, blue jays' and you go on. But if you stop to look at one blue jay ..." Her voice trails off. Then: "It's the same with anything. Like floorboards, even. You walk across them and they're just floorboards, but when you stop to look at one floorboard ..." Again the idea is bigger than words. On a hunch I say, "And the same with ice crystals?" Sabra smiles. "Yes."

We seldom seem to encourage children to take the time to become involved with one particular *anything*. We accept that young children deal with specifics much of the time but because we put such a premium on classifying we may make it hard for them to retain their acute sense of the individual items which form classes. Adults live in a highly symbol-dominated world. Most of us approach reality only gingerly, as if afraid of being overwhelmed by detail. Children, however, revel in detail. As a result they often become amazingly perceptive. I recall a ten-year-old girl who could identify each one of a dozen chicks within a day or two of hatching. Not for her, "Oh, baby chicks" but rather, "This chick, that one."

Concepts are formed by focusing on likenesses. Most of us are lazy and in time may think only of likenesses, forgetting differences, irregularities. Perhaps only poets retain a vivid sense of differences, an awareness that nothing is quite like anything else, no two birds, no two ice crystals, no two people. The laziness is worth fighting, the poetry worth cultivating. If children are fortunate as they learn to classify they may come to see that categories are more than simply handy devices to sort out complexity. They may see that well-formed concepts enable them to return to each unique member with a sense

of its relation to other members and with more insight into its individuality.

R. D. Laing, the psychiatrist, speaks of the "invalidation of experience." The self-defined sane person defines another as insane by saying, in effect, "My experience is right, yours is wrong." John Holt has pointed out that much of what happens to children in schools involves adults trying to invalidate children's experience by means of correcting, belittling, hectoring. A major kind of invalidation is the insistence on the adult sense that "the unclassified life is not worth living" and that in the romance between a child and the unique present instant and its contents lies danger, if not positive sin.

Walking on a beach in Maine in August Sabra stops to look at a sand dollar. She stoops to pick it up and ...

13 September 1968

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INFINITY

My first recollection is of a can of Royal baking powder, a magic can with a picture of itself on its ornate label, and on the label in the picture another label. I believe I could see as far as the can on the can on the can on the can, quite far enough to generate in my mind the image of an endless series of ever-smaller cans and to bring me back time and again to peer at the label in the hope that closer examination would reveal just one more tiny image. I can't date this memory accurately but I would guess I first puzzled over the baking powder can when I was five or six.

My second recollection I think of as "The Head Is In The Way" problem and I believe it is a common one. In another form Anna and Fynn deal with it in the book *Mister God, This is Anna.* The memory is of sitting in a barber's chair in a shop with the two long mirrors along the walls in front and in back of me giving rise to a large number of ever-smaller barber shops, barbers, and heads being shorn. I vividly recall moving my head back and forth in the hope (which I knew was vain but which at some fantasy level persisted) that just once I might surprise that little boy staring back at me and get a glimpse around his obstructing head. I *knew* that if the head weren't there the sequence of images would go on and on and on. I did not know the term "vanishing point" but if I had been told it I'm sure I would instantly have known what it meant–it was what the head got in the way of!

My third recollection is more mysterious, involving a mental image I recall puzzling over night after night lying in bed waiting for sleep, an image I can still reconstruct and which still baffles me. I picture a wheel turning. It turns more and more slowly but I cannot make it stop. In order to stop it I have to close a mental shutter, take a new mental picture of the wheel, now stopped. Though I can picture the wheel turning as slowly as I like, I cannot picture the transition to stopping. This seems to have something in common with Zeno's paradox of Achilles trying to overtake the tortoise–recall that if each covers half the remaining distance in a given time then no matter how fast Achilles or how slow the tortoise, Achilles can never catch up. Finally, my observation, made a few years ago, of a twenty month old playing with nesting dolls. Gwen was fascinated by those brightly colored, smooth, lacquered dolls, of which my set comprised seven.

With help she took apart the largest, then the next and the next, until finally she had six tops and six bottoms in front of her and held in her hand the tiniest doll, the one that does not come apart. I can still see her face screwing up with concentration as she attempted to twist that doll apart, and her increasing frustration turning to rage and tears when she discovered that it was never going to come apart. How should we read this? Possibly Gwen was simply frustrated in a task which, for her, went no further than the doll in her hands. But equally possible, it seems to me, is that somewhere in her mind she had formed an image of an endless series of dolls. Infinity? Who can say yes–but who can say no?

Outlook, Winter 1978

16

SOME THOUGHTS ON CHILDREN AND MATERIALS

While visiting an infant classroom recently I spent a few minutes watching and working with six year old Karl. He was building a pyramid out of colored X Blocks which, as their name suggests, are X-shaped blocks that interlock with one another in interesting ways. Karl's pyramid grew to be about seven or eight blocks wide at the base and perhaps six blocks high with the apex placed symmetrically at the top. When he had finished there were still several blocks left and, after some hesitation, he started another column up one side of the pyramid. This left the apex asymmetrically placed. After further thought Karl rearranged things so that symmetry was restored. He was obviously pleased with his construction. After we had both admired it for a while I asked Karl whether he had ever tried making the same structure and then taking a few blocks out to leave some X-shaped holes. He didn't understand my question, so I asked him to help me remove one of the blocks. The result left him wide-eyed with excitement and he ran off to bring over the teacher to see the hole. I then helped him to remove five more blocks and after each removal he called over the teacher to view the result. My role was largely one of steadying the structure as Karl eased the blocks out. I could see him hesitate before each removal and once or twice apparently change his mind as he contemplated the way the structure was put together. After one near-disaster his intuition became excellent and he was able to remove blocks which did not serve a vital structural function. When the pyramid finally fell it was less because too many holes had been punched in it than because it was handled too roughly during a removal.

Watching and working with Karl and later talking with people about what I had seen has led to a number of thoughts about the relationship between materials and their users, and between materials, their users, and an onlooker who may want to participate in what is happening. I want to present some of these thoughts not as fully developed conclusions but as starting points for further exploration.

1. It may be useful to think of a dialogue between the child and the materials accompanied by a second dialogue, or monologue, which the child carries out in his mind. No words need be uttered,

although especially with younger children the materials may provoke a spoken commentary. At times no words may be involved at all, much of the "dialogue" being an interplay of images or unverbalized thoughts. But there surely is some sense in which materials "speak" to a user before, during, and after they are used. In some instances the user's actions prompt a response; if Karl placed a block insecurely the structure wobbled or fell–a rather forthright kind of "No" or "Watch out." Sometimes materials seem to initiate the dialogue; the shape of the pyramid and the pile of unused blocks suggested to Karl a further addition to the structure. There was evidence of the internal dialogue, too; at times I felt quite certain, in the context, what possibilities Karl was considering and I could then see which he tried. One can obviously never know for certain what another person is thinking but where thought leads to choice and action some fairly shrewd inferences can be made.

2. Thinking in terms of child-material and child-self conversations suggests a style of approach which might be useful to the onlooker who is interested in what is happening and wants to participate in it. Imagine that you are approaching two people talking about something that interests you, and you want to join the conversation. If you are hopelessly obtuse you will simply barge in, all elbows, and often be confronted by thoroughly risen hackles. If you have some sensitivity you generally will listen for a few minutes to find out what is being discussed, to reconstruct some of what has probably been said, and to consider how to make your own contribution relevant. You will try to judge in advance its effect on each speaker; you will try to put yourself in the position of each speaker and to anticipate his reactions. All of this sizing up is normally done quickly and without much conscious thought. Seldom will it be carried out sequentially as I have outlined it here, but some such process of evaluating the existing situation and one's probable impact on it often does take place.
3. It seems to me possibly useful to make a fairly direct translation of this process to the child-material situation in which an onlooker wants to participate. Looking at what is happening one can often infer what has led to it. I could, for example, tell from the height of the pyramid when I first noticed it that Karl must have had a considerable number of "yesses" from correctly placed blocks, and it was reasonable to assume (although I didn't put it in these terms at the time) that he was having a successful conversation with the blocks. I was thus prompted to suggest an extension which might prove challenging. I introduced an entirely new

element but at a time and in a way which seemed natural, because Karl's conversation with the blocks seemed to have reached a pause. If I had felt that this was a pause following a series of failures I might have suggested a different task or I might have refrained from intervening at all.

