New abridged

GIVE YOUR CHILD A SUPERIOR MIND

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PART ONE

Chapter I—The Facts

The educators say, “Hands off!”

There are more exceptions every day. But the average educator is still a jealous creature. He doesn’t want outsiders in his bailiwick, and he gives arguments against trespassing—some of which seem credible enough. Let’s take a look at them.

> “The child who receives a preschool education will be bored in school.”

This argument is partly true.

Obviously the first-grade child who can read on a good second- or third-grade level will not be very excited about learning “C is for cat.” But almost every school system has worked out a program for the child who is ahead of his classmates. Every year “readers” wander into the first grade. The school is probably prepared to make some kind of arrangement for them to work on their own, in which case they will not be bored.

Also, we must allow that the child who receives a pre-school education is not the only one who may be bored in school. The average fourth grade in the average school is a melting pot. The span of achievement in reading, arithmetic and just about all other subjects ranges from the first- or second-grade level to the seventh- or eighth-grade level. The individual differences that were noticeable in kindergarten become exaggerated to such grotesque proportions that the teacher cannot communicate effectively to every segment of the group. So she presents material that allows each child to “progress” at his own natural rate. And the span of individual differences continues to increase, the slow getting slower and the bright getting brighter.

Another factor that weakens the boredom argument is the teacher herself. Teachers in all grades enjoy working with children who actually need the least amount of help, the gifted. They don’t normally balk at the extra work involved in processing and placing the advanced child. Instead, they enjoy discovering him and working with him. The preschool reader, therefore, is less likely to be subjected to boring activity than the non-reader.

> "The child who receives a preschool education may become socially maladjusted in school and later in life."

This argument implies that "giftedness" is a potential cause of maladjustment, since the gifted child—like the mentally handicapped or the deaf child—differs from his peers. To compensate for the fact that he is "different," according to the argument, he becomes the class clown, or a hollow introvert. This argument has a great face-value appeal but little basis in fact. Studies indicate that gifted children stand at least as good a chance of adjusting in school as the child who is average or below average in intelligence. The most extensive study, the California Study, followed over 1,000 gifted children (IQ range from 135 to 200) through high school and into adulthood. Although the facts about these children are sometimes obscured by a rather dazzling halo, the study showed that maladjustment in school is not a necessary function of superior intelligence but is the outgrowth of more fundamental conflicts. According to achievement scores in all academic subjects, the gifted children average from one to three years beyond the grade in which they were placed. Many of these children had been double-promoted, compounding the adjustment problem even further. Yet, they were reportedly well adjusted in school; they distinguished themselves in extracurricular activities and leadership; seventy percent of them attained professional or semi-professional status later in life; and they were superior to the average child in physical health, mental health, breadth of interests and other areas. A superior intelligence may contribute to adjustment problems, but a superior intelligence is also a handy tool in solving these problems.

> "The parent is not qualified to educate."

This argument is rapidly becoming obsolete as more and more educators recognize the value of preschool training. However, there are still some who maintain that teachers are experts. According to this argument, teachers, unlike parents, are specially trained to educate. Unfortunately, this is not so. Certainly there are good teachers, but only a fraction of the good ones are good as a result of the formal training they received. Studies dealing with experimental preschool programs and adult education show rather clearly that the good teacher is the person with the desire to teach, not necessarily the one with a certificate. Furthermore, the interested parent is in a far more enviable position than the schoolteacher because the parent is able to work with fewer children at a time. This means that the child receives a greater amount of individual attention. Mistakes are corrected more quickly and learning generally proceeds more smoothly.

THE ROLE OF THE ENVIRONMENT

The scene is an experimental nursery school. The children in attendance are culturally privileged 4- and 5-year-olds, most of whom come from an academic community. The children are engaged in free play. Listen to them.

DAVID: "Hey, that's my block. I need it for the house."

JOEL: "No, you can't have all of the red blocks."

NAN: "Why don't we play train? I could be in the engine. Joe could be in the caboose."

DAVID: "Where's Debby today? Is she sick?"

Now their teacher calls them to attention. She holds up a paper bag.

TEACHER: "Tell me, can you see through this bag?"

CLASS: "NO!"

TEACHER: "Such good loud voices. I wonder if any of these smart boys and girls remember what we would call this bag if we *could* see through it. George?"

GEORGE: "Transparent!"

TEACHER: "Oh, that's *right!* I'm thinking of a harder question now, so hard I would be surprised if very many boys and girls remembered the answer. I'll ask it anyhow. And any boy or girl who does know the answer can just shout it out in a big voice. What do we call something when we *can't* see through it?"

CLASS: "OPAQUE!"

TEACHER, in mock shock: "I believe every single boy and girl knew the answer!"

Class laughs over the way they surprised their teacher.

TEACHER: "Who can name something that is transparent? Laura?"

LAURA: "A bag."

Teacher (careful not to make Laura feel that she had failed): "Well, yes, if it's the kind of bag you can see through. But it's *not* transparent if you can't see through it—like this bag. Is *this* bag transparent?"

LAURA: "No."

TEACHER: "Good. David, can you name something that is transparent?"

DAVID: "Glasses!"

TEACHER: "Sure. Like my glasses. [She removed them.]

Transparent. We can see right through them. Now, let's get back to this bag. Do you know what I have in the bag? Can you tell?"

CLASS: "NO!"

TEACHER: "We can't tell what's in the bag, can we? Why? Because the bag is opaque and we can't see inside. But what if I told you that I had something very, very *big* in this bag?"

CLASS, objecting loudly: "NO. That's not right!"

TEACHER: "Why not? Linda?"

LINDA, quite disgusted: "Because it's a *small bag!"*

Now let's cut to a different scene, another nursery school, not three miles from the one described above. This one is sponsored by a local women's club. It is run by well-meaning volunteers for culturally deprived black preschoolers. These children talk less; what communication there is usually comes as a single word or cry. "Gimmee." "Teecher." "No."

There is no talk of big blocks and colors because the average child does not know the name for blocks and cannot tell red from green. Even more serious, he does not understand that something like a block can be both big and red. He does not understand *language.*

The teacher calls the class to attention. She is as poor at teaching as the other teacher is good. She unwittingly shames the children and she doesn't correct their mistakes properly. Her manner of presentation is slow and boring.

TEACHER, holding up a book opened at an illustration of a deer family:

"All right. Junior, sit still. Marcus [snaps fingers]. Marcus, look up here. John, what animal family is this?"

John studies the picture for fifteen to twenty seconds, while other members of the class start jostling each other.

TEACHER: "All right, Spencer. Now you just sit still. Debby, you tell me. What kind of animal family is this here?"

DEBBY: "I don't know."

TEACHER: "Well, my gracious. You know what kind of animal family this is. Look at it . . . Junior, what kind of animal family is this?"

JUNIOR: "Billy goats."

TEACHER, disgusted: "No, it's not Billy goats. Spencer, this is not a time for talking. Carol!"

CAROL: "Billy goats."

TEACHER: "Marcus."

MARCUS: "Billy goats."

TEACHER: "Marlena!"

MARLENA: "Billy goats."

TEACHER: "Take a *good* look. David, what kind of animal family is this here?"

