

David Cayley

Each of the different stages of mental organization appears in its own time. No amount of teaching can convince the child of four that a change of shape is not a change in volume. Maturation, not teaching, is the critical factor.

Eleanor Duckworth

There's a wonderful experiment either to do with the weight or the volume, but it's easier to do with the weight, for children who say there is the same amount of clay, but this one weighs more — this one will weigh more. Then you do it. You try it on a scale, and after the first time, some children will look at the scale and say, "Yeah, it's down there, a little bit more on that side. See, I told you it would weigh more." They sort of invent the data for themselves, whereas somebody else would look at the scale and say, "Oh that's right. They're equal, I can see that they're equal." And even further, a child could try a different shape and read the scale correctly and say, "Oh I was wrong, they do weigh the same. I thought it would weigh more, but they do weigh the same. Well, now I'll try a different shape." So he tries a different shape, and tries three or four different shapes, trying to find some shape that will confirm his deep belief that a change in shape changes the weight. But the scale will still tell him that they weigh the same no matter what shape he puts the other one into, they weigh the same. So there is that sort of accumulation of data that goes against his deep belief that it's got to weigh more if it's got a different shape.

But some children will be sort of defeated by the evidence. "Okay. I don't seem to be able to make any kind of shape that will weigh different, so they must weigh the same. I guess I was wrong. The shape won't change the weight." But then as an experimenter in Scandinavia — Smetslumol did. He did one last trial where he took away a little bit of weight from one of them, and weighed them so that they did — it looked as if they did weigh differently now, contrary to the four or five other trials the child had done. The children who believed that they would weigh differently, then say, "There, I knew that it would weigh differently. I knew all along that the shape would change the weight." And will go back to what they believed, and disregard the four or five other attempts that showed no difference in weight. Whereas children who believed already, not from data because they knew things would have to stay the same weight — when he did that with them, took off a little

piece, they would say, "Hey, what's going on here? What's wrong with this scale?" And neither of them is believing the data, each of them is believing their profound conviction about the nature of the relationship between shape and weight.

David Cayley

The gradual maturation of children's concepts culminates at approximately age 11 in what Piaget calls "formal operations". By this he essentially means the ability to think abstractly. Children are now able for the first time to manipulate ideas without reference to concrete reality. Jerome Kagan of Harvard believes that the discovery of formal operations will ultimately prove to have been Piaget's most distinctive contribution to developmental psychology.

Jerome Kagan

I think history will say that the most original idea was the idea of formal operations. And I say that because many observers of children, even lay observers, noted that there's a change around two years of age. Eskimo and Fijian mothers know that. English Common Law and the Catholic Church recognize there was a change around six or seven. Confession was now possible, the child was responsible for his crime. They didn't say the cognitive structures had changed, they didn't say the child was concrete operational, but they recognized the change, which was intellectual. But to my knowledge, and I'm willing to stand corrected by any listener of your program, and I read a lot, I have run across no one who ever said that at adolescence there's an important cognitive change. They said, there's a hormonal change, there's a motivational change — but no one ever said that it was a profound cognitive change. Piaget did. I think he's right, and I think you understand some of the conflicts of adolescence if you recognize that now the child can deal with the hypothetical, that now the child worries about the consistency of his premises and beliefs, that now he's able to exhaust all the possible solution hypotheses. Therefore if he's in trouble he can become depressed because he can recognize, "My God, there's no way out, there's nothing I can do." A five-year-old can't recognize that. That is very important and very original.

David Cayley

It is quite impossible to do justice to Jean Piaget's work in ten minutes, and my intention

here has been simply to provide a sketch from which key ideas can be derived. Two points stand out. First, that children's ideas undergo an inner development which is relatively independent of formal instruction, and second, that although the environment must provide models, materials and even inspiration, knowledge itself remains the active creation of the child. In short, the child's understanding develops in its own time and according to its own laws. The importance of this is that it can teach us patience, respect and a certain humility in the face of our children. As adults, we often try to impose both ideas and behaviours for which they have not themselves understood the need, and often in consequence these socializing schemes go awry.

Piaget of course has not provided us with a complete theory of development, nor has he claimed to have done so. He has tried as a philosopher to explain the origins of knowledge by examining the development of certain concepts like space, time, number, causality and so on, from infancy to early adolescence. He has done so as a scientist, and thus has tended to value most highly the type of thinking which he himself employs — formal, abstract logic. We need therefore to ask what types of thinking he may have undervalued or overlooked.

Richard Katz is a professor at the Harvard Graduate School of Education, and an anthropologist who has studied 'Kung and Fijian society. He argues that other cultures can teach us to value different abilities than the ones which we prize most highly.