4. In order to join in a conversation you must obviously know what a conversation is about–not just the specific conversation at hand, but Conversation in general. You must know what it feels like to take part in a discussion. My analogy suggests that to join a child-material dialogue you must know what it feels like to work with materials. (It will also help, of course, if you remember what it feels like to be a child. If you are used to confronting new materials this shouldn't be too hard!) A person who is not used to handling materials in a free way, who is not used to listening to them, is not likely to be sensitive to the two-way communication between the child and the materials; he may readily enough see what the child is doing to the materials but he is less likely to consider what the materials are suggesting to the child and what it feels like to engage in this kind of interaction.
5. Just as conversation with other people is an active process, so communication with materials involves the user reaching out and taking meanings. It is not a passive waiting for something to happen, but a probing for possibilities, and it depends to a considerable extent on what the user brings to the situation. A good teacher will have had a lot of experience with materials in general and perhaps with the specific ones the child is using, but he will rely on his own experience as a general guide to some possibilities, not as a limitation on what can be done. He should be aware that children approach materials with differing expectancies and competences and may receive from them quite different meanings and proceed in many different directions. Sometimes because of his general or specific experience the teacher will see connections between uses the child sees as separate and his contribution to the dialogue may be to point out some of the connections. This is, of course, often what a third party contributes to a conversation, a fresh view of the possible fitting together of old elements.
6. It may be useful to think of materials as having two different kinds of meanings, following the semanticists' approach to words. To use the awkward but well-established usage, words have both extensional and intensional meanings. Extensional meanings are those which can be agreed on, the "dictionary definitions," so to speak. Intensional meanings are the personal associations words

come to have for individuals and they differ from one person to another. Semanticists point out the danger of using words in a discussion assuming that only extensional meanings are involved or that we understand fully other people's intensional meanings or that they are the same as ours. In thinking of materials, the extensional meaning might correspond to the obvious use, the use the material was originally intended for, the use which most people agree it has; blocks are to build with, paper is to paint on. In a classroom a wider range of agreed-upon uses may develop over time as a result of what children and adults do and these become new extensional meanings; blocks are also weights for balances and paper can be rolled into logs and built with. No matter how many uses are agreed upon, however, it is important to remember that a child at work with materials will probably have his own set of intensional meanings for them. Just as in conversation it is often important to bring into the open differing intensional meanings of words, so it may be an important part of a teacher's job to discover and to encourage the development and sharing of as many intensional meanings of materials as possible. In doing this the conversations of all may be enriched and a silent dialogue between a child and materials may, in good time, lead to a pooling of what has been discovered.

7. Some materials seem richer than others in providing opportunities for a variety of intensional meanings to develop. Some objects have such a dominant built-in use that it is difficult to see what other uses or meanings might develop. Materials may differ in what can be called their transparency, the ease with which they can be seen into by someone approaching them for the first time. Some extremely rich materials may be quite opaque. To use music as an example, a piano seems more transparent than a violin in that the keyboard invites the absolute beginner to take action and provides some satisfying results, whereas the strings of a violin require such specialized treatment that the beginner is not likely to achieve much satisfaction. There are often things a teacher can do to increase the initial transparency of materials and thus make it more likely that children will become involved with them.
8. Things are not people, and, although I find the social analogy useful it must not be allowed to obscure some of the differences between things and people. One important difference may be that things are more often seen as neutral, not as adversaries. That is, one's general approach to materials is not one which assumes that they are trying to hide a meaning or a use, although there may be

an infinite number of meanings and uses there to be discovered. In dealing with people, even with friendly people, such an assumption is not always safe. In human social situations one quickly learns to be alert to motives and to the possibility of deliberate or unintended withholding or obscuring, the possibility that things may not be intended as they are apparently offered. One may say to a person, "Why didn't you tell me that earlier?" With materials the reaction is more likely to be, "Why didn't I think of that before?" Perhaps another way of putting this is to say that whereas we discover the meanings of people we invent the meanings of materials–although I'm sure that the distinction between discovery and invention is not always a clear one.

9. Finally, it is interesting to contrast the way in which materials and people disagree or contradict. Materials disagree by failing to respond as one predicts or wishes. Instead of staying up, the improperly placed block falls down and thus communicates in no uncertain terms that something went wrong, that you didn't correctly understand its meaning in that situation. Whereas the material may communicate that "something went wrong," people are much more likely to communicate the idea that "you are wrong." One might say that materials pass judgment only on a specific act or situation, while in many human relationships there is at least an overtone of judgment of the doer of the deed, not just the deed. It may be for this reason that children are often able to accept with equanimity the sudden collapse of a building which they have been working on for twenty minutes whereas the slightest social provocation may, on occasion, release torrents of tears. This is really a restatement of the fact that generally (and with many exceptions) materials, "nature," are not seen as being "out to get you" whereas so often even friendly people play the game of oneupmanship. Another reason why teachers must themselves deal extensively with materials in the same spirit as will the children in their classes is that the perception of the neutrality of materials may be important as one observes and helps children who are using materials.

Maths Teaching, Autumn 1967
Primary Schools Broadsheet, Leicestershire, Spring 1968
Outlook, Autumn 1972

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HOMO "CARTOGRAPHICUS"

(This is a revised version of a talk given by Tony at the Easter Residential Course, Loughborough, 1970)

I want to start by telling you about something that happened last summer in Vermont. Several of us were there for a course something like this one. On the day before the course started John Paull was going out to look at a small wood behind the school where the course was being held to see how useful it might be, and he invited me to come along. I don't know anything about woods but it was a fine day and I felt I didn't have much to lose! When we got into the wood we both noticed a loud tapping sound coming from high up somewhere. It sounded to me like a woodpecker. We couldn't immediately find the source of the sound but finally we discovered that two tree trunks, probably one hundred feet tall, had grown too close together and were rubbing against each other making this strange, disembodied sound.

Because I'd mentioned woodpeckers John pointed out to me a few minutes later a nice smooth, round hole about ten feet up in a tree. He said it was a practice woodpecker hole. I said, "*A what*?" He said it was a hole where woodpeckers learn to peck. I laughed, but I tend to believe things that John says about natural phenomena and in fact later we came to other trees which had smaller, more irregular holes further up their trunks and he said that these were real woodpecker holes. Apparently you graduate from the practice hole to the real thing!

I'd learned something I didn't know about woodpeckers. Next we came across a large spider web just off the ground. It was very beautiful and John asked me if I'd take a picture of it. He said, "By the way, do you know how the spider can tell if there's something in the web?" I didn't know and he told me that there was a little strand coming up from the web to where the spider sits and waits at night, a sort of telegraph wire, and if anything gets into the web the spider feels the vibration, scurries down, grabs it, and scurries back.

We looked around a while longer, turned over some logs, and John did some demything by telling me that the Boy Scout Guide is all wrong about finding north from the moss on trees. Or at least

mostly wrong. It works if you have one tree on its own but if you're in the middle of a wood it's not very reliable because the moss and lichens grow where it's dampest, not necessarily where the north is.

By now we'd seen many things. John had pointed out much that I had never noticed and never would have noticed if I'd been alone. Then I saw some fern leaves and picked one of them. I noticed that the veins came off from the spine in a different way near the base of the leaf than near the tip. At the base they came off in pairs, together, one on each side of the spine, but further out they were staggered, one on one side, then one on the other and so forth. I asked John if this was true of all ferns and he said he didn't know. To me this was exciting because, having been shown many things, I had discovered something for myself, something I didn't know about, something that John didn't know about, but something which seemed a real question, a real discovery.

The point of the story is that we were on a piece of territory that was very much John's and very much not mine, about which he knew a lot and I knew little. He had communicated to me his excitement about what he and I were seeing and had led me to see things I wouldn't have seen otherwise. He gave me a sense that he had in mind a mental model or map of something called "a wood," that the wood was a place of exciting and complex phenomena, and that if I looked carefully I could begin to make my own map of some of the interconnections. My map would not necessarily be the same as his map; in fact it would certainly be quite different and, like all mental maps, would change time and again as I learned more about the territory, but it would be a real and useful map.

It's maps I want to talk about this evening as you may have inferred from my classically illegal title. It seems to me that one can think of map-making as a fundamental human activity, if not *the* fundamental human activity. I think we can usefully look at learning in terms of map-making. In the wood I had a very inadequate map and was in the early stages of exploring a territory, beginning to see, because I was with someone who clearly had and was excited about sharing a map, that I could make one too. Notice that this is an active process. It is not something that just happens. It happens only if the person with a good map communicates the excitement and usefulness of having it and if the person being taken into the territory catches some of this excitement and says, in effect, "Yes, I can see the beginnings of connections. I can see that I can construct a map." Much of our mapping undoubtedly occurs without the direct assistance of others, but there's not much doubt that being with a skilled cartographer helps enormously.