DAVID: "Billy goats."

TEACHER: "No, it's not Billy goats. Mark, what animal family is this?"

MARK: "Look like Billy goats to me."

TEACHER: "Doesn't anybody know what kind of animal family this is? Junior, You stop that and look up here. Now who knows what kind of . . ."

GLENN: "Reindeer!"

TEACHER, quite disgusted: "Well, it's not reindeer, it's *deer!*

This is the *deer family.* You can see that."

DEBBY: "I see big horns sticking out of that one's ears."

MARK: "Still look like Billy goats to me."

There are obvious differences between the children in these two groups, and unfortunately the differences are not temporary. The children from the academic class will enter the first grade with an average IQ of over 120. (An IQ of 100 is normal.) Those from the other group will have an IQ of 90 or less. The differences are real, but why do they exist? Are the children from the academic class hereditarily endowed with more powerful brains, or did something happen during their first years to give them a headstart? Does it matter that somebody spent time teaching them the names of colors, and how to count, and how to write their name, and how to read a few words? Does it matter that although their nursery school teacher is far superior to the other teacher, they can come out of the nursery school experience with about the same IQ as they entered while *the deprived black children may gain ten to fifteen IQ points during a single year?*

Exactly what is the role of the environment in learning?

THE ENVIRONMENT IS THE TEACHER

The first step in explaining the role of the environment is to ask: What do we know about the environment? What does it do? When does it do it? Where?

What do we know about the environment? We know that *the environment is the teacher and the child is the learner.* We know that if the child grows up among Australian Aborigines, she will develop as a typical Aborigine. She may never learn how to use fire; yet she will carry around in her head a knowledge of kinship relations so complicated that it took more than one generation of anthropologists to break the code. If the child is raised among the traditional Masai, she will learn to read signs in the bush that completely escape the Western eye. If she is raised among the Eskimos, she will see many different kinds of snow where we see one; she will speak like an Eskimo; she will be an Eskimo.

There are thousands of different environments, and the most obvious and accurate generalization is that a child raised in any of these environments will learn what that environment teaches. He will not learn to speak Greek if he is raised in Tokyo. He will not develop the concept of quadratic equations if he is raised among Jivaro headhunters.

Consider these rather obvious facts in relation to the notion that man's capacity to learn is genetically fixed. Fixed in what sense? We have some idea of how a rat's capacity is fixed. A rat can learn only a limited number of motor responses to a limited number of sensory cues. We know something about how a bee's capacity is fixed. But with man the situation is quite different. The environments in which he can be placed require different *kinds* of responses and different *levels of performance.* A child raised in a prosperous United States community will be required by his environment to learn a far greater number of responses than if he were raised on the South Pacific island of Truk, where the children spend most of their early years segregated from adults, trying to learn from other children. A given child has the potential to become a bright young man who stands a reasonable chance of entering one of the better colleges or a suspicious, confused lad who, by our standards, is irreparably mentally deficient.

Human capacity to learn is not fixed in any ordinary sense. *It is not fixed in terms of the responses it will produce; it is not fixed in terms of absolute level of knowledge it will achieve.* This point is inescapable.

THE PHYSICAL ENVIRONMENT— THE FIRST TEACHER

A child raised in Omaha, Nebraska will grow up to be quite a different person from one raised in Lebanon. But when does the difference begin? The baby in Peru makes the same babbling sounds as a baby in Australia. An Indian papoose who is swaddled and strapped to her mother's back during most of her first year learns to walk at about the same age as the child who is given all the freedom of a home in Scarsdale, New York.

The differences between children emerge when their teachers become different. But at first, almost all children learn from the same teacher—the physical environment. It may be decorated with different trappings and be accompanied by different background noise, but it teaches the same skills in precisely the same order, with precisely the same rewards and punishments attached to each. In San Francisco or Santo Domingo, York or New York, the child is required to learn the same principles of tracking objects with her eyes, of coordinating her eye-image with her hand movement, of keeping her center of balance where it should be. If she fails to learn these principles, she is punished, either by being prevented from doing what she wants to do (which may be some activity like jamming a round peg in a square hole) or by being physically hurt. The environment is quite consistent. If the child tries seventy-six times to walk without observing the center-of-balance principle, the environment—the teacher —will punish the child seventy-six times, immediately and dramatically. Plop. The environment is not moved by sympathy; it does not care how charming the infant looks or how many tears she sheds. The seventy-seventh attempt is met with the same punishment as the others. Plop.

Learning theories often treat the physical environment as a passive thing, little more than a medium in which learning takes place. But if we look at the physical environment *as* a teacher, it resembles a tyrannical, overbearing, *active* agent that follows the child around, correcting her, punishing her, teaching her the rules of the game.

Almost all children study under this taskmaster, and they learn at near-maximum speed. When the overbearing physical environment is stripped of authority and transformed into a more gentle thing, learning becomes severely retarded.

Imagine a place that is designed to handcuff the physical environment, a monotonous place, with no great range of things to see or hear, with nothing very hard or very soft, very loud or very subtle. Put infants on their backs in shallow cribs, make a rule that we never turn them over, rarely pick them up (even when we feed them or change them) and give them the barest human contacts. Attendants will not talk to them. In such a place, the physical environment would be handcuffed.

The truth is that this description refers to a real place, a foundling home in Teheran, described by Wayne Dennis in *Journal of Genetic Psychology* (1960). Only fourteen percent of the children were able to crawl *at the age of 1 or 2 years.* Only forty-two percent of them could sit alone at this age. And only fifteen percent of them could walk alone at the *age of 3 to 4 years!*

If the child is to learn the basic rules of the physical world, the physical environment *must be active.*

THE SOCIAL ENVIRONMENT

When the children move from the raw physical environment to the social environment, differences begin to appear. They learn to speak, and as they do, they learn sound patterns that make them deaf to sound patterns in other languages. The child who learns the relevant sounds in a given language learns at the same time which sounds are irrelevant, which are mere “noise.” These he disregards and ignores. In the process, he becomes relatively deaf to them. Granted, a child who is bilingual is not deaf to as many sound patterns as a child who knows only one language, but he is quite deaf to many sounds just the same. We were acquainted with a charming 3-year-old boy who could speak perfect Midwestern American and perfect German, but who was completely unable to pronounce the name of a Japanese girl, “Coy-oh-ka.” Although his attemtps sounded acceptable to us, the girl made it clear that he wasn’t even close. If your ear is trained, you can identify different foreign accents—German, Swedish, Italian, Japanese. Each accent is relatively uniform because the people speaking a given foreign language learned to hear certain patterns; these made them deaf to certain sounds in English, just as we are deaf to sounds in Japanese, Italian, and so forth. If this weren’t the case, you would not be able to identify a foreigner by the way he talks.

As children move into the social environment, they learn which elements in their environment are important and which are irrelevant. This involves interpretation. And the interpretations differ widely. Slowly the children from Truk, Tokyo, Australia and Omaha start down the different paths their teachers have marked for them. No social environment can ever be as active as the physical environment. But since different environments teach different *amounts* of knowledge, some environments must be better teachers than others. The social environments that teach the widest and most complicated variety of skills have a great deal in common with the physical environment. They are *active.* They constantly stimulate the child to learn, always using what he knows as the stepping-stone to the next task. They force experiences on the child and exploit his native desires as a means to teach him about his social reality. They make consistent demands and punish unacceptable behavior. They expect more. And they receive more.