Richard Katz

Well, I remember when I first read in Piaget and talked and heard about his emphasis on the child growing out of that kind of thinking which has been called so-called 'magical thinking', and wondering: was the end point of development: from an intellectual point of view or a cognitive point of view really becoming in the Western sense scientific, that is, able to make distinctions on a so-called scientific basis? Because that then leaves out the whole area of experience which is more intuitive, more poetical, really that area of experience in which the mind does not function in a logical or linear fashion, but functions in another fashion. And I remember thinking, gee, that doesn't really capture what I would see as the full potential of a human being. And the interesting thing is that

in many, many other cultures, the notion of logical linear thinking, the idea of a person being empirically scientific, making dichotomies, making distinctions, is not the most valued capacity, but equally valued is the ability to merge concepts, to see things as connected, to think intuitively. So that what we sometimes call "primitive thinking" is really not primitive, it's just a different mode of thinking. And I see the two as really parallel, and that rather than one being the foundation for the other, if we can encourage young people to keep alive the poetic and the intuitive, so that when this training in scientific thinking, making distinctions, making logical connections, when that training occurs, it doesn't overpower the intuitive, poetic and non-linear thinking.

Terms have been used, for example, that there's a difference between magic and science — these are two common terms that people have used, implying that magic is primitive thinking and science is advanced thinking. In point of fact, and there's been interesting research done by Tambaia, who's an anthropologist. He shows that both modes of thinking proceed according to their own logic. They have different assumptions about the nature of reality, and different assumptions about effects. The scientific model is convinced that cause and effect is the explanation for events. The magical mode is convinced that contiguity, events occurring close to each other, explains why they occur. Neither is superior to the other. With that kind of more open, democratic, if you will, approach to thinking, we can then talk about children who are raised to both appreciate the linear and the non-linear — the logical and the intuitive.

David Cayley

If we are to have the more open, more comprehensive view of development which Richard Katz proposes, then we will also have to include within it the emotional life of the child. We learn best when we are involved in our learning as whole beings. The act of knowing blends both thinking and feeling, and knowledge without feeling simply doesn't exist. Indeed, I think we can trace much of the anti-intellectual bias in our culture back to the negative feeling with which forced learning has imbued our knowledge. And yet in both schools and pre-schools, the emphasis often remains on teaching intellectual skills without regard for the feelings or wishes of the child.

Otto Weininger is the chairman of the early childhood section of the Department of Applied Psychology at the Ontario Institute for Studies in Education.

Otto Weininger

My work has really been an attempt, and continues I think to be an attempt, to reintegrate these two — what some people think of as different areas. For me, they're not different areas at all. I don't think that I can look at a child's development from a strictly cognitive point of view without saying that there is something happening emotionally to that child. And I don't mean emotionally negatively, I mean emotionally just in terms of living. Nor do I think that we can take a child and just talk about the emotional aspects of the child without also trying to involve ourselves in what is the child learning, and how is the child learning involved in this emotional situation. For a while now, for a long time unfortunately, ranging back to the twenties, the thirties, there's really been an attempt to really deal with what is called strict cognitive developmental aspects. So that what we're trying to do is we're trying to present to children specific aspects within the cognitive realm and teach them specifics. So we provide them with specific kinds of equipment.

Like in the Montessori school we might provide them with the golden beads, and we don't permit the child to explore the beads in any kind of constructive or functional way as far as their emotional development would suggest them doing. What we do is we lay out a pattern for them, and we say that we want you to do it this way, and we want you to count them like this, and we want you to number them, and we want you to do this in this particular kind of structured way. Implying then that what this will do will be to help the child's mathematical developmental skills. We also, for example, in some schools suggest to children that no, when you take a ruler, you use it strictly as a line-guiding device, and you don't use it as a sailboat, you don't use it as a bridge, you don't use it as a catapult, you don't use it in any other way which creatively you may be able to devise. So I think that those schools of thought would suggest that the cognitive development is away from any of the emotional aspects that the child brings to the learning situation.

David Cayley

By trying to separate the cognitive from the

emotional. We alienate the child from his learning, but we may also do much more specific kind of damage. Children mature at very different speeds, and so do their individual abilities. Physical, emotional, intellectual and perceptual abilities may all develop at markedly different rates. This fact has led the American educators, Raymond and Dorothy Moore, in a book called Better Late Than Early to propose that we consider something which they call 'the integrated maturity level'. This is the point at which the child's various abilities reach a mature and co-operative level of functioning, and they suggest that it is rarely reached before age 8, and sometimes much later. Before this time, real harm is done by those who try to isolate and force the child's skills.