Learning, then, consists of looking at something new and beginning to see paths into it. You construct a map or a series of maps, each one helping you to go further into the territory. We all do this. We all have hundreds, thousands of maps each of which represents a way we have learned to look at part of the world. A few maps have labels; there are maps labelled "mathematics" and "art," there are music maps, language maps, maps of social relations, maps of the physical environment some of which may get labelled "science" maps. Most of our maps probably don't exist in sufficiently tidy form to warrant labels, and most of them are complexly related to many other maps. Many of them are changing continuously. Some of them are more wrong than right. Some of them probably correspond quite closely to the maps other people have, while some of them are probably uniquely our own. What they have in common is that all of them are models in our minds of what we think the world looks like and we can consult them to help predict what the world is going to be like, what connections we can expect, how we should act, what the consequences of our actions are likely to be.

I think that one can say that not only is map-making an important human activity, but it is an essential human activity. We couldn't survive without the ability to make maps of the world in which we live. We can see map-making very clearly by looking at babies. They start mapping at least from the moment they're born, if not before. One of the early maps is that of what is and what isn't part of themselves. Children are not born knowing the distinction between self and not self. Gradually, through touching, pinching, biting they discover that some of the soft world they live in is part of them and some of it isn't. There's the fact that if you pinch yourself you feel it twice but if you pinch something, or someone, else, you only feel it once. Something like this must happen in the process of building up this first, probably quite crude, map of what is and what is not part of the baby's body. Next, think of what happens when you get to the stage of recognizing someone else. Most babies by the age of six months, at least, can pick out their mother from all the other people they come in contact with. There's no mistaking mother for anyone else. Think of the extraordinary task this is, to learn to recognize one face, one person out of all the others who come within the baby's presence during a day or week or month, all the people peering down, handling him. This is a kind of mapping, too, the beginning of a social mapping.

Then you have the beginnings of mapping of the physical world. One example here is that of constancy. At some point the baby or young child begins to realize that as objects and people come closer

or move further away they don't change size. This probably doesn't happen very early or very completely. It's probably something that is mapped over many years. Bill Hull once told me that when one of his daughters was three she went on her first airplane trip. When they got into the air she asked, "When do we start getting smaller?" This is a logical question, if you think about it. What it suggests is that the map she probably had which said that people across the room aren't any smaller than people nearby couldn't quite extend to something that you were part of several thousand feet off the ground, something that always looked small from the ground. It was an incomplete map with some details missing. It represented not an error in thinking but incomplete thinking owing to incomplete information.

We see examples of incomplete mapping in the results of some of the Piagetian experimental tasks. You remember the famous experiment in which children are asked to pour water from a tall, thin beaker into a short, wide one and are then asked which one has more water. Young children often say that the tall one does and this is interpreted as meaning that they don't yet have the idea of the conservation of liquids. In fact, I think they probably have a lot of ideas about conservation which *are* correct: they probably know that a glass of water won't fill the bathtub. Again, they don't have all the details and you can construct tests to show which details are missing at any given moment, but they have begun to build up the map of conservation, which is pretty complex. This is the way it is with maps: they are formed slowly, you lose parts of them, change other parts, build them up again as you have more experience.

Perhaps the most spectacular map that anyone forms is that of his own language. This is a monumental task. We often hear people say that the hardest thing to learn is speech but I doubt that we really take this seriously, possibly because learning to talk happens before we are likely to be watching ourselves learn–or if we are, we don't remember it later. But consider the conplexity of the task. For example, a baby grows up in a world in which people are speaking in sentences. How does he learn that there are words and that what he hears isn't just one long word? To a person who knew no English the utterance, "Unaccustomed as I am to speaking after dinner" must sound very much like Mary Poppins' word, "supercalifragilisticexpialidocious." They both take exactly the same amount of time to say–that is, they have the same number of syllables. What the non-English speaker has to learn, what the baby has to learn (presumably in both cases not trying words having fourteen syllables in the early stages!), is that one of these utterances is made up of separate words and one isn't. Teasing words from their context, from

the stream of words they arrive in, then learning to match the sound with a sound one makes, then learning to use the words in a framework of your own, all this requires a great deal of practice. And there's some evidence that at least some children do almost systematically seem to practice doing this. There is a book called, I believe, "Language of the Crib," in which two parents who were both linguists tape-recorded their son's babblings during the half hour or so before he fell asleep each night. I think he was 15 or 16 months old–it was just that critical period when he was beginning to use "real" words. They discovered that he was doing things like this: "Daddy go, maddy go, faddy go ..." He was taking a sentence that he could make and substituting for one word others which sounded like it. He was testing what sounds you could put in front of "go" which still made something that sounded like a sentence. This went on, with this baby, for several months during this early period of language mapping.

Learning language is obviously an active process. We don't "just learn" a verbal map. At the same time that the baby is hearing the sounds made by others he is beginning to make sounds of his own. He's inventing maps. Most children go through a period during which they have all kinds of private words that don't mean much to anyone else but which mean something to them. They have their own names for objects, perhaps based on a mishearing of something that someone else said or perhaps just pure inventions. These are parts of their map at that time. They aren't part of a socially accepted map and so they're not much use to anyone else and aren't too good for communication, but they do represent an important part of verbal map-making. Gradually, of course, those parts of the map that don't correspond to what a child hears tend to drop out. Perhaps in part this is why we often find quite remarkable some of the things young children say. When they begin to have lots of words and some useful ways of putting them together they often come up with some breathtaking juxtapositions of images. They haven't learned yet that you "don't do this" in English and that generally you get approval for sticking to the straight and narrow path. (Perhaps those who don't learn this lesson become our poets!)

By the age of three or four the child has at his command a substantial part of his native language. He doesn't have all the fine points and he certainly doesn't have all the words, but he has the basic grammar, the "feel" of the language and this allows him to do that most remarkable of all things, invent new sentences. B. F. Skinner would like us to believe that language is nothing but a series of conditioned reflexes, that we get rewarded or we don't get rewarded and we say what we've heard and have been rewarded for saying. But

this is *not* what happens with language at all: a large percentage of the things one says have never been said before and are not things one has heard. The words have been used but the context is new. Conditioning cannot explain invention. (This is the argument of the linguist Noam Chomsky who has done battle with Skinner on the issue of how language is learned for more than a decade.)

There, then, we have various kinds of maps and there are others–maps of kinship, maps of social behavior, and so forth. By the age of four or five, certainly by the time children enter school, an enormous amount of map-making has gone on.

Now I want to assert something which seems to me to follow from what I have said so far. Mapping, I have suggested, is the fundamental human activity: it's the thing that humans do all the time and that most other animals can do, if at all, only to a very limited extent because mapping so quickly comes to involve making symbols and using them in a flexible, creative way. Since mapping is essentially human, it seems reasonable that map-making ability has been involved in the process of natural selection and that over eons people not equipped mentally with the capacity for mapping, mapping which is necessary for survival, have simply not survived. In addition to his strength and his fleetness of foot, man required mental agility, map-making capacity, in order to survive. I think this is a reasonable assertion. Now, go one step further. Any human being who is capable of growing into an autonomous individual must have such a great map-making ability, so much more ability than is ever used, that differences between individuals, compared with the total ability all have, are very small indeed. In other words, all of us have vastly more map-making ability, inventing ability, learning ability than we ever use and in relation to this potential individual differences are probably insignificant. This is a statement which I doubt can be proved, but equally, I don't think it can be disproved and it may be useful to accept it and see where it leads us.

To me the implications of this are profound and surprising. One implication is that at the moment of birth all people are capable of anything: at the moment of birth, nothing is ruled out. This idea was first suggested to me (not in these precise words) by David Hawkins. When he asserted this I was predisposed to argue with him. I said, "Do you mean that Picasso could have become Casals?" David said that a more interesting question might be, "How did Picasso become Picasso?" What happened to that baby which enabled him to grow up into a great artist?

We don't know much about this. But it may be worth thinking about some of the influences which, from the first days or hours of life,

set people in the many directions they go. The great painter and the great musician are not interchangeable. But what I am suggesting is the possibility that the artist, the poet, musician, teacher, scientist are not born with these specific potentials but that these outcomes depend on things that happen to them, things that they do along the way.