There are many environments within our culture. Each makes different demands; each manufactures a different product. The lower-class Italian environment does not expect much from the child (in terms of independent behavior toilet training and language) and the lower-class Italian in America shows the effects of his passive environment. In fourteen studies cited in 1958 by Maslan, Sarason and Gladwin, “Italians consistently fell near or at the low end of the continuum (sometimes below the black groups selected for comparison).” In contrast, the upper strata Jewish child is expected to be toilet trained at a younger age, be more independent, express himself more articulately, and learn more. The child from this environment may average twenty IQ points above normal; forty points above the lower-class Italian or black. The more active the environment, the greater the child's capacity to learn. There is a great deal of evidence. We shall present only a part of it.

We begin with the orphanage.

There is a rule of thumb about these institutions—not a nice rule, but a fairly useful one. The more children there are assigned to an adult supervisor, the greater the degree of mental retardation of the children. The orphanage environment at best is passive. It presents sounds and shapes, but nobody explains what these are. As a result, institutionalized children do not learn the fundamental assumptions of language. Their IQ may drop five to ten points a year, and it is not uncommon for the average IQ of children in an institution to be *thirty points below normal.* Skeels, Updegraff, Wellman and Williams give a vivid description of institutionalized children in the late 1930s. "Language and speech were greatly retarded . . . In fact the urgency for communication seemed to confine itself to situations of extreme discomfort . . . A phrase or a word said by one child would be repeated by several not as a game, not in hilarity, but more as an activity arising from nothing and resulting in nothing . . . Strangers and visitors were objects of curiosity and overwhelming attention but the children's reaction would probably have been the same to wax figures."

Could we improve the orphanage environment by making it more active: Skeels and Dye did so in a controversial experiment. They transferred 1- and 2-year-old orphanage children to a training school for *feeble-minded girls.* These girls acted as mother substitutes. They cared for the children, talked to them, played with them. Two years later, these children's IQs has increased by *twenty-seven points,* while the IQs of a similar group of children who remained in the orphanage had *dropped* twenty-six points. The children placed with the feeble-minded mother substitutes had achieved an overall gain of fifty-three IQ points.

This experiment illustrated the important point about an "active" environment. It is only active in terms of a specific child who is at a specific stage of development. It is not active in general. Feeble-minded mother substitutes can be relatively active in teaching the preschooler. They can teach him basic vocabulary and fundament concepts. But they obviously cannot provide an active environment for a child who is ready to learn negative numbers. Conversely, an environment that is geared to teach a 4-year-old negative numbers would not necessarily provide much activity for a 20-month-old infant who is wrestling with the concepts “good” and “daddy.”

A situation similar to that of the feeble-minded mother substitute is found in the larger family. The number of children is great compared to the number of adults. So each child receives less parental attention. For the first few years of a child’s life, however, she has a kind of mother substitute, an older brother or sister. These are good teachers, up to a point. The child learns the fundamentals of language and basic concepts, but unfortunately her teacher generally is not well prepared to present more sophisticated concepts. Thus, the child’s IQ drops as family size increases. And the child who is in the most direct communication with the adults, the oldest, usually has the highest IQ.

The difficulty in trying to learn from somebody who knows no more about the subject matter than you do is illustrated by the intellectual development of twins. Most twins are subjected to a relatively passive environment from birth. The primary agent in a twin’s environment is the other twin. As a result, the average IQ of twins is lower than that of single-birth children. The language development is inferior, the incidence of mental retardation is significantly higher.

Identical twins assume an extremely important role in any discussion of “environment vs. heredity,” because identical twins grow from a single egg and have a single set of genes. Therefore, any difference in their mental capacity cannot be attributed to genetic causes. Identical twins provide an investigator with the rare opportunity of watching two nearly identical persons developing. Unfortunately, the environments in which identical twins are usually raised do not offer much difference. Rather, parents of twins often make a determined effort to give each twin an identical environment. The twins are dressed alike and are treated alike. They are fed, bathed and toileted together. As a result, they usually achieve almost identical IQ scores.

The situation is quite different when twins are separated shortly after birth and raised in different environments. Newman, Freeman, and Holzinger reported on nineteen such pairs of twins in 1937. In this study, Newman, Freeman and Holzinger had cited five sets of twins who had been separated at birth and placed in environments that differed substantially in their activity level. One twin from each set received at least four years more formal schooling than his sibling. When these twins were tested later in life, the twins who had received the greater amount of formal education averaged sixteen points higher in IQ than his less fortunate sibling. (Sixteen points can be the difference between a person who has an average IQ and one whose IQ places him in the upper five percent of the population.) The set of twins who had grown up in the least similar environments showed the greatest difference in IQ, *a difference of twenty-four points.*

For almost twenty years after the report, learning theorists tried to warp the findings to conform with the notion that intelligence is genetically fixed. In 1955, the Fels Research Institute project disclosed the results of an extensive study of IQ constancy. Over sixty percent of the children under investigation fluctuated more than *fifteen IQ points* from the time they were a few months old until they were ten. Slowly and reluctantly, theorists began to relinquish their hold on the cherished notion that IQ is fixed and constant. Even more slowly, they began to admit that perhaps the Newman, Freeman and Holzinger findings were not completely consistent with the interpretation that “identical inheritance produces identical intelligence.”

A change in the activity of the environment results not only in a change in what the child learns but also in his *capacity* to learn. Decrease the activity and capacity goes down. Decrease it by forcing the child to speak in one language at home and another in school and IQ drops drastically. Decrease it by placing the child in the rural South, perhaps in South Carolina (which held the per-capita record for “mentally deficients” during World War I) or the Tennessee hills, and the child’s IQ may drop as much as three points a year throughout his primary school years. Decrease it by giving him uneducated parents, and his IQ drops perhaps twenty to thirty points. But capacity is a two-way street. Increase the activity level of the environment and the child's IQ will rise. Increase the activity level by reducing the number of children in the family and the IQ goes up. Increase the level by strengthening the education of the parents and, again, IQ goes up. Increase this level by placing the child in an active neighborhood, and IQ goes up.

Capacity to learn follows the activity of the environment. IQ correlates with just about every available measure of environmental activity from the age of the parents (with the older, more concerned parents providing the more active environment) to the per-capita number of telephones in the state, the value of the state's school property, and the size of the community.

Chapter II—The Story of Genius Builders

In *Genetic Studies of Genius,* Catharine Morris Cox gives brief biographies of three hundred historical "geniuses." On the basis of performance and skills exhibited by these three hundred geniuses during their childhoods, it is possible to estimate IQ scores, and Dr. Cox makes what seem to be reasonable and honest estimates. The classifications begin with the geniuses in the 100–110 IQ range (Copernicus, Sir Francis Drake, Michael Faraday, and others) and continue upward, through the 110–120 group (Oliver Cromwell, Andrew Jackson); 120–130 (Haydn, J. S. Bach); 130–140 (Rousseau, John Calvin); 140–150 (Hobbes, Kepler); 150–160 (David Hume, Tennyson); 160–170 (William Pitt, Alexander Pope); 170–180 (Voltaire, Coleridge); 180–190 (Bentham, Goethe); and finally, 190–200 (one entry: John Stuart Mill).