Otto Weininger

If I force this child to learn by insisting that you do this, and point out what you're doing wrong rather than my recognizing that the child is just not ready yet for that, then I think I'm going to turn that child away from something like mathematics. Now they are doing that in some schools now, where rather than recognizing the emotional aspect of what the child is doing and dealing with, they insist on dealing with certain cognitive skills, and they deal with this in separate parts. They fragment it to the point where the child does not see it as being useful to his whole living, to his whole life. Until the child is emotionally capable, psychologically capable of dealing with these aspects, the child will not learn. And so we have this whole concept of learning problems. That's not to say that there are not some learning disabilities which are neuro-psychologically based, and we're not talking about those at this point. But so many of those problems, the learning problems that I see in school, and that many of my students see in the classroom, are as a result of these kinds of psychological ineptitudes that the child has not yet been able to grasp, and that the educator has not yet been able to recognize as important to deal with. They've travelled on in the cognitive sphere without recognizing that they've left the child miles behind.

David Cayley

The splitting of the child which Otto Weininger sees in schools also mirrors a division in the field of child study itself. On the whole, it has been the psychoanalysts who have concerned themselves with the child's dreams, fantasies and deeply felt needs, while the developmental

psychologists have considered the child's evolving intellectual abilities. In a recent book called *Intelligence and Adaptation*, the psychoanalyst Stanley Greenspan of the National Institute of Mental Health in the U.S. has attempted to overcome this split by presenting a unified perspective in which the insights of both Piaget and psychoanalysis can find a place. Dr. Greenspan suggests that the same types of mental operations may be employed in both the impersonal problem-solving tasks observed by Piaget, and in the emotional domain which psychoanalysis has charted. But he also notes an interesting difference between the two domains in the rate of development.

Stanley Greenspan

I noticed in watching how kids work on their emotional world that they seem very early in life to do things that Piaget would describe only later in development. So that a child, if you asked him to . . . wanted to see if it had a concept of the family, a kind of classification test, he could identify . . . a very bright 2 1/2 year old could identify all the family members and say who was in the family and who was outside the family. All right? But if you gave him at the same time an impersonal task to classify objects according to their properties — size, shape — might not be able to do it, and usually couldn't. So that it looked like where there was affect and emotion, and strong motivation, an early form of classification could occur in one realm but not in another realm.

Now the same thing would be . . . I'll give you an example of a seriation task. I saw youngsters who could talk about different degrees of anger — being mildly angry to a little angry or very angry. You know what I mean? And yet if you asked them to line up sticks according to their length, could not line up from smallest to biggest. They could give you a verbal description of gradations of anger. So the theory then as it became involved was that there's this one structure that's dealing with realms of experience, but that . . . For metaphorical purposes I said that there were two boundaries to the structure: a boundary that had more to do with internal emotional life and another that had more to do with sort of external, impersonal life, like mathematical problems. And that there was no reason to assume that these two boundaries differentiated or moved to higher levels of organization at exactly the same rate. That for some domains of experience they did,

and for other domains of experience they didn't.

David Cayley

What Stanley Greenspan says here reinforces and extends a point made earlier by Otto Weininger. For young children, the emotional domain is of primary importance, and their developing intellectual abilities are applied first to sorting out their feelings. But there need in fact be no conflict between these two domains if we allow children to do what comes naturally to them, and that is to play. Play is activity under the control of the child, and since it is the child who knows best what his own needs are, it is activity in which he develops both his abilities and his self-respect.

Otto Weininger

I think that when a child plays, what they usually do is they repeat some activities that they have already known, and they get the feeling that they are being able to be successful. That capacity to be successful allows them to think of themselves as a fairly effective person. It allows them to say, "I can do it." It allows them to say, "I can respect myself because I am successful, because I have been able to accomplish something." Now there is no other activity that will allow the child to do that. When they play, they know what they're doing. The child has the understanding of what kind of goals they're trying to reach, and usually they set their goals in such a way so they can achieve them. Once they have been achieved, you'll also notice that they begin to extend their goals further and further, so that they're pushing themselves — we don't need to push them, we just need to set the environment for them. They'll push themselves, but they will push themselves with the feeling 'that I can respect myself for having been able to accomplish something'. I've not as a teacher pushed the goal so far away that the child can never reach it, or feel that they're never successful, because I think that there is a degree of self-respect as I begin to feel myself successful. It allows me to achieve a degree of autonomy, because I can now, having had a feeling of success and being somewhat respectful of myself, I can put myself in a position of risk. I can allow myself to be at risk in terms of saying "I don't know it and I'm going to go on and try and find out about it." And that's a risky position. Listen, a lot of adults can't say, "I don't know it," and go on and find out. And I think a lot of adults can't say that because neither do they not have success

about themselves but they don't have respect for themselves, nor have they been able to acquire the feeling that "I could do this" and "I could put myself in a position of risk". Well the playing child can put themselves in the position of risk, and that allows them to explore further of their world.