What are some of the things that can happen? A few of you were watching the stream table today when the water first started flowing onto the dry sand. It seemed almost random which direction the water started flowing in when it came out of the tap–the sand *looked* smooth. But some slight unevenness channeled the water in one direction rather than another. As soon as it started flowing in one direction it made a channel and this became deeper and broader: the water coming from the tap subsequently could not as easily go in any direction. We saw this happen again and again–some small, even imperceptible irregularity in the sand would redirect the water and as soon as this happened that direction was well set and a channel was formed. This may not be a bad, though partial, model for what happens in human development. Perhaps something catches the baby's attention very early. In Picasso's case it might have been a pattern of light or a color; he may have noticed something in the visual world which riveted his attention, for reasons we don't know. Chance? Perhaps. Having noticed something, he noticed it again, noticed other aspects of it, began to think about it, began to perceive the world in highly visual terms. The musician may have noticed first, for some reason, sounds, and begun to listen carefully. It's the nature of such a chain of events that once something happens other things follow from it, while still other things may be prevented from following.* A small beginning can have all kinds of ramifications. The further the chain of events goes the less likely it becomes that this person over here can switch directions and become that person over there. This doesn't mean, of course, that each person develops in only one direction or that substantial change may not occur.

* Again I am indebted to David Hawkins for suggesting this line of argument.

Unfortunately there are many factors which can prevent a person from having the feeling that he has gone along any path at all. There are a lot of environmental factors which may make it difficult for people to move sufficiently far in the direction of mastery, of map-making, so that they have a feeling of satisfaction, so that they have some maps they feel good about. Perhaps the early environment is threatening rather than rewarding. Perhaps the baby's first attempts to reach out, to touch and look are not rewarded, perhaps his first babblings are not welcomed. Perhaps very early he is made to feel that exploration is dangerous, not approved. Well, the chances are he is not going to explore as freely as is the child whose early mapping,

his first explorations, his first babblings, his first attempts to make sense of things are valued. I suspect that very early children begin to feel confident or hesitant about map-making and this will have profound implications for the ways in which they continue.

Some children are born into families where the adults may all be competent and enthusiastic map-makers. If they have marked preferences for certain kinds of maps it's possible that these children will tend to explore in similar directions. The Huxley family is a good illustration of this. Many of them became scientists and their children were born into an atmosphere which encouraged certain scientific ways of thinking, of asking questions. The family must have looked upon its children as young scientists–and an amazing number eventually became Fellows of the Royal Society. We know that this kind of thing happens in the development of language. Children born into families where language is used fluently and with pleasure tend to develop a more fluent use of language and get more pleasure from it, are more capable when they start to read. They have around them a lot of examples of people using language;they get a lot of rewards for their own efforts.

There may be other factors at work. People may be born with different metabolic rates and this could affect, among other things, activity level. It may be, for example, that the child who lies passively as compared with the one who reaches out will have a more restricted range of early experience of all kinds. On the other hand, one could as easily say that he will think about his experiences more deeply. Here we can see how little we know about how these things work, but it does seem that there are a great many variables.

I think that what one can see in the way of mapping has a lot to do with self-esteem. The children who very early begin to feel good about their own attempts to make maps will make more maps. The children we see in school who are good map-makers, who move confidently into new territory, who take us into their territory and share their maps with us, these are the children who have a lot going for them. But there is also evidence that even if you haven't shown outstanding mapping ability from the earliest days, such ability and the confidence that goes with it can develop at almost any time. Something may happen which sets a child (or an adult for that matter) off in a direction which becomes very important to him. A good case might be Darwin. As far as I know there is nothing to suggest that he was an unusually gifted child. He was interested in collecting things, but so are lots of children. He grew up in a family which expected its children to go into one of the professions; so did many middle-class families. It wasn't until he was at Cambridge that he really seemed to

come alive intellectually. He said, as I recall, that he came to know a biologist who "seemed to like to have him around," who found his questions interesting. And so the map-making became directed and then came the happy chance to sail on the Beagle–and the rest is history.

You don't have to go to someone as famous as Darwin to find examples of someone suddenly getting "hooked." I know a girl who is now fifteen and looks like what you might want to call a born musician. She's a good violinist, an excellent guitarist and is now writing songs of real musical value. But she was *not* a born musician and until the age of nine or ten showed very little evidence of special musical interest or ability.

Here's another example. I recently saw a boy named Michael in his classroom. I was told later that for the first four or five years of his school life he showed no particular interest in anything and was considered very average. Then this year he came into a class with a gifted teacher who was interested in all things natural; there were rocks, fossils, shells, animals ranging from guinea pigs and gerbils to stick insects and so forth. Michael became fascinated by rocks. He began to sort them, read about them, ask about them, classify them, talk about them, write about them. His knowledge of rocks quickly became almost encyclopaedic and his general liveliness and curiosity and apparent self-confidence were a pleasure to see.

The idea of specific born gifts which lie dormant for years and then emerge seems to me at the very least inelegant. You have only to say, "Michael was born with a rock classifying gift which took nine years to reveal itself" to see how odd, if not ridiculous, it sounds. It is much more likely that Michael was born with what all children are born with, an enormous capacity for an infinite range of things, and this year this capacity became channeled in a way which it hadn't before. So Michael goes off on geology and this interest may lead to other things, especially if he is with people who are interested in other things. It may lead to an interest in other natural phenomena, it may lead to a broad general curiosity about many aspects of the world and, very important, it may lead to a feeling of being capable, of being a successful and valued map-maker.

I think there are a great many implications of what I've been saying. If we take it seriously it should have a considerable effect on our attitudes towards children and what we do with and for them in school. It means that there are no average children, there are no slow children. There are children who have not discovered the pleasures of map-making and have not felt the success which leads to further

exploration. This is not because they lack potential, but because as yet nothing has set them going. We have to find out what might do that.

Easter 1970

18

SOME THOUGHTS ON APPLIED PIAGET

Here is a transcript of a small part of a film suggesting ways in which teachers can use some of Piaget's experimental tasks as means of finding out about children's mathematical progress in the classroom. The film is part of a series entitled "Children and Mathematics" prepared by the Nuffield Mathematics Project and presented on the BBC. The scene I have transcribed shows an adult (not, I think, the child's regular teacher) and a boy of perhaps six or seven who has on the table in front of him three tulips and six or seven daisies.

Adult: Are there more flowers or more daisies?
Child: More daisies.
Adult: More daisies. Right. Now, I'm just wondering whether there aren't more flowers because the daisies are part of the flowers, that's right, isn't it?
Child: Yes.
Adult: And the tulips are also part of the flowers?
Child: ... (does not reply)
Adult: The tulips are included in the bunch of flowers?
Child: ... (does not reply)
Adult: Is that right?
Child: Yes.
Adult: And so the whole lot of them are flowers. Now, I think they are all flowers but only these ones (pointing) are daisies. So I think there are more flowers than daisies.
Child: ...
Adult: Now, does that make sense?
Child: ... (after a long pause) No.
Adult: (with a chuckle) Are there more flowers or more daisies?
Child: More daisies.
Adult: More daisies.
Commentator: Who would imagine that this is the child's view of the world?

Who indeed?

It is dangerous, I feel, to suggest the use of this kind of Piaget technique as a classroom assessment technique, because a little Piaget can be very misleading. Let me say at once that I believe there is much validity in many of Piaget's suggestions about the order of development of mental skills in children. Let me also say, however, that an experimental situation such as the one portrayed here does not, in my opinion, shed light on the child's thinking about part-whole relationships nearly so much as it sheds light on his willingness or, in this case, unwillingness, to engage in a type of classroom dialogue with an adult the rules of which are known to both–the child's job is to figure out what the adult expects him to say and the adult's job is to make this as easy as possible for the child. This little boy displayed remarkable honesty, I felt, and considerable willpower in resisting making the statement that the adult was trying to suggest. (Actually the thing is more devious yet, because knowing what the Piaget stages are, the adult probably is hoping that the child will *not* say there are more flowers than daisies.)

On the evidence supplied, then, I think we cannot infer anything about this boy's understanding of part-whole relationships. It is quite possible that his understanding is poor, but I am quite confident that in meaningful situations in which part-whole relationships had to be dealt with operationally, he would show more comprehension than in this abstract verbal sparring in which he is scarcely free at all to think about the *things* in front of him.

I have found it revealing over the past few years to inquire of children and adults whether there are, or were, more children or people in their families. The following is a representative dialogue:

Me:	How many children are there in your family?
Child:	Three.
Me:	How many grown-ups?
Child:	Two.
Me:	Are children people?
Child:	Yes. (Although some children, even of nine or ten, need to stop and ponder this.)
Me:	Now, are there more children in your family or more people?
Child:	More children.

Alternative answers have been on the following lines: 1. Huh? You can't ask that; 2. More children, naturally; 3. Huh? What do you mean? I think I can say accurately that out of perhaps 20 children I've

asked this question of, no more than one or two under the age of ten have given the correct answer to my question. In addition, I have received the same answer from several intelligent adults. Note that if my question had been, "Are there more children or more *adults*?" the answer given would be correct.