We do not agree that there is any great significance in the classification of "geniuses" according to childhood IQ,, because obviously Sir Isaac Newton, with his estimated 130 IQ is at least a full cut above Thomas Babington Macaulay or Hugo Grotius with their 180 IQ's. However, it might be interesting to examine the relationship between the early training of these geniuses and their degree of "giftedness." If our interpretation of the active environment is correct, there should be a strong relationship. There *is* just such a relationship. As you progress through the book from "IQ 100" to John Stuart Mill, you come across a number of references to home tutoring and intensive early training. And the closer you get to Mill the more frequently these references occur. The trend becomes so clear from IQ 180 onward that only a true exponent of the fixed capacity theory could fail to see it.

We will let Dr. Cox (who is not sympathetic with the environmentalist's interpretation of IQ) speak for herself, with an excerpt from each of the cases listed as having a childhood IQ of 180 or more.

Jeremy Bentham (jurist and philosopher): "When he was 3 his father bought a Latin grammar and other books to begin his classical education. The

Greek alphabet he learned on his father's knee, using Lily's *Grammar* and the Greek Testament as the two principal instruments of instruction."

Thomas Babington Macaulay (English historian, poet, statesman): "'Still the merest child,' he was sent, reluctantly on his part, to his first school. . . . Before the age of 7, Thomas wrote a compendium of universal history, which his mother describes as 'a tolerably connected view of the leading events from the Creation to the present time, filling about a quire of paper.'"

Blaise Pascal (French geometrician, philosopher-writer): "When Blaise was 3, his father began to devote all of his time to the education of his children. The boy never attended school and had no other teacher than his parent. When young Pascal was 8, the family moved to Paris and the father began a systematic course of training, the rigor and originality of which can be likened only to the discipline of John Stuart Mill."

Johann Wolfgang von Goethe (German poet): "From the age of 3 until he was 6, Goethe attended a day nursery or kindergarten, and here, according to tradition, he learned to read. His father had already begun to tell the little lad and his sister the history of the town. . . . Goethe's father early recognized his son's unusual ability, and friends of the family enthusiastically mapped out careers suited to such rare talents."

Hugo Grotiius (Dutch jurist, founder of the science of international law): "Hugo remained at home in the care of his parents until he was 8 or 9, and was instructed by them in the rudiments of Christian doctrine and impressed with sound principles of morality and honor. Before he was 7, the foundations of his knowledge of the Latin and Greek languages were laid by his tutor, 'an excellent man.'"

Gottfried Wilhelm Leibnitz (German philosopher and mathematician): "Leibnitz was brought up in a studious and scientific atmosphere; he enjoyed an education very unusual in the period of German decline in which his early years were passed. His father, when teaching him to read, made every effort to instill in him the love of history, both biblical and secular. After his father's death, which occurred when the boy was 6, his mother devoted herself to his education and, in order that his formal training might be of the best, sent him to the Nicolai School in Leipzig."

John Stuart Mill (English philosopher, writer, logician and economist): "Until he was 14, Mill was educated at home by his father. He began to learn Greek at 3; and from then to his 9th year he studied Greek classics, making daily reports of his reading. At the same time under his father's direction he read innumerable historical works."

Every single genius at the top end of the IQ scale received intensive early training. Every single one was subjected to an extremely active environment, not one that folded its hands and waited for the child to "mature" but one that went after him and *trained* him when he was still of preschool age.

Perhaps it seems that these men were atypical because of the feats they accomplished early in life. How could a normal child ever learn Greek at 3, as John Stuart Mill did? Mill throws some light on the issue in his *Autobiography.*

> I have no remembrance of the time when I began to learn Greek. I have been told that it was when I was three years old. My earliest recollection on the subject is that of committing to memory what my father termed Vocables, being lists of common Greek words, with their signification in English, which he wrote out for me on cards. Of grammar, until some years later, I learned no more than the inflexions of the nouns and verbs, but after a course of Vocables, proceeded at once to translation; and I faintly remember going through Aesop's fables, the first Greek book which I read . . . What he [my father] was himself willing to undergo for the sake of my instruction, may be judged from the fact that I went through the whole process of preparing my Greek lessons in the same room and at the same table at which he was writing: and as in those days Greek and English lexicons were not, and I could make no more use of a Greek and Latin lexicon than could be made without having yet begun to learn Latin, I was forced to have recourse to him for the meaning of every word which I did not know. This incessant interruption, he, one of the most impatient of men, submitted to, and wrote under that interruption several volumes of his History and all else that he had to write during those years.
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> The only thing besides Greek that I learnt as a lesson in this part of my childhood [before 8] was arithmetic: this also my father taught me: It was the task of the evenings, and I well remember its disagreeableness. But the lessons were only a part of the daily instruction I received. Much of it consisted in the books I read by myself, and my father's discourses to me, chiefly during our walks.

From Mill's account you receive the picture of a boy—not a machine that learned Greek at 3 and Latin at 8. Granted his performance is good, but notice the characteristics of this environment, evident from Mill's quote. The environment works throughout the child's waking hours; it takes pains to ensure that the child has learned his lessons; it carefully reduces the possibility of mistakes; it establishes a clear pattern for using what is learned; it forces the child when necessary; it establishes firm models for him to follow. This is an environment that will succeed with *any* healthy infant. Yes, if we could play a little game with history and switch the real John Stuart Mill with some unfortunate infant from the slums of London, the history books wouldn't change very much. The unfortunate would become a Mill.

It was no secret that John Mill was a "manufactured" genius, yet, partly because of Darwin, most people who lived in Mill's day were not convinced that such genius-building was possible.

To understand the situation, we must turn back two hundred years to John Locke, the English philosopher who took the first important step in emancipating man from the Old Testament conception of the human being as a thin veneer of goodness through which bleed the sins of Eve and Cain. Locke proposed that man's mind is something like a blank slate when he is born, a slate on which society would write. Many people violently disagreed with Locke, but they had no powerful weapon with which to fight him.

Locke was followed by a series of great philosophers—Berkeley, David Hume (who showed that man is not chained to God's will and that there is no way to know about God even if there is a God), Jeremy Bentham (great political and social reformer), and James Mill (John Stuart Mill's father).

John Stuart Mill was at the end of this chain, and in some respects he was its culmination, the proof that man could be molded. His life, his training, his intellectual heritage set him up as a symbol of the widespread reforms in education, law and politics. But his was not a unique case.

Before the stage is completely set, another strand of the story must be woven. To pick it up we have to go to the Continent six years before John Stuart Mill was born. Here we find Karl Witte, an Austrian clergyman, expressing his views on education to a group of local instructors. Karl is complaining that traditional education places too much emphasis on natural aptitude. The local instructors do not share Witt's views. They favor the idea that it's impossible to change a person's capacity to learn.