David Cayley

Because play integrates and provides scope for all of the child's developing abilities, it can also serve the purposes of education. And for young children, it can do so much more effectively than formal teaching.

Otto Weininger

If an adult who is working with children has an understanding of children and of child developmental processes and what the child is all about, then they can begin to elaborate the world of the child by extending it by adding in certain materials which they see the child will next be able to use. In other words, if the children are playing with tricycles, all I have to do to organize them and to help them is to draw a chalkline or two chalklines on the floor, and then they'll follow the path. I know they will. That's no great trick. Now, if I want to extend it because I see that play is getting stale, all I have to do is put a stop sign there. Now they'll recognize the shape and the colour -- they won't recognize the letters necessarily, but some of them will, and some of them will point out that word says "Stop". They'll all stop when they come to it. That's extending the environment. If I want to extend it more in a particular direction, all I have to do is start to make a cardboard box and say, "I think that this will become the gasoline station." Now I've added something else into this play. I'm extending it, I'm elaborating it, I'm not allowing it to stay stale. What I'm doing is, I have certain goals as an educator that I want to teach these children, and I'm going to teach them by elaborating the environment. Not by telling them, "Now it's time for us to do such-and-such, we have to learn how to spell the word 'stop'." I know these kids will learn the word stop, I know that they will recognize it, and I know that gradually they'll also be able to print it.

David Cayley

Otto Weininger proposes that instead of teaching young children, we simply allow them to learn by extending and elaborating their environment. Development in this view depends only on the

availability of materials and the freedom and security needed to explore them.

Burton White, the author of The First Three Years, has observed the same principle at work in the lives of very young children.

Burton White

Children become very mobile for the first time at around 7 months, most of them. This is when they can first get around on their own, one way or another. We have objective data that says they are now into the single most dangerous period of early development, between that time and about 2 years of age, there are more accidental poisonings, and more falls and fractures and so forth than there are before, obviously, and later. Now this is fact, there is nothing I can do about it. It's there. The reasons are understandable. And the normal reaction of a lot of people is to avoid danger at all costs and to avoid the extra work that's involved, and the damage that might happen by confining the child either to a playpen or in a jump-seat, or in a crib, or in a tether -- in any number of different ways. That particular child rearing practice, which is widespread, especially among low income families and not terribly well educated families -- but not exclusive to them -- is not usually associated with very good outcomes at 3. Very simple. What's more likely to be associated with it is a modification of the living area to make it more safe and more appropriate for a crawling baby, and the encouragement actually of the exploration of the living area by the adult. The encouragement of it, along with a lot of supervision and a lot of participation and a lot of talk. That particular pattern, I'm willing to put money up on, and guarantee it will ordinarily produce a talented 3 year old.

David Cayley

Very young children, exploring their immediate sensory environments, are doing what they both want and need to do. They seek out materials which they can use in their drive for mastery, and there is probably nothing more moving or impressive to a parent than to observe the diligence, the imagination and the unity of purpose which children bring to this activity in which work and play remain undivided. The problem comes later when we begin to teach children knowledge for which they have no use. It is quite likely that reading, writing and arithmetic will all be introduced to children before their usefulness is at all evident. There

are many reasons why this happens. Because we are impatient, because of our belief that the children will only learn if we force them to, but also because up until very recently, writing and mathematics have simply not been useful skills for a child.

In his book *Mind Storms*, Seymour Papert argues that the advent of small, flexible and relatively cheap computers for home or classroom has now changed this situation.

Seymour Papert

Mathematics brings out an aspect of the computer, because it allows mathematics for the child to be an instrument for controlling something. For the engineer, mathematics is a way of controlling machines, systems. In the world as it has been before the computer, the kind of mathematics we teach in school like algebra or arithmetic doesn't control anything in the life of the child, so it becomes scholastic. It's like learning a dead language. The computer is a technology that can be controlled with that kind of mathematics, so this kind of mathematics becomes something real and live, like a living language for the child. So the child's relationship to the mathematics is totally different and it can now be learned experimentally without being forced on the child by teachers who say, you learn it or else.