Let me adduce one further bit of evidence that all is not straightforward in some of the Piaget situations. Joan Tamburini, of the Froebel Institute, told me last year of a student of hers who was replicating one of Piaget's classification experiments. In this, the child is given a number of miniature representations of cars, people, dishes, silverware, etc., and is asked to put together those which he feels belong together. Young children invariably classify according to some seemingly chance or superficial scheme: perhaps they put the car with the plate because they had a picnic in the country, etc. Tamburini's student, however, finished by asking the children if they would put the various pieces back in a box. And this time they quite easily and naturally grouped them in a systematic way, the vehicles together, the eating utensils together, etc. What is one to conclude about their ability to group? Surely the conclusion is that when presented with things to play with they will play, and their play will follow its own rules, but when asked to tidy up, they will follow a more adult, "logical" convention for sorting. Do they or don't they have the concept of putting likes with likes, of grouping according to function? Well, it all depends, it would seem, on what task they think has been set for them.

Quite apart from the merits or disadvantages of any particular test situations, I seriously question whether teachers of young children especially should be encouraged to engage in any sort of formal evaluation of the progress of children in their classes. I realize that the desire to test is a strong one, and it may be that a skilled teacher who was aware of the verbal complications of some of the Piaget tasks might be able to gain some insight into children's thinking on the basis of them, certainly more than by using traditional tests which involve setting purely symbolic problems with paper and pencil. But surely a teacher skilled enough not to be led into misreading the results of this kind of situation, a teacher skilled enough to avoid the blatant "answer-pulling" the adult in the film engaged in, is skillful enough to find evidence in the child's everyday activity and in casual conversation with him, in his own speech and his writing at the appropriate age, of how he stands with respect to important concepts such as enclosure, part-whole, conservation, "if-then." This kind of deliberate testing seems to me very like the gardener who pulls up his newly planted flowers to see if the roots are growing: it betrays an impatience which is surely out of place in the classroom.

There is another danger in this kind of testing and, indeed, in all testing, but especially with children. This is the danger that we will assume that the child who does meet our criteria, who does "pass" our test whether formal or Piagetian, has reached, once and for all, a given level of mastery of a particular concept and that we will then base further work on the assumption we have made. In fact, attainment of concepts is never such a clear-cut matter and I suspect that one could find situations involving conservation, say, which would "prove" that most adults have not really grasped the concept. As for the concept of enclosure, we know on the basis of work with attribute materials that this is an exceptionally difficult concept at times: few people, children or adults, have been readily able to deal with all the problems we have invented embodying it.

I suggest, then, great caution in "testing" young children and, more generally, in mistaking the ability to verbalize a concept or to deal with it symbolically, for a grasp of the concept in operational terms.

1966

19

AWAY FROM STAGES

Few adults crawl. One might reasonably say that we pass through and leave behind the crawling stage. The stages model of growth seems less convincing when applied to mental development. It doesn't feel right to me; it doesn't adequately explain my own learning or my observations of the learning of other people, adults and children.

Learning is less a process of moving through stages, casting off and leaving behind, than a process of accretion. Old kinds of thinking modify and are modified by new kinds. We all find in our thinking elements which can only be termed "childish"–if, that is, our model of learning requires that some thoughts be labeled "childish" and others "adultish." Similarly, children are often capable of careful, rational, "adult" thinking.

Piaget discusses several stages of thinking and suggests a linear relationship between them: pre-operational–concrete operational–formal. The terms themselves seem apt descriptions of processes which do occur. It is the way these processes fit together that I want to examine. Perhaps the linear, stages model can be revised to reflect more acccurately what intuition says is true.

Edward Blishen, in a splendid essay called "The dialogue between teacher and taught,"* speaks of fantasy as "... a making of wild sense in areas where the making of rational sense is not yet possible." This seems to me an excellent description of pre-operational thinking, which is fantasy in this sense of the term. It is important to note that wild sense is often good sense. The young child who says that trees make the wind has a point: if you wave a branch you do create a breeze. This can be called pre-operational only because of the limits of the child's experience of operations and of his ability to tie together elements of his experience. He may not recall that he once blew at a leaf held in his hand.

* In *The World of Children*, Paul Hamlyn, London, 1966, p. 63.

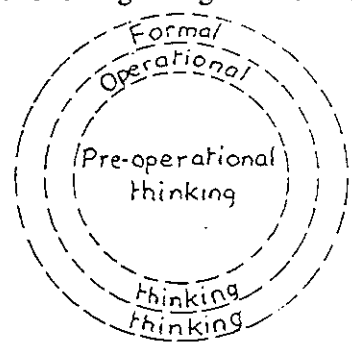
No kinds of thinking are the exclusive property of a given chronological age. The child for whom trees make wind has a two and a two but does not yet see how they make four. Many adults, however, are also poor at addition, now and then. I can illustrate this with a painful experience of my own. I have many operational concepts about my car and I probably have a formal concept or two about

internal combustion. One evening a couple of years ago I switched on the ignition and found the system stone dead. After peering dimly and frantically at the engine I rang the Automobile Association and waited miserably for two hours. The mechanic arrived, tapped the battery, said "Cable was loose," and departed. For all the playing about with batteries and bulbs I had done, in the context of the car all my operational concepts about electric circuits had come to naught.

The same incident illustrates another aspect of learning. My first reaction on discovering that the car was out of order was, as always, a strong urge to give it a good swift kick–a most pre-operational impulse (though strangely one which has often seemed to improve my television reception ...). Added to the impulse, however, were certain restraints learned over the years, highly operational restraints, and so the car was spared.

I hope I need not press the point further. To say that adults have put behind them all things pre-operational is untrue. It is equally incorrect to imagine that even young children have not developed a useful store of operational concepts: without them survival would be difficult.

If, then, we can't accurately speak of leaving stages of thinking behind us, do we discard Piaget's terminology? Not at all. We use his labels to build a better model. Rather than the linear sequence of stages, I suggest the following arrangement of modes:



This picture suggests that modes are incorporated within other modes, with pre-operational thinking at the core and with highly permeable boundaries, reflecting the ease with which we move among the modes. The young child has many pre-operational concepts and few formal ones. The adult, with a larger stock of operational and formal concepts, still retains a solid core of pre-operational thinking, "wild sense."

Bruner once wrote something to the effect that, "When you have developed a concept, you can't again look at the world as though you hadn't developed it." Precisely. No matter how capable we

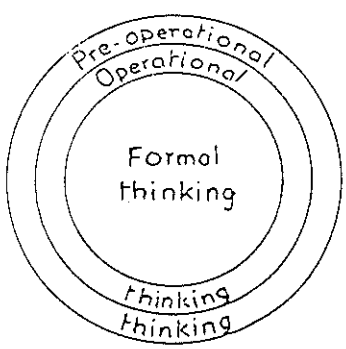
become at thinking concretely and formally we must be influenced by all our cumulative attempts to make sense of our experience. Not only *are* we so influenced, but we *should* be.

Reading some accounts of scientific discoveries (not fictional accounts as provided by some textbooks which tidy things up retrospectively) one can see evidence that scientists employ many kinds of thinking. I especially like the account, retold by Polanyi** of Einstein at the age of sixteen developing the intuition that the speed of light is a universal constant by imagining what it would be like to pursue a light beam through space. This bit of fantasy (which undoubtedly followed much formal thinking) gave rise, ten years later, to the theory of relativity. I suspect that few first-class scientists try to "be scientific" at the expense of easy access to their own wild sense.

** Polanyi, M., *Personal Knowledge*, Routledge, London, 1958, p. 10.

From the teacher's point of view this last point is crucial. Education has traditionally been greatly concerned with hurrying children along toward formal concepts which, even if attained, may not have a sufficiently firm underpinning of experience and reflection. It is not just education in schools which does this kind of hurrying. At least in the Western world almost all of child-rearing is based on the premise of forward movement, of leaving behind that which seems (to the parent) no longer appropriate. How often, for example, does the admonitory phrase "act your age" really mean what it says? My observation is that it almost always is directed at a child who *is* acting his age, and that it really means "act older." In school the equivalent phrase might well be "act your stage." Children are chivvied along towards the kinds of thinking adults pretend they always engage in, thinking that is free of fantasy, trial-and-error, utter bafflement.

A model which represents the implicit aims of traditional education–and some which are not so traditional–might look like the previous drawing, but turned inside out:



Here we see a large area of formal thinking at the core, a small layer of operational thinking in which it is acceptable to dabble now and then if things *must* be tried out, and a fringe of pre-operational thinking or fantasy–once you know something it may be all right to have idle, fanciful thoughts about it. The solid lines are intended to suggest that according to the traditional view it is essential always to know what kind of thinking one is doing, and not to let the various kinds of thought get mixed up.