Finally, Witte—a little rednecked—says these words, "Now I naturally must keep quiet, for there are thirteen or fourteen of you against me. But I hope to prove to you in fact that I am right. If God grants me a son, and if he, in your own opinion, is not to be called stupid—which Heaven forfend—I have long ago decided to educate him to be a superior man, without knowing in advance what his aptitudes may be."

Witte keeps his word. A son is born in 1800, and his education begins from the cradle. His wife thinks her husband's efforts are a waste of time. She thinks that the boy is dull. The members of the instructors' circle are amused by the proceedings. But suddenly, the snickering stops. What had been a slow infant and a normal 4-year-old has become an exceptional 6-year-old; and then an almost astonishing 9-year-old.

Most of those in the old instructors' circle are saying that the child's mental superiority had been evident from birth. But not all of them. Here is part of a letter from a friend, dated June 3, 1810 (when young Karl was almost 10):

Honored friend:

> You have kept your word! Your Karl has become what you promised before his birth he would become, nay, he has done even better. When, ten years ago, you declared to me ecstatically in the presence of our deceased friend Glaubitz that you were hoping soon to be a father and that you fervently wished to be the father of a healthy son, you added the unforgettable words, If my son will be healthily organized, I am determined to educate him to a superior man.
>
> I then contradicted you, saying that the success of your favorite plan did not depend alone on the health of the boy you were expecting but more especially on his natural aptitudes. . . . I continued to express my doubts, but Glaubitz assured me that you had already transformed a boy

> in Switzerland in a short time into a more than common man, although he had been given up by his former educators as almost stupid. I then promised you that I would delay my judgement until your boy should someday appear himself and speak for or against your assertion. Here he is, your boy. I see him in manly maturity, with childlike innocence and goodness in a rare union—a charming picture of ennobled humanity! O lead me into a room filled with such men, and I shall deem myself to be removed from earth and in company of higher spirits!

It seems safe to conclude that the friend was impressed. And according to other sources, his enthusiasm was not unfounded. Young Karl entered Leipzig at 9. He received his Ph.D. at 14, his Doctor of Laws degree at 16. He was immediately appointed to the teaching staff of the University of Berlin. At 23 he became a full professor at the University of Breslau, and he remained there for the rest of his life, building a reputation as a teacher, writer and scholar.

Before Karl was 20 years old, his father had written a book detailing the boy's training. It contained over a thousand pages of almost unreadable, monotonous detail. However, some people read it and some believed. One seems to have been a mathematics master at a Belfast academy, James Thomson. Although he subjected all *four* of his children to an active Witte-type environment, his oldest two sons were the ones who received the intensive treatment. And they became gifted. By the time they were 10 and 12, they were admitted as regular university students at Glasgow. "No brain can stand it!" the critics shouted, but the two Thomson boys went ahead, distinguishing themselves in school and then later in life—James becoming an authority on engineering; his younger brother, William, one of the nineteenth century's greatest physicists, Lord Kelvin.

One of the more prevalent beliefs about early education in the days of the Thomson brothers, Mill, and Witte was that it would sap a child's vital energies and strain his brain. Mill lived to be 67 years old, and although his life was not a model of psychological adjustment (since he suffered a "nervous depression" as a young man) he was productive to the end. James Thomson lived to be 70 years old. He, too, was productive until the end of his life. Karl Witte and Lord Kelvin both lived to be 83 years old and both were productive until their last days.

But the issue about early education had been settled long before any of them died. It had been settled in 1859.

That was the year of Darwin. The theories of the day had been shot through with the optimism of reform. Even the theories of evolution had been optimistic. They held that animals could transmit acquired characteristics. If a giraffe stretched his neck hard enough, it would become longer, and this long-necked tendency would be transmitted to the giraffe's offspring. And then Darwin stepped onto the stage. The conflict between optimism and fatalism was quick, the outcome decisive. The basis of this conflict can be studied in the two most important works published in 1859—John Stuart Mill's *On Liberty* and Charles Darwin's *The Origin of Species by Means of Natural Selection or, The Preservation of Favored Races in the Struggle for Life.* (Almost ironically, in the same year—1859—John Dewey was born.)

There it was—the weapon. Psychologists and anthropologists, geneticists and miscellaneousists had their proof. The giraffe didn't get his long neck by reaching, by exercising; *he inherited it.* So it is with intelligence. The mind cannot be stretched any more than the giraffe's neck can. Intelligence is inherited! The emphasis should therefore be on eugenics, on selective breeding. Forget about Mill, Witte, and the Thompson brothers. Forget about the effect of intensive early training. Instead, dig up genealogical facts; draw family trees. Find proof like the Jukes family with its umpteen generations of degenerates. Find genetically illustrious personages like Sir Heneage Finch (who had in his family tree he Earl of Aylesford, Daniel, 2d Earl of Nottingham, Thomas Twisden, and of course, Heneage Legge).

Today, our still current—but seriously threatened—beliefs about intelligence are not merely tinted with Darwinism; they are saturated with it. Binet, Piaget, John Dewey and practically all other important educational philosophers start from the unquestioned premise that man drops from the womb with a fixed capacity. The whole idea behind IQ testing rests on this assumption. The entire philosophy under which your children are educated hinges on it.

The belief in intensive early education was lost in the wake of Darwinism, but it sputtered again at the beginning of this century. A volume of Witte's works had been gathering dust in the Treasure Room of Harvard University Library—the only copy in the United States. It came to the attention of a handful of people in the Harvard and Tufts circle. Several of them were enthusiastic enough to give it a try. One was Dr. A. A. Berle, Professor of Applied Christianity at Tufts College. He educated his children according to Witte's principles. His daughter Lina matriculated into Radcliffe at 15; his son Adolf (who later became a renowned lawyer) entered Harvard at 13. Said Dr. Berle, "If this result had been secured with one child, the usual plea of 'unusual child' might possibly be raised. But it is unthinkable that there should be four 'prodigies' in one family!"

Another to try the Karl Witte approach was Leo Wiener, who later edited and translated Karl Witte's book into English: *The Education of Karl Witte.* Professor Wiener explains his philosophy of educating his children: ". . . I have sought to train them in effective thinking and to give wholesome food for the strengthening of the intellect. And I have always tried to present this food in an appetizing way—that is, to make the studies to which I wished them to devote themselves really interesting. It is the things in which children are most interested that they most readily learn."

His son Norbert had a different evaluation of his father's cuisine. He writes in his autobiography, *Ex-Prodigy: My Childhood and Youth,* "Algebra was never hard for me, although my father's way of teaching it was scarcely conducive to peace of mind. He would begin the discussion in an easy, conversational tone. This lasted exactly until I made the first mathematical mistake. Then the gentle and loving father was replaced by the avenger of the blood. The first warning he gave me of my unconscious delinquency was a very sharp and aspirated 'What!' and if I did not follow this by coming to heel at once, he would admonish me, 'Now do this again!' By this time I was weeping and terrified. Almost inevitably I persisted in sin, or what was worse, corrected an admissible statement into a blunder. Then the last shreds of my father's temper were torn, and he addressed me in a phraseology which seemed to me even more violent than it was because I was not aware that it was a free translation from the German."