Now mathematics is the clearest example, or maybe the second clearest example. I think the clearest example is the alphabetic language for very small children. I think the reason why children learn to talk at such a young age, that is they acquire the spoken language very early and very easily, whereas the alphabetic language is learned much later, if at all, and only when we impose it on the children. The reason for this could be because writing is more complicated than speaking. I don't believe that, and one reason why I don't believe it is that we now see 3-year-old children mastering keyboards because they can use the keyboard to make a computer do something. In the past for a 3-year-old child, the written language is a totally useless thing — you can't do anything with it. And so it's extremely frustrating for the child who can grab ahold of it and master it like you master mud pie, by making it, by using it. And so there again the computer because it's such a flexible technology that can be mastered by very simple means allows knowledge that has been passive and has to be imposed on willing recipients

become something active that can be used in order to make this medium do something.

John Holt

The child is interested in the world —enormously interested in the world as it is, and not only interested in learning about it and collecting facts about it and making some kind of sense of it, but interested and from a very early age, in doing something in it. There's no such thing as abstract knowledge for a child. The children want to be active, they want to be useful, they want to make a difference. They want to take part in what happens, and as soon as possible. So the idea that some kind of enforced socializing process is necessary in order to put children into the adult world is an absurdity. They are as interested in its social realities as in its physical realities. They want to be in it. It would have been perhaps my only serious objection to my old friend A.S. Neill, that it seemed to me he was trying to create an island for children away from the world, and I'm interested in creating bridges. You could do anything you wanted to at Summerhill except go to London — which was of course the most interesting of all things to do. Neill philosophically I think felt, "The world is a pretty ugly place and the longer I can keep children out of it, the happier and better off they'll be." And this is not my perception at all. Good or bad, there it is. It's all interesting to them. They want to get in it and do things with it. Maybe in time, they'll want to change it. And children in order to do things in that world will learn whatever they have to learn in order to do it. The idea of schools is that you learn this now so that you can do something later. And this works for a few children who are capable of spitting out meaningless information, but it doesn't work for most. I think of a young woman I know, now in her late 20's, who as a child was an absolutely hopeless student. Really. She went to a very good private school, the kind of a place where they don't kick you out, but she was just at the bottom of all of those test scores and worst of all in arithmetic —couldn't do the simplest kind of addition and subtraction. After she got out of this school, she was perhaps 13, 14, she went into a free kind of secondary school where she could do what she wanted, and she took up photography — as many children do. This was real photography, the children took photographs and printed, developed the film, and printed and enlarged, all of this sort of stuff. And all of that needs numbers. Now the position of the schools which is on the surface plausible

enough is that you have to know numbers in order to do photography, so if you haven't learned the numbers first, you can't do photography. What actually happened and actually always happens, is that because she wanted to do the photography she learned in a couple of months the numbers that 6, 8, 10 years of schooling had not been able to teach her.

David Cayley

Children learn best by observing and participating in meaningful activities. John Holt therefore proposes that we should reconsider the virtues of the apprenticeship method of learning which was once so widespread.

John Holt

All of what we now consider the learned professions — law, medicine, architecture, engineering and many branches of science — were once learned by the apprenticeship method. Our greatest city architects, Louis Sullivan, Frank Lloyd Wright, never went to architectural school — there were none. The great bridge-builders of the 19th century didn't go to engineering school, there were none. Everything that we now think has to be learned in a school was at one time learned out of a school, in a context of real work. And it seems to be much the best place to learn it. I have long felt this was true, but I was very interested and very much confirmed by meeting a young Englishman just within the last month or so — a brilliant theoretical physicist, working on the far frontier of theoretical quantum physics which is so abstract and crazy that you can just hardly believe it. And he showed me a paper which we're printing in issue number 29 of our magazine *Growing Without Schooling*, in which he says that he believes that the best way in which a 12 year old who is interested in physics can become a physicist is to leap-frog all those intervening years of school and begin to work as an apprentice in a laboratory, in an institute where people are doing the advanced work. Go right out to the frontier, and work with and among the people who are doing the frontier work. He thinks if he had such an apprentice, that he could give that apprentice real problems to solve — that the apprentice could solve. As he says: "any big problem often breaks down into a lot of little problems, and it would not be a long time before this 12 year old would in fact be useful to me, and would more and more begin to think of real work of his own to do."

I wouldn't have had the nerve I think to propose that the apprenticeship method would work in such a highly, as people say, abstract field as that. But he not only believes that it's true, but he and some friends of his are trying to figure out ways in which they can actually do this. It's worth noting that he said of his own academic training as a physicist, secondary school, university, graduate school, all those years . . . all he ever learned was theories which when we finally got out to the frontier he found nobody believed any more. Because he spent years learning what was in fact wrong. Nothing that he ever learned in his academic training was of any use to him in his work. When I asked him where in your schooling did you begin to encounter the ideas or problems which now lie at the centre of your work? He said to me, I never did. I picked them up independently in my independent reading.