What a perversion of common sense this model embodies! If teachers succeeded in fitting pupils to it they would have produced robots, dull, pedestrian, capable of dealing admirably with tasks for which they had been programmed, incapable of imaginative thought. Most people don't bend so easily, but as it is most education does result in large numbers of people having little ability to think as freshly as they did before they went to school. These are the solid citizens whom traditional education has made sufficiently guilty about "childish things" so that they replace with hermetic seals the permeable membranes which in younger and healthier thinkers permit commerce among the modes of thought. And, of course, the insufficiently grounded formal thinking these folk do is not likely to be very satisfactory. It may largely be empty words.

I have referred to traditional education, but even some quite "progressive" education has done strange things. The progressives whose schools I attended, schools which were in many ways admirable, did not pretend that fantasy was unimportant to children. For some doctrinal reason, however, they didn't want fantasy to get mixed up with rational thought when the chips were down, in dealing with the earnest, workaday world. Piaget was not yet in fashion but these progressives had a strong sense of stages. They were willing to let us recycle and return to fantasy now and then, but only during periods carefully labeled "Art" or "Creative Writing" or "Play." When we were involved in "Science" or "Current Events" they seemed fearful lest we depart from a model of total rationality which, they appeared convinced, was always applicable.

One can speculate endlessly on the reasons why people who would like to manage children's development are so afraid of the continuing presence and potency of the core of wild sense. Many adults, being a bit tired, harassed, being always busy and goal-directed, may feel threatened by the tremendous energy they see children spending so recklessly. John Holt argues that much of this energy is directed towards becoming more competent, more like "the big people." But much of it is unfocused, and leads to a tearing about in a world not yet required to make rational sense at all times, a world

to be experienced first of all and then reflected upon. Being threatened, adults may try to curb children and impose upon them the limitations of adult fatigue. Having worked so hard for so long to get a precarious grip on their surroundings, many adults can't easily tolerate the sight and sound of children who, in their exuberance, may occasionally knock down the walls and trample on the flowers.

Semanticists use a phrase I've long been fond of in the context of teaching: they speak of "time-binding," the ability to bring past and future together in the present. In terms of the model of development I have suggested here the teacher might be thought of as a layer-binder. She encourages children to move freely among the modes of thinking available to them (doing this in part by being free herself) while helping them to extend and develop each mode as it is relevant. As she helps children develop skill in operational and formal thinking, she must take care not to make them feel guilty when they move outward from the core with a bit of wild sense with which to enrich logical thinking or when they move inward with a bit of logic to enrich the wild sense.

5 June 1968
Mathematics Teaching, Winter 1968
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MEMOIR

In the following pages Frances and David Hawkins recall the Tony Kallet they knew.

Beginning in San Francisco Frances Hawkins taught young children for many years. Later she undertook teaching and consultancy work with early childhood groups and programs across the United States. She is the author of The Logic of Action *(Pantheon Books, 1974 and University Press of Colorado, 1985), a study of four-year-old deaf children, and a forthcoming professional autobiography,* Journey With Children.

David Hawkins is Distinguished Professor of Philosophy Emeritus at the University of Colorado and was Director of the Mountain View Center for Environmental Education 1970-82. Among his publications are The Language of Nature *(Freeman Press, 1964),* The Informed Vision: Essays on Learning and Human Nature *(Agathon Press, 1974), and* The Science and Ethics of Equality *(Basic Books, 1977).*

Throughout a quarter of a century Tony Kallet was one of the bright angels in our life. According to the old stories angels bring messages from another sphere but are devoted, according to their lights, to this one. Tony's light was his quickness of wit–permutations and combinations of words, ideas, numbers, or musical themes were always at the tip–and you had only to mention some really fresh topic of maths or science or politics to see the glow.

Tony's other sphere was for him not far away; it was the world of childhood. As a precocious young musician he had himself missed out on the carefree fun of that world. He built his bridges back to it, as all adults ought to do and teachers must, with a very special devotion. The traffic on Tony's bridges was always there for children's learning and above all for the fun of it.

When we first met him in 1962, Tony had just left the world of research in academic psychology, the study of the "gifted." He knew all children were gifted and had decided that the atmosphere of small tests and large numbers was a poor way to study them. He had

therefore taken an internship at Shady Hill, a prestigious private school in Cambridge, Massachusetts, and came one day with two other interns to visit our shop.

That shop was the Elementary Science Study where we were embarking on an effort to create new ways to help children explore the world around them (Tony wanted always to say "worlds," not "world") and for teachers to support them. Bill Hull and David Armington were the other two good men who visited us that day.

Our visitors came at the invitation of Frances who had met them while visiting Shady Hill. What caught her in those early meetings was a childlike quality of Tony's. He was not polite about bestowing his interest but once it was bestowed he gave his full attention. It was the topic of balance that had recently fascinated Frances which captured Tony's deep interest. From then on he was always with us in spirit.

Our long and loving friendship with Tony flourished, inevitably if irregularly, during the years he spent in Leicestershire. It was an association with advisers and teachers that Bill Hull had pioneered and Len Sealey* first welcomed. Tony was soon on his way there, Tony the advisor in peripatetic-teacher clothing. We visited Leicestershire several times, twice for the primary teachers' Easter courses at Loughborough and once on an extended three month visit to Leicester University.

* Len Sealey was Adviser for Junior Schools, Leicestershire, 1955-65.

It was a happy world for Tony. New friends shared his commitments and his questions. We think especially of Mary Brown and Bill Browse, John and Dorothy Paull who valued his insight and delighted in his way of being. We sometimes went with Tony on school visits and saw something of the way he could clothe fresh subject matter for teachers and children with interest and excitement, music especially but also whatever else was uppermost at the time in Tony's extensive repertoire.

The story of Tony's Leicestershire years is for others to tell. A detail or two stand out. Tony and David often had conversations about scientific matters, deep or trivial. Tony was fascinated, for example, by the art of large number estimation–the number of breaths or heartbeats in a lifetime, of leaves on a tree, of sand grains on a beach. He was good at it; we think he invested this important art with charm for a good many adults and children. He would often turn to Frances for long discussions of young children.

Tony once wanted to know why the noise you hear on the radio between stations is called "white noise"–a scatter of random frequencies of sound, as of light. Tony the superb musician was exquisitively sensitive to sounds of all kinds. His ears were tuned

always to a kind of vision, of ear-sight, of what was going on in the world around him. Faint noises in the night could catch his full attention and reinforce his insomnia. During one Loughborough Easter course we were all housed in a high-rise dormitory. Tony got up at midnight on the first night and drove the long distance to his apartment to retrieve his radio. Tuned between stations the white noise obscured the sounds of the lift, of the faint gurgling of the water pipes, of what he called the building's "metabolism." Then he was able to sleep.

Shortly after our last visit to Leicestershire in 1968, we received financial support for some advisory work of our own in Boulder, Colorado and vicinity. The Ford Foundation was interested in our commitment to what we called environmental education by which we meant education through the environment not just about it. Tony came to be on our staff as did Ron Colton* from Northumberland and with John and Dorothy Paull** seconded from Leicestershire for a year we were off to a good start.

Tony promptly began to enrich our environmental emphasis by explorations in the everyday world of sound and some extensions of it, linking it to expression and music. Hung high in his workroom was a string of potlids to be struck, a scale of pure tones never duplicated before or since. There were also xylophones, both home-made and Orff, drinking glasses carefully selected and arranged in various intervals. There were many environmental sounds carefully recorded–the squeaking of a door or mailbox, the glissando made by a jar being filled with water or by a metal slinky vibrating in a stairwell. These were all grist to the mill and Tony soon gained a following of teachers, both musical and non, all excited by the discovery that music is a far deeper and richer subject than conventional teaching allows.

Tony was a person who grew in unusual ways and at an unpredictable tempo. We were quite sure Tony would always be the sedentary one but there was a steep little hill behind his first apartment in Boulder, a kind of first step into the Rockies just west of us. Tony climbed it one day and that was it. Soon he had equipped himself with proper boots and other gear and become a proper hiker. Then he discovered the deer, a band in our near hills. Tony became their admirer, their photographer, their familiar.

When after ten or eleven years our funds were being cut and our staff was shrinking, Tony saw his chance for a new adventure. He became a private music teacher for children and once again the commitment was absolute. In the small house he bought, his studio took half the space. We loaned him a small grand piano which he then

*Ron Colton, from the University of Newcastle upon Tyne, had been Director of the Schools Council "Project Environment."

** John Paull was Advisory Teacher for Environmental Education. Dorothy Paull was teaching at Anstey Latimer Junior School.

thoroughly recommissioned. There were also drums and xylophones, strings and horns, records and tapes, a library of music texts.