Professor Wiener robbed his son of a great deal, but he provided an intellectually active environment, and Norbert (although he had a shredded self image) responded accordingly. He entered Tufts at 10, graduated at 14, and received his Ph.D. from Harvard at 18. He continued his studies at Cornell, Columbia, Cambridge, Göttingen and Copenhagen, and became the father of cybernetics, the great-uncle of communication and system theories. He died in 1964.

Some astonishing successes were achieved during the early 1900s. Unfortunately, the movement was, for the most part, in the hands of "eccentrics." Some of the environments that were provided taxed the limits to which children could be pushed emotionally.

Leta Hollingworth, in her book *Children Above 180 IQ,* reports on a woman who became so engrossed in educating her child that "she often accompanied him to school, sometimes registered for courses along with him, or herself took courses calculated to make her more useful in his training . . . During E.'s college career the two were often seen together on the campus."

Winifred Sackville Stoner educated her daughter in a relatively active environment. The daughter published a book of verse at 7. The mother wrote several books on education. In one of them, *Natural Education,* she provides some of the most interesting and entertaining arguments found in literature. She tries to discredit Montessori with the following: "Doctor Montessori speaks quite ironically of 'foolish fairy tales,' but if there are no fairies, then we mortals must have killed them with our cruel doubts. Fairies will not dwell with those who have lost faith in them. But I can not see how any one doubts fairies' existence when he stands by a sleeping baby's couch and watches the smiles playing on his rosy lips. Surely the imaginative fairy hovers about the babe and whispers stories which make him smile."

In another place Mrs. Stoner uses the case-history method to demonstrate the value of early education. "Fitzgerald Villiers-Stuart, the 7-year-old author of

The Biography of a Brownie, and Byron Cade, the remarkable young pool player, are all examples of the early development of innate tendencies."

Henry Olerich, another early training advocate, selected an orphaned infant "to test in a practical way a new theory of education which we believe to be much superior to any system heretofore used." The 8-month-old girl he selected was "an average one in good health. . . . She was, however, somewhat pale and sickly . . ." At 3 years of age she was described by *Pedagogical Seminary* as "advertised by some as the most advanced junior scholar on record. She has been exhibited in many American cities . . ."

We don't know what happened to Viola after her early accomplishments. Olerich doesn't mention her in his later writings, probably because he became interested in problems of greater magnitude. In his preface to *The Story of the World a Thousand Years Hence* (a 177-page book published over twenty years later by the Olerich Publishing Company) he has this modest statement about the value of his present contribution. "It [the book] clearly points out how every man, woman, and child can live a free, easy, independent, happy life financially, industrially, domestically, socially and parentally. It clearly and definitely presents the first real glimpse of ideal civilization, a real heaven on earth, and is, therefore, the most important message ever delivered to struggling humanity."

The exponents of the movement were eccentric, but they succeeded in making their children gifted. At one time, shortly before World War I, there were three handmade prodigies at Harvard. One of them was William Sidis, the son of Dr. Boris Sidis. The father seemed to be insensitive to his boy as anything but a kind of exhibit. Years later, the advocates of fixed capacity cried that the father had stretched the son's mind too far and that it had snapped. Certainly something happened, but was it an overstretched mind or an emotional reaction?

Norbert Wiener gives a partial answer. "Young Sidis, who was then eleven, was obviously a brilliant and interesting child. His interest was primarily in mathematics. I well remember the day at the Harvard Mathematics Club in which G. C. Evans, now the retired head of the department of mathematics of the University of California and Sidis' lifelong friend, sponsored the boy in a talk on the four-dimensional regular figures. The talk would have done credit to a first- or second-year graduate student of any age . . . The papers had a field day when, after one or two years of limited success at Harvard, Sidis received a job at the new Rice Institute in Houston, Texas, under the sponsorship of his friend Evans. He failed to show the maturity and tact needed to make good at this impossible task. Later on, when he carried a banner in some radical procession and was locked up for it, the papers were even more delighted.

"Sidis broke down after this episode. He developed a resentment against his family so bitter that he would not even attend the funeral of his father . . .

"I saw him many years afterward, when he used to haunt the halls of the Massachusetts Institute of Technology. His intellectual career was behind him. He asked for nothing more than a job at which he might earn his bread and butter as a routine computer, and the chance to indulge his simple amusement of collecting streetcar transfers from all over the world. He avoided publicity as he would the plague."

The active environment succeeded with William Sidis. However, it was presented in an impossible emotional setting. William fought back with his most powerful weapon—rejection of his father and himself. But the advocates of laissez-faire education didn't see it that way. They began the chant of "overstretched mind." Textbooks on abnormal psychology contained a brief reminded of the streetcar-transfer-collecting unfortunate for M.I.T., and the issue was closed. Good people, the authorities agreed, do not push their children.

But even while the Sidis episode was unfolding, another interesting case was reported, the case of Martha. Martha learned to read at a very young age. As an older child, she achieved an IQ of 150. However, Martha is of primary interest not because of her performance but that of *her brothers.* She had two older brothers. The oldest, according to Lewis M. Terman, "has the highest IQ I have found among California children . . . The boy was given a course in intensive mind culture similar to that employed in the case of Martha . . . There is one other child in the family, a boy two years younger than John. This boy was given a course in intensive mind culture similar to that employed in the case of

Martha . . . There is one other child in the family, a boy two years younger than John. This boy is making an average record in the third grade and seems to be little if any more advanced in intelligence than the average child his age. *This boy enjoyed no special instruction like that given the other two children for the reason that the father at the time was fully occupied by professional duties."* [Italics ours.]

After the failure of William Sidis, parents still taught their preschool children, but seldom admitted it. They would often say, "Imagine little George learning to read all by himself! I didn't even know about it." Unfortunately, the theorists of the day were only too eager to believe these comments, because they needed support for the idea that gifted children are genetically different from normal children. Accordingly, the authors of the California study concluded, "Nearly half of the gifted children learned to read before starting school . . . Most of these learned to read with little or no formal instruction."

Nearly forty years later, a response came from Dolores Durkin, who investigated the spontaneous early reader. She writes, "Parents sometimes say of their preschool child: 'He learned to read all by himself.' Data on these 49 early readers indicate that *none of them learned without some kind of help."* [Italics ours.]

Score one point against the notion that the gifted child is a genetic phenomenon. Return to the California Study and score a few more.

1. The children in the study showed no exceptional early development. In fact the parents did not first notice that their children were gifted *until they were 3 1/2 years old.* That these children were not gifted from birth is rather difficult to explain genetically.

2. A healthy majority of the subjects who had siblings were first-born. A similar tendency is seen among historical geniuses. There is no way to explain this tendency genetically, because the genes cannot know in advance whether the present effort is to be the first born, the fifth, or merely a nice try. The only explanation that makes sense is that the first-born child is the one who is in most direct communication with adults, who is charged with the greatest amount of responsibility, and who is therefore subjected to the most active environment.

3. The parents of these gifted children were probably quite a bit more pushy than they claimed to be. Over 70 percent of them indicated that they “allowed the child to go at his own pace.” But consider: most of the subjects received private tutoring and spent an average of six hours a week working on their outside lessons. This is a pretty good indication that the parents encouraged their children a bit more than they admitted.