David Cayley

It has been my purpose in this program to suggest a theory of knowledge and a practice of education which is more in keeping with the natural learning style of children.

Next week, in the final program of the series, I will turn to the social side of this issue by examining the institutions and technologies which now shape the world of the child.

PART IV

Kevin Marsh

Good evening. I'm Kevin Marsh, and this is Ideas.

John Holt

My very strong feeling is that if children are allowed a growing up which enables them to become adults with a strong sense of their own dignity and confidence and worth, they will extend these feelings to include other people.

Kevin Marsh

The idea of childhood as a protected space for human development is the creation of centuries.

Today, this idea rests on a knife-edge, threatened by social, economic and technological changes which are pushing the very limits of our adaptability.

Joseph Chilton Pearce

The average American child sees 6,000 hours of television before entering kindergarten at age 5. Now, this means that the whole bulk of their model structure of the world, their criteria system for judging what is real and not real in the world, is no longer the parent.

Kevin Marsh

The integrity of any society depends very directly on the bonds which link families and communities together, and it's in childhood that these bonds are forged and the relations between generations established. In the context of secure human bonds, technological change can be shaped and controlled. Without them, childhood itself becomes a domain of technological management and control.

Valery Suransky

Everything runs according to schedule, agendas, and instructions are pasted up on the door of every room. So you see the children becoming almost mini assembly line workers — which is a rather tragic sight.

Kevin Marsh

Tonight on Ideas, the final program in our series The World of the Child, presented by David Cayley.

David Cayley

I want to begin tonight's program with a rather nightmarish vision of what may lie in store for the infants of the future. It was brought to my attention by Dr. Seymour Papert of MIT, whom I had arranged to interview on the subject of children and computers. He had been painting a rather sunny picture of the educational possibility of computers, when he mentioned, towards the end of our conversation, that he saw causes for alarm as well as for optimism. He continued as follows:

Seymour Papert

We now have the means to try experiments on children which could have radical consequences which only show themselves many years later. I think it's very plausible that the first year or two is vitally important, or the first few months, maybe, are vitally important in the

establishment of object relations — especially with the mother, with other people. Also relations with objects in the ordinary sense of things. And the relationship with reality gets built up at that time. Up to now, our technologies have not intervened very much. Older children might watch the television a lot; three month old children or even two month old children don't look at television. They're really very superficially touched by any technologies. And I think we do now have the means to make interactive devices that could capture the attention of a newborn on day one, and lock into what kinds of feedback are desired by the child.

So we could enter dynamically into the developmental process of the relation between the child and reality, and I think we absolutely don't know anything about what the consequences of this would be, and we certainly could make a generation of psychotics. Moreover, I think there are economic forces that are pushing to want that. There is obviously a big industry that would love to make these devices, and I think there are whole schools of psychologists who would love to say, "Look, these things are stimulating the children. Stimulation is what they need." And of course, there are millions of parents who would like the baby sitting aspect. So that something which you could call the "baby stimulator" could become the big selling item of next year.

David Cayley

On hearing this, I suggested that surely nothing could rival the bonding process by which mothers and newborn infants become attached to each other. He was sceptical.

Seymour Papert

So far there's never been anything that could really rival that bonding. And I think that one could imagine machines so designed, so seductive, so engrossing for the children that they bypass the bonding. There's the idea that's come up in research of the ecologists, people like Tunberger and Lorenz, who can find stimuli that release the natural responses in a more powerful way than the natural stimuli. We haven't yet had that sort of thing for human babies in the first weeks and months of life, but it's not inconceivable.

David Cayley

It's doubtful whether the baby stimulator will be commercially available next year, although I

don't doubt Dr. Papert's statement that it is technically feasible. What alarms me, however, is the plausibility of his idea, that substantial sections of our society might welcome such a device. It becomes plausible, I think, when we consider the extent to which we are already abandoning our children to pre-school institutions where they are hectored and hurried into early achievement. Is it such a long jump from trying to teach babies to read to Papert's horrific vision of computerized baby care? We seem to be able to give our children everything but what they actually need: unhurried time and uncrowded space in which to grow up at their own speed. And because we are too busy to be available to our children in their time, they must learn from infancy to live in the institutional time by which we measure our own lives. The regimen in many day care centres is a case in point.

Valery Suransky, who teaches in the department of educational psychology at the University of Michigan, has made extensive studies of existing day care facilities, and reported her conclusions in a book called The Erosion of Childhood. Although she is generally concerned with the extension of schooling into early childhood, she singles out the rapidly growing corporate day care centre as a particular problem.