Tony was soon welcomed into the local society of musicians and teachers. He returned for a time to his first instrument, the 'cello. The tone he produced, he was amazed to discover, was still as good as ever but the fingering was too much to regain. So he turned to the piano, not for the easy style he had always had with it, but for that of the concert. We witnessed this absolutely Kallet-like devotion. One or two of Tony's young students had talents that could lead to the concert stage and that was his deep delight.

Meantime the teacher in him was growing in insight and assurance. All of Tony's children flourished. They mastered rhythms, they listened and discussed, they improvised–Tony was a master of duo improvisation–they learned to read music, they composed. Those who already had been set to the piano or the violin continued with their former teachers. Tony was not interested in the teaching of technical skills as such but in children's love and understanding for music. This did not seem at all to threaten the other teachers. They valued it and sent their children to him.

By the time his last illness began to affect his work, Tony had a young clientele of thirty or so and a long waiting list. As his illness became increasingly debilitating, we saw him more often than a busy schedule had allowed for some years; gave him, we think, some comfort; and once more marveled at this man, this child, this poet and punster, this artist and teacher. One will not ever see his like.

CODA

Shelley Schlender of Boulder, Colorado, captures the essential mood and structure of Tony Kallet's teaching in this narrative of her young son's music lessons.

Walt is five years old. He can't read notes. Tony was fifty-five, with a post-doctorate in psychology from the University of Chicago, years of early childhood training, vast musical knowledge, and an enthusiasm so infectious, Walt never noticed the difference in age or expertise. Week after week, in half-hour sessions with Tony, he simply noticed the joy.

The first music lesson Walt ever had, Tony ushered us in with a joke and a grin. He directed me to a visitor's chair, motioned Walt toward his many instruments and, in his hearty English tenor said, "I like to start with the drums. Shall we?"

Screwed to the underside of a table were cup hooks. From these, Tony hung a large drum and cymbal, putting them down at kid level. He placed three smaller drums on the floor. (Three, orange-handled grippers were clipped to each of these drums, like legs, to hold them above the floor so they would resonate.) Tony sat on the carpet, cross-legged. Walt sat opposite, the drums in between.

With a conspirator's grin, Tony asked, "Would you like to play a game?"

Walt's eyes lit up. The sneaky, delicious grin spread to his own face.

Tony said, "I'll play something on the drums, then you try to play the same thing." He started simply, but on his concert-quality drums, with his lively touch, the rhythm sparkled. It was also so easy, Walt played it faultlessly.

"Like that?" asked Walt.

"Perfect! Now try this." Tony played something livelier, more complicated.

Walt matched it.

"Now this." More complicated still.

Walt furrowed his brow, pressed in his lips, and in the next moment matched Tony's rhythm again. He looked up, grinning.

Tony laughed. "Very *good*! All right, it's your turn. You play something, and I'll try to follow."

This musical game of Simon went on for five minutes or so, filling the air with the tong and skip of drum songs, Walt giggling, Tony smiling, joking, giving praise, and occasionally aiming an adult observation my way, such as, "Rhythm is such a basic component of music, I spend a great deal of time on drumming." I knew he was talking to me because he turned my way, but his tone was the same as when he addressed Walt: Matter-of-fact, friendly, and adult. In fact, Walt cocked his head and nodded, reflecting on Tony's comment as he drummed away.

Tony began a secondary rhythm over Walt's steady beat. Walt giggled, shut his eyes, and whapped at the drums. Since Walt's eyes were closed, he didn't notice when Tony's face took on the expression of a connoiseur who has just sipped a sour wine. Tony kept his tone friendly, however, and urged, "No, now, just a little quieter. That's it. You've got it." His expression relaxed; he let his head sway to Walt's drumbeat, then smoothly as a dancer stepping onto the floor, Tony again drummed with Walt. Again Walt flailed, assaulting the air with a smatter of noise. Tony didn't frown; he didn't scold. He waited until Walt looked up; he grinned and said, "Want to try something else?"

By the end of that first lesson, Walt had bonged on a turtle shell, strummed some squeaky notes on the psaltery, and toodled on the piano. Tony had even taken plastic poker chips and dropped them on the wooden table to show that mundane objects can be musical and that two objects that look the same (such as identical chips) often produce different notes.

All week we perked our ears to unexpected, musical sounds. Walt, his three-year-old brother, Amory, and I bonged pan lids with wooden spoons. We filled glasses with water and tapped them lightly. Walt played the piano and listened to favorite records. At next week's lesson, he raced to Tony's door.

Tony greeted him with, "An elephant! Just what I needed! Hello, Mr. Elephant."

Walt's mouth dropped open. He squealed, "I'm not an elephant!"

"Oh? Who are you?"

"Walt!"

"Well then, come in."

This lesson, Walt bonged on the front, sides, upside-downs, and inside-outs of all the drums. Tony complimented him, praising his desire to experiment. Next Walt tried the piano, and especially

striking was how often he picked unusual scales, like the Phrygian, the Ionian. Not that Walt knows anything about formal scales, but because he was listening closely, the logic of these scales structured his exploration. It gave me an intriguing insight, that a child doesn't naturally fall into the sing-song of nursery rhymes. A child's music can be simple but unexpected, like birdsong at dawn.

After the drums, the psaltery, a wooden tone drum, and the piano, Walt chose Tony's organ. Tony pumped it full of air. Walt put down his fingers, listened to the full-bodied sound, and grinned in ecstasy.

"Sounds marvelous," Tony said, then added, as casually as someone picking daisies, "Tell me, can you play a high note then a low note?" Walt complied. "How about the highest note?" Walt marched his fingers up until they had reached the highest note. "And the lowest?" Walt played it. "Very *good*!" Tony told Walt, then added, "My informal surveys indicate less than 20% of all children under the age of six understand the concept of high notes and low. This lad has a surprising grasp of music already."

Even though these words were directed at me, Walt, of course, had heard. "Aren't I really good?" he asked.

"You're doing *wonderfully*."

In response to this praise, Walt played a sweet, serene tune.

"Lovely," said Tony. "Now do you want to hear a really big sound?" He let out all the stops for a booming Bach chorale that, to my moderately trained ear, had some of the same rhythm and melody line of the invention Walt had just played. With his conspirator's grin, he asked Walt, "What do you think of *that*?"

Walt smiled sheepishly, gulped, and said, "I know how to swim."

Sitting in my visitor's chair, it was hard not to laugh. Tony glanced my way, eyes twinkling, then turned back to Walt. With that nonchalant, pick-the-daisies air, he said, "You know how to swim. Well, that's very nice. Play something else for me now."

Timidly Walt touched the keyboard. Soon the deep sound of the organ restored his confidence. At the end of the lesson, he swaggered to the car.

And that's how it went, through summer and into fall, Tony gradually acquainting Walt with more and more instruments, stretching his abilities, pulling back when Walt got overwhelmed, then helping Walt become increasingly sure of his rhythm, his musical direction.

Sometimes, Walt went to lessons on his own while I ran errands. Just as regularly, I found an excuse to stay, for the music was

lovely, and besides–how often does a parent get to watch another grown-up with a young child, giving that child full attention, and them both having fun? Walt, without words, paid Tony his greatest compliment by becoming totally at ease with him, bantering away after drum practices, elbows akimbo, or leaning against Tony like he leans against me or his Dad when we read him a story.

I was learning how Tony always praised anything worthy. It *did* have to be worthy, however. There was none of the half-attentive, "Oh, that's very nice," to something mediocre. Tony looked for specific things that were good, and when he found them, he bestowed lavish, positive judgments. How lavish? In front of Walt, he would say such things as, "I have 12 year olds who can't hold a rhythm as well as Walt!" or "You have an excellent sense of pitch. Really quite remarkable in a child this young." Tony just as easily could have concentrated on negative judgments, such as, "You have trouble concentrating when another person is playing, too" or "Your songs are always short." But he never did. The generalized comments were always, *always* positive. Tony was being someone we all need, someone who can help us see our true, best selves.

That is not to say that he never criticized–Tony demanded plenty, but always against the clear, positive backdrop of what quality he was certain Walt could obtain, and always as concrete suggestions, such as, "Use the blue-colored drumstick. It makes a softer sound" or "Try taking your foot off the pedal more" or "Now, not so many notes. Slow down. That's right."

Tony was patient through the low parts, when Walt was silly, tired, or ill, and banged the drums, banged the piano, banged everything. Tony had studied and been around children long enough to recognize such behavior as a cue for him, the teacher, to change the pace, change direction, slow down and wait. That patience paid off–seemingly endless ebbs gave way to moments where Walt played something beautifully unique, and Tony pressed down his mouth to hide a smile, looking my way as if to say, "Did you notice? Isn't it wonderful?"