The genetic interpretation of giftedness and intelligence is a myth, supported by an almost unbelievable collection of folklore. It is a cruel joke, but it is not funny when you consider that your child is the victim.

Chapter III—The Theory

THE LEARNING PROCESS—A STEP AT A TIME

Reduce your vocabulary to several hundred of the simplest words, and step into a world of bizarre shapes and sounds. Put a familiar figure—a mother perhaps—in the scene. Now try to pay attention. You can tell by the sound of her voice that she's trying to teach you something. But what? She's walking and saying, "Fast." She's telling you about the room. The room. Now she's walking again, but she looks different. Mad maybe. No, not mad. She tells you about the room again. "Fast," she says. Or is it about her? You thought it was called "walking," not "fast."

Oh well. "Fast," you say.

She smiles. "Slow," she says. But she's *still walking.* Something's not right. You'd like to go out and play. Instead you search the room for the slow. It must be around someplace. You're confused.

There are two elements in any learning situation, a teacher and a learner. In the preceding chapter, we looked at the teacher's most obvious characteristics. Now we are looking at the learner.

One hundred percent of all healthy children who have parents interested enough to try teaching such concepts as *fast-slow* learn these concepts. So we know that the child will learn what her mother is trying to teach. But how? How does she find that invisible quality we call "fast"? Many learning theories would have you believe that the young child operates on a concrete level, that she digests concrete sensory impressions and somehow spits them out again as a concept. But how can this process lead her to *fast-slow?*

Yet the child learns to understand *fast-slow.* The concepts and skills in her repertoire bring her within range of it. They let her know that her mother is trying to teach her something. They tell her to direct her attention to her mother. They provide the root concepts to which *fast-slow* will attach, the words that describe the motion and those that describe objects. "See, *mother* is *walking* fast." "The *train* is *moving* fast." "The *turtle crawls* slowly." This is as far as the concepts in the child's repertoire take her. She must travel the rest of the way alone in one jump. There are no halfway steps. There is nothing between what she knows and what she must learn. In a year, she will deal with similar concepts through analogy, noting the similarity of certain concepts to *fast-slow.* But for the present, she must leap and hope.

LEARNING AND EVOLUTION

The human infant comes into the world with nothing but a few primitive reflexes, his sense organs—and his brain. When the infant matures, he will be the smartest animal on earth. This is a fact. It is also a fact that no other animal is born as vulnerable as is man. Other animals have instincts that tell them when to become afraid, when to fly north, when to fight, when to mate—and how. These animals start with more information than man and end with less. The lower they are on the phylogenetic ladder, the more they start with and the less they are capable of learning. A frog whose optic nerves are crossed, so that the image that should be coming to the brain from the left eye comes from the right, will never learn to adjust. If he wants to strike at an insect to the right, he'll move left—a hundred times, a thousand times. Virtually all of his knowledge is wired in. There is a report of a human, on the other hand, who had *an entire cerebral hemisphere removed* and still attained an IQ of 115.

Man must be prepared to learn from any of a thousand teachers. While instinctive knowledge might serve him well in some situations, he would be at a disadvantage in most others. He is therefore born with nothing that interferes with *any teacher.* His brain is nonspecialized.

And here we see a parallel between the learning process and the evolution of life forms. Nonspecialized life forms are able to achieve the greatest evolutionary development; nonspecialized brains are capable of achieving the greatest thought development. The price man pays for his oversized, nonspecialized brain is slow initial learning. To understand why this is true, think of the brain as a pegboard on which your opponent pales a single peg. You don't know where the peg is, because you are blindfolded. Still blindfolded, you try to put your peg next to his. You keep trying and trying until you succeed. Obviously, the difficulty of this game depends on the size of the pegboard. If it is small, your task is not difficult. If it's the size of Rhode Island, you are in trouble.

The pegboard inside man's head is tremendously large. A newborn horse learns to walk in less than two hours, a dog in less than eighty. The human infant requires over six thousands hours to learn to *crawl.* Yes, the physical environment presents the same basic problem to all animals. All must learn to keep their center of balance in a certain relationship to their supporting limbs, keep the appropriate limbs rigid. A human obviously has a greater ultimate capacity than a horse, yet the horse outperforms the human on *initial learning* tasks. Furthermore, the relationship between ultimate capacity and initial learning speed can be seen up and down the phylogenetic ladder. The organism with the greatest ultimate capacity is the one with the biggest cortex (the biggest pegboard) and the one that is slowest during the initial learning stages.

Isn't it possible that this relationship also holds within a species? Isn't it possible that a healthy child who is slow during his first two or three years is actually a child with a bigger pegboard and therefore a greater ultimate capacity? The advocates of fixed intelligence say no. They maintain that since IQ is genetically fixed, the fast-learning infant will be the fast-learning adult. There is little evidence to support this position, and it is just as reasonable to take the opposite stand. Actually, the most sensible conclusion seems to be that any healthy infant, fast or slow, has the potential necessary to become "gifted." Remember, if you judge the capacity of a human—any human—on the basis of his *initial learning speed,* you would have to conclude that horses should ride men and dogs should master them.

LEARNING AS EVOLUTION

Historically, the theory of evolution has been opposed to the theory that intelligence can be molded. Strangely enough, however, the two theories are not necessarily incompatible. If we study the principles of evolution in relation to *the learning process itself* and not to the native capacity of the learner, it becomes evident that learning is actually a kind of evolutionary process closely paralleling the evolution of life-forms in at least four ways:

1. Both evolution and learning move in fixed steps. In evolution, there is no halfway step between a mutation that provides protective coloring and one that does not. In learning there is no halfway step between the concept *ball* and the higher order concept, *red ball.*

2. The driving force of both evolution and learning is sheer trial and error. For every new form of species that survives, there are thousands that die off. Similarly, for every acceptable idea the mind creates, thousands fail. Trial and error has to be the driving force of learning, because the child cannot look into the future. He has no way of knowing in advance how the environment will react to a given idea. The only—the *only*— way he can find out is to try out an idea and note the reaction of the environment. Remember, the child comes into the world prepared to survive in virtually any intellectual environment. This means that since he cannot look ahead, he must produce the basic responses demanded by virtually every environment. He must produce the sounds he would need to learn virtually every language in the repertoire of man. Only in this way will he be assured of producing the sounds of the particular language he is expected to learn. Similarly, he must experiment with a host of rudimentary ideas to assure that he will stumble on the ones considered necessary by his particular environment.

3. Both evolution of life forms and learning are characterized by a process that can be described as "natural selection." The natural selection of ideas is quite similar to the selection of life forms. Those that are not consistent with the environment's very narrow demands are rejected. We like to think that some

environments are “intellectually liberal.” Actually, they are not. Even the most liberal environment doesn’t allow the child to think that all men with deep voices are “Daddy,” that all letters are “a,” or that there can be any appreciable deviation from the required concepts. Environments that are quite liberal have been created artificially by placing subjects on soft beds in surroundings that are almost devoid of sights and sounds. Subjects who are placed in such environments for prolonged periods show significant signs of mental and emotional disintegration—sometimes becoming haunted by zany hallucinations.

4. Both evolutionary changes and the learning process are generally irreversible.

We pictured the mind earlier as a kind of pegboard. Actually, it’s more like a dark catacomb of caves. When the child comes into the world, these are unmapped. An incoming sensory impression is free to wander through them, pausing from time to time to mark a spot that seems appropriate. And then it continues wandering aimlessly through the dark echoing chambers. Slowly, the structure of the mind changes. As the infant matures the chambers become illuminated. The points at which incoming impressions most frequently pause become linked together to form a modest rail system that meanders through the caverns. The system is awkward at first. Collisions of impressions and ideas are frequent. Movement is slow and is achieved only through great effort. The tracks are not firmly rooted and cannot stand up under heavy loads. The child learns more about his world, and the rail system becomes improved. The rails become shinier, faster. The paths are more direct. A newly installed set of switches keeps impulses zipping along on a precise schedule. What had been accomplished through the greatest effort is now achieved automatically. Once these tracks are laid, once this system is established, the mind is relatively fixed in its potential and limitations. It is possible to tear up the tracks and re-lay them, but the original tracks were laid on a perfectly flat, smooth surface. When the system is torn up, large chunks of the surface come with it. Any replacement system must therefore be laid over extremely rough terrain. This system can never achieve the speed or efficiency of the original. There is a certain note of finality about the track-laying process.

The function of a preschool education is not so much to teach the child specific facts as it is to direct his track-laying efforts and help him build the kind of system that will require the least amount of rebuilding. The highest evolutionary development is possible only if the system is smooth and properly directed. A preschool education assures such direction. It is insurance against the development of complicated but cumbersome systems somewhat analogous to giant sloths or brontosaurs.

RULES, RULES, RULES

To look at learning from another angle, let's go to the town of Doom, which is located in the flood plain of a great dammed river. The dam is weak and will soon break. The mayor of Doom is not particularly concerned, however, because the citizens of Doom are the most completely logical and obedient people in the world. So she forms a committee of the most logical of all. "Now, people," she says, "follow my instructions to the letter. Determine what the condition of the dam is, and draw all the logical conclusions you can. I want your report in two weeks." The members of the committee go out obediently with clipboards, slide rules, calipers and Geiger counters. Two weeks later, they submit their report, a voluminous thing that tells about the structure of the dam, its weaknesses and so forth. The report concludes, "The dam will break within two months, in which case an estimated ninety to one hundred percent of the population of Doom will be killed. Immediate evacuation could save one hundred percent of the lives, however."

Three days later the dam breaks and ninety to one hundred percent of the population of Doom is drowned. Why? Simply because there is no logical connection between the statement, "Immediate evacuation could save one hundred percent of the lives," and the command, "EVACUATE." The command is not implicit in the statement. It follows from personal motives. The committee was given the verb *is.* All strictly logical conclusions therefore had to be expressed with this verb. But the command "evacuate" does not depend on the verb *is.* It uses the verb *do,* the language of action, which never can be derived from *is.*

The human mind, according to the traditional learning theory, functions in a manner similar to the committee in Doom: it is supposed to deal in information received through sensory impressions. And yet, if this theory is correct—if the mind deals in information—how can it act in the way we know it acts? Assume that a ball conveys the impression of ballness or roundness, or whatever. This "ballness" comes into the mind as a kind of visual fact, or an expression of what *is.* If the mind is to use this information, it must use the language that is given, namely that of visual facts. Any conclusions must be expressed in this language as an *is* statement. *The incoming impression therefore can never become linked with the word "ball" because obviously the word "ball" is not in the language of a visual fact,* just as the command "EVACULATE!" can never derive from *is* statements. To link the visual fact with the word, the mind would have to use action language.

This point is not easy to see, but it is extremely important and worth mulling over for a few minutes. The language of the mind must use the verb *do,* and the verb *do* is not contained in any sensory impressions. At best, sensory impressions can create a certain feeling of pleasure or pain; beyond that, nothing—no necessary information about what the organism should do about it. A ball is capable of communicating an infinite number of concepts. It contains enough information to form links with any concept in the repertoire of human experience. In addition to "ballness" the ball, that innocent little plaything, is porosity, buoyancy, inertia, gravity, inches, miles, pounds, ounces, beauty, nonmetallic, nonconical, non-Mr. Jones, and on and on forever. But none of this information *has to be* derived from the ball. A certain feeling on the retina, a certain taste and smell—these are the only necessary derivations. Any further refinement is a creation of the mind.

One of the fundamental canons of traditional education is that children learn from concrete things and progress from the concrete to the abstract. This notion would have a strong appeal if the mind could deal with things directly. *But* *the mind deals only with rules about things.* Rules are abstract notations. So the mind does not move from the concrete to the abstract but from the abstract to the more abstract. From the beginning, the child learns rules. She learns to track objects by making up rules about moving her eyes. Nothing concrete here. The rules apply to all objects, not to a particular, concrete few. She learns to walk by making up rules about her center of balance. She doesn't merely learn to walk on a certain floor in a certain concrete situation. She learns to walk on any flat surface. She learns to talk by making up rules about controlling her voice. She learns the concept "chair" by making up a rule that tells her how to identify, classify and use the concept. At no place along the way does she deal directly with concrete things. It is a serious mistake to think that she does.

Learning Involves the Entire Child

The instructor has drawn three lines on the board. The one in the middle is noticeably longer than the other two. The instructor now starts around the class, asking, "Which of these lines is the longest?"

"The one on the left," says the first young man.

"The one on the left," says the next, and the next. All members of the class except Peter are shills and are in on the trick. Finally, the instructor comes to Peter.

"What about it? Which of these lines is the longest?" Peter is a little surprised at what a big production the instructor is making about something so obvious. "The one on the left," he says. And he actually believes it. Peter does not see what is on the board. He sees what his classmates said they saw.

Not everybody reacts as Peter does in this experiment. But everybody is governed by the same need that prompted him to rework the raw data he received. This is the need to live in a predictable world.

All thinking and learning are motivated. A thought is information expressed in the action language of *do.* In imposing the notion of *do* man imposes *himself* on every thought. Thoughts are not foreign objects wandering around in the brain. They are creations, born out of a great deal of trial and error. They exist for the simple reason that they serve the thinker in making sense out of jumbled impressions that constantly bombard him. They make his world more predictable and orderly, less full of surprises and contradictions. They represent a massive personal investment. Their creator will not easily give them up. If you tilt his world or warp the mirror in which he sees himself, he will go to great extremes to preserve cherished rules. He may fight back, with rage and fear. He may kill or go insane. Or, he may find a much easier solution—resolving the conflict as Peter did by “seeing” the left line as the longest one.

A reaction similar to Peter’s was observed in concentration camps during World War II. Inmates who had been subjected to brutal punishment resolved the horrible inconsistency of their predicament by believing that the guards and officials were perfectly justified in their brutality. By accepting this idea, life once again became sensible.

A similar reaction is seen among young children who cripple themselves merely to prove that their parents are correct. These are children who have been told they are stupid. “Why aren’t you more like your sister? Why did