Valery Suransky

What I found in my observations in my two-year study, which I report in my book, as well as subsequent observational work that I've done in the last three or four years, I see tremendous abuses occurring in some cases. The outright physical or psychological abuse of children, and in other cases, they're more subtle. For example, I was in Canada last May, and visited several profit run centres in Alberta. And the one centre that I visited was a fairly competently run day care which had infants, going through children in kindergarten. Each age group of child was confined to a specific room, and there were specific activities that were geared supposedly to the developmental level of these children. There were over 100 children in the centre. And I sat in the infant room for a while, and I observed all the infants being woken up and given their snack at the same time, and put in their high chairs. Children at that age — these kids were about 10 months to a year — who would mess with their food, crumble it up, throw it on the floor, experiment by pouring their milk out of the cup, would be reprimanded

immediately by the staff — not out of malice, but because it's very difficult to manage 8 to 10 infants doing that at the same time. Infants who wouldn't eat at that particular time would be labelled as difficult or problematic. All the kids would be placed on potties for potty training later in the afternoon. I went into the toddler room and found 14 children lined up on their tummies with a crayon in front of them next to a large roll of white paper. And they were having a so-called 'art activity' and were told to draw. Each time a child moved out of his or her specific spot, which had a cross marked on it, they were put back flat on their tummy and told, "it's drawing time," and they were forced to stay there — not unpleasantly, but nevertheless forced to stay for 20 minutes, because they had to have a so-called 'art activity'.

When you think of an 18 month old child needing to experiment with the world, to play, to move, to perhaps not lie flat on a tummy, but be able to take several crayons and line them up and turn them into a train, as opposed to being forced to draw with them, you realize how even in a relatively mildly coercive atmosphere as I saw there, these children are being trained very heavily, being socialized into conformity and docility. If they don't obey the teachers, then they're reprimanded, and if they stay there 10 hours a day, obviously they need to feel the approval rather than the reprimand of their care-giver. And so to disobey means, in a way, to lose love, to lose affection and to lose being in the orbit of the care-giver. And so of course the children, very quickly I think, obey, become socialized, and the kids who don't become the rebels or the deviants of a structure such as that.

And I saw many rebels, i.e. children who would not conform, emerge in many of the places that I visited. And if we're trying to create two year olds who conform and who are obedient, who are not allowed to freely experiment and act upon their world, I think that we are doing some very dangerous things both emotionally as well as cognitively to their later development. And I have seen these particular ways of treating children occur — most of them — in the profit-run centres, because they resemble most often assembly lines where everything runs according to schedule, where agendas and instructions are pasted up on the door of every room.

So you see the children becoming almost mini

assembly line workers — which is a rather tragic sight. Of course, I've seen abusive situations too. In Lollipop Learning Centre, which is the pseudonym I gave centres that I looked at in the mid-west, I saw children being locked in closets, I saw them being hit, I saw them being psychologically humiliated and abused, and when that happens as a daily dose of existence, I think again we need to react with horror at what's happening to our young children in the society.

David Cayley

In the day care centres which Valery Suransky describes, we can see children being denied the opportunity to freely explore their surroundings. In a book called Magical Child, the American writer Joseph Chilton Pearce has suggested that without this type of exploration, children will fail to develop what he called "a full dimensional sensory knowledge" of their world.

Joseph Chilton Pearce

Certainly when I speak of a full dimensional sensory structure, we're talking about the difference between that and the ordinary isolated, alienated child, that is, a child who's of course separated from parent at birth, and then brought up in cribs, playpens, strollers, all sorts of devices which keep them separated from a full sensory interaction with the world. And then we have the fact that 60 to 70 per cent of all American children under age 4 are in day care centres, which is a further means of isolating them from direct contact with family life, and so on, and actually the life of the culture, and puts them in artificial holding tanks.

Now we have also the fact that the average American child (I can't speak for Canadian) sees 6,000 hours of television before entering kindergarten at age 5. Now this means that the whole bulk of their model structure of the world, their criteria system, for judging what is real and not real in the world, is no longer the parent, no longer really the culture but the culture and parent as represented by television. Because it is the major input into the child's mind-brain system during the entire period of development when he should be developing a knowledge of world and self and the relationships between world and self. And so he's making his whole structure of knowledge of relationship with world and self through television primarily. And this is a shallow dimensional system. It only appeals, or only utilizes, the long-range sensors

of sight and sound. It leaves out the other three senses which are necessary to build a full dimensional knowledge, or structural knowledge, of a world system.

If you watch the little toddlers when they first see television, they try to crawl through the set to get at the stuff, at the 'thingness' of it, to fill in with the rest of the sensory system. They're driven by nature to do that. Now, of course they're thwarted, so in the first seven years we have the bulk of their conscious time and energy being spent on a shallow dimensional structure. Now this means it isn't so much that you won't get some precocity, but you have no substructure for the great movements of intelligence later on in the teenage period.

David Cayley

The argument here is that full sensory exploration of the world provides the foundation for the later development of formal abstract intelligence. Television, according to Pearce, inhibits this exploration, first by providing a substitute activity, and second by replacing the real work of imagination with synthetic, ready-made imagery.

Joseph Chilton Pearce

If you look at the highest point of all human thought according to Piaget, he calls it reversibility thinking. Now reversibility thinking is totally contingent upon the ability not only to take a problem and solve the problem, but to then retrace the steps of the problem's solution — that is, start at the solution and retrace your steps back to the problem to see how you arrived at the solution. And then be able to extract or abstract out of the context of learning the actual ability itself as a kind of blueprint of action of problem solving, and then apply that in any other context. Now, what happens, you see, is that the child is being stripped of process itself. The mind-brain is not having to produce process. As a result, it's impossible for reversibility thinking to take place, since that requires the reversing of process itself.

For instance, the damage of television is not in the programming, but is in the fact that it gives the child an end product, without all of the machinery of the brain having to produce the end product over the period of the developmental years in the first seven years. As a result of the stripping of the brain's necessity to produce the product, then there is no way reversibility

thinking can possibly take place. That's one thing. The other thing is it strips the limbic system of its necessity of creating internal imagery in keeping with world structure, because instead of the internal imagery having to be created by the limbic structure in the brain, you have the finished product of the imagery given as a synthetic process, an end product, without any of the production in the brain having to take place. So then there's no way in the world the child is capable of what we call imagination. And imagination is the key to formal operational thinking at age 11 — the ability to imagine something not present to the senses, hold that as the goal, and then move toward the target. Now the grounds for that are produced in the first seven years.

David Cayley

It would be difficult to prove the validity of what Joseph Pearce says here, although we do have the interesting fact that some universities are claiming that up to half of their incoming students are deficient in abstract reasoning ability. I'm inclined to believe that he is at least partly right. If television is the dominant influence on the young child, and many surveys of children's viewing tend to suggest that at least in terms of time, it is, then I think it will undermine the child's development. But I don't think this is necessarily true of more moderate viewing, so long as exploratory play remains the predominant activity. Decoding television images is also a skill, and perhaps in its place a valuable one. The critical question is not just "What does television do to children?", but also, "What experiences does it replace?"

Alan Mirabelli is the co-ordinator of communications with the Vanier Institute of the Family in Ottawa, and he says that this question led him to wonder whether television was substituting for a diversity of experience which is simply no longer present in our world.

Alan Mirabelli

What other experiences does a child or an adult give up in order to participate in television viewing? And that began for me to sort of give a fairly strong sense of what was wrong with the medium — or what was wrong with us in our use of the medium, to express it better. Because here we are in Canada saying we're willing to spend three hours a day with the television. So I'm giving up, or my child is giving up, a great number of other opportunities. To be playing

outdoors, to be playing with his friends or her friends — generally to be in a social context. As I started to ask that question to myself, what experience are we abandoning, I thought, well, maybe the society is so well organized that we don't want to participate in a variety of other experiences. Let me give you a sense of what I mean.

If the option is to be isolated in my home with my television set, where I get a variety of things brought into the household, as opposed to being immediately banded into an age group — okay, you're four years old, you now go to four-year-old kindergarten. You're five years old, you now go to five-year-old kindergarten. And it goes right through school. How much of a diversified experience can the child really acquire by moving outside of the home? Now that we've banded our kids together in peer groups, and our old age people, and the working community, where's the diversity of experience by which one can measure anything? And so I don't blame television per se. One has to say that television was born in an era that was ready for it, to provide the diversity that may not have existed elsewhere.

David Cayley

Lack of diversity in the lives of children is in some ways reinforced by the lack of real responsibility as well. And without the opportunity to participate responsibly in meaningful activities, children become alienated. Bob Glossop, director of research with the Vanier Institute of the Family.

Bob Glossop

We have created a period of prolonged childhood and adolescence that is almost precisely designed to be a period of irresponsibility. In this regard, we often put our children in a double bind. By failing to allow them to exercise responsibility, we then are stopped short when, for a variety of reasons, we see irresponsible behaviour on the part of children. At the same time, when we look at that so-called irresponsible behaviour, I think there's almost a perverse sense of jealousy that influences our adult reactions. We create this long period of dependency, and we regard that as a time of almost absolute freedom. We use the phrase that "it's the best years of your life," etc. etc. We as adults then feel terribly burdened by our own responsibilities and obligations, and therefore look at childhood as that favoured