"Isn't it wonderful?" he said to Walt, after Walt had finished an improvisation. "Really, some beautiful, beautiful sounds." He laughed out loud.

Walt beamed. "Am *I* your favorite student?"

"You're one of them." Grinning, Tony shot a glance my way, attesting that he spoke the honest truth, true for each and every student he'd ever had.

The music, the concentration, even the games grew more complex.

One day I returned toward the end of a lesson and found them laughing. Tony was saying, "*What* did you have for *break*fast?" while drumming LONG short-short long, long, LONG-long.

Walt replied, while drumming, "A *cheese sand*wich." (short LONG, SHORT-short)

Tony drummed back, "A *cheese sand*wich?" (short LONG, SHORT-short) "*I* had *oat*meal." (LONG long SHORT short)

Walt bantered something back, and grinning, smoothly, Tony drummed along with him. Walt seemed not to even notice, but kept on talking and drumming. Tony grinned and glanced my way. Yes, without ever talking about it, a breakthrough–he was drumming a secondary rhythm, and Walt hadn't lost his concentration. On they bantered, the rhythm of the words directing the rhythm of the drums.

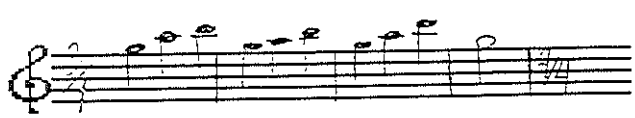
Finally Walt grew tired and lost focus, and this time *Walt* himself suggested that they do something else. Back to the piano, or the "hopsichord." ("Because of my accent, there will be a whole generation of musicians who think they play the hopsichord," Tony would say.)

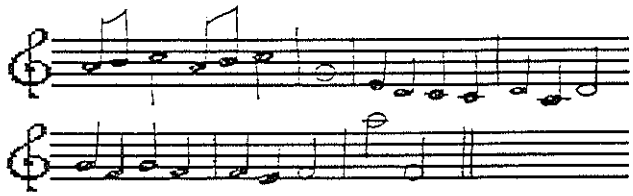
... "Where did he figure that out?" Tony would ask, chuckling. "Are you or your husband musicians? Do you sing around the home?"

And that gave Walt more support–that yes, he was on the right track. It gave me another clue, too, that yes, it was okay, all the silly songs we sang at home. That maybe, in our love of music, our boys have listened, too. What are the keys that unlock joy? At each lesson, I discovered more.

Early on, Tony had given Walt a blank music book. The book filled more each week, for Tony transcribed many songs that Walt created, letting Walt name them, silly names like "The Tubish Man" or thoughtful ones like "Coming to the Road." Tony always showed Walt the notes, then played them back so Walt could hear his song, preserved in the book. Sometimes Tony reversed the process, letting Walt write down notes before Tony played. Walt loved these written songs. He would bring them home, share them with pride.

The earliest songs were on simple instruments, such as the psaltery or the xylophone, where the natural spacing between the notes led to pleasant harmonies. Walt's first song, transcribed by Tony on August 18th, 1988, went like this:





"This lad has a nice sense of shape," Tony said, as Walt discovered ways to repeat rhythms and finish in a way that "sounded" finished.

Tony intermixed his own playing between Walt's, usually rich, solemn classics that Tony loved, but sometimes jazz, sometimes Bartok or Debussy, depending on what might be most similar to what Walt had just constructed. He also would turn on his compact disk so they could listen to a concert piece together. On recordings, Tony chose solo performances with a single melody line, and he put the score between them so he could follow the music with a pointer, commenting, "See? The music's going up ... Now down ..." *Not* saying, "And now it's time for you to learn how to read music," but instead watching Walt, waiting for the moment when the idea clicked and they could move ahead.

Walt came to appreciate the similarities between whatever theme he had invented and that of a more experienced master. Hints of those melodies, chords, and rhythms blended into what he played.

Technical progress also came as Walt watched Tony tune his instruments and learned how to bow on the psaltery without making it squeaky, how to play loud and soft on the drums, how to pump the organ, and most of all, how to use the piano.

"I know it's expensive, but a piano's really the best instrument to have at home because it provides the most opportunities to experiment," Tony said one day. "And after the piano, I'd say some drums."

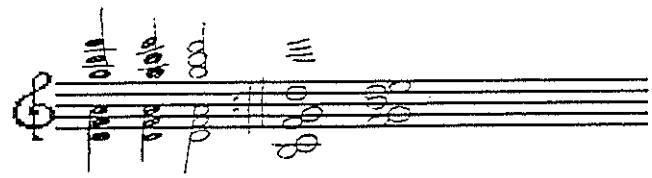
Walt was at the piano playing a one-fingered song, every now and then putting all ten fingers down in a mish-mash of noise. "Try leaving a space between two fingers," Tony suggested. "Just one white note. Yes, like that."

In one of those unexpected flashes, Walt suddenly understood chords. He played many combinations of two-fingered chords, varying the rhythms, setting up patterns, leaning his elbow on Tony's knee while he thought, then leaning forward in his chair and playing, and beaming.

"All *right*," said Tony. In spite of his proper English accent, he managed to convey the enthusiasm a basketball player might show for a dunk shot. "Mix in a black note, too."

And in this way, Walt ran into fifths and sevenths.

His first piece in the music book, with chords, written on December 8th, went like this:



Winter break was long, for Tony was having what he called minor surgery and needed time to recuperate. Waiting at home, Walt spent half an hour each day at the piano, trying different combinations of chords and chord scales, with the pedal down, too loud, too fast, tiresomely repeated, but slowly building his knowledge.

This practice often made us cover our ears; sometimes I told him to quiet down when the noise got too loud. For the most part, however, I was relieved that I could keep my mouth shut. Coming from me, asking Walt to slow down, to stop ramming the pedal, would be nothing but nagging. Tony would know the right way to focus Walt's efforts without discouraging him at all.

Winter break finally ended, and there was Tony, wan and grey, but nevertheless greeting Walt with, "Hello, Mr. Elephant."

Walt grinned, relieved. He pointed a finger at Tony. "I'm not an elephant, remember? You're a hippopotamus."

They told dumb jokes all the way to the piano where, without any warning or preamble, Walt played a set of chords I had never heard before. He held his fingers down. The air resonated the still great silences behind the music, and I could feel heaven, wide open.

By Tony's glance, I knew that he had heard it. Walt looked at Tony, his own eyes burning, for he had heard, too.

That wonderful quality of beautiful chords, heard for the very first time, continued.

Tony got out Walt's music book and asked him to play a song, saying, "Hold your fingers down a minute so I can get all the notes ... No ... keep them there ... that's right. Now hold it. Okay. What's next?"

Walt looked at the keyboard, brow creased, then put his fingers down. The chord was something I never would have done, yet it worked.

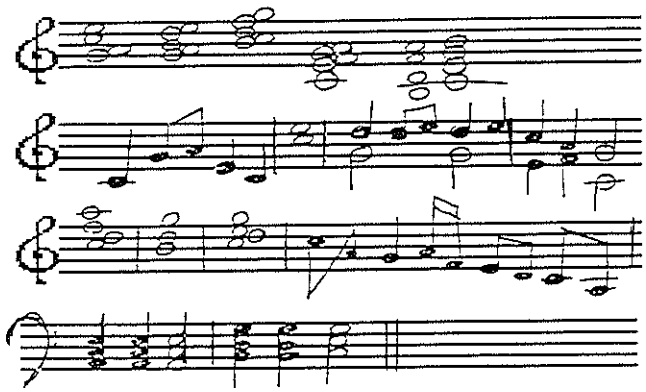
"This is what you've got now." Tony played the chords with great feeling, as reverently as if he were playing a mass by Bach. He

pressed his fingertips together as though measuring a millimeter. "Try just a little bit with just one note at a time, just for a little while."

Walt thought a moment, then complied. And it worked.

"Now, if I can suggest, an ending like this." Tony played the last three chords. "Do you hear it?" Walt nodded. "Do you want that there?" Walt nodded again. It was a delicate situation–the first time Tony had ever suggested adding to Walt's song, yet there was no hesitation in Walt's reply. They were a team.

The result was this song:



"What would you like to call it?" asked Tony.

Walt suggested three different names, finally settling on, "Lullaby."

"Lullaby Music. I think you picked just the right one." Tony looked at Walt, full of pride and joy. "Walt, you always play such *happy* music. You must be a very happy fellow."

Walt swung his legs under the piano bench then, with a smile of total contentment. "Yeah, I am."

Tony patted him on the back. "See you next week."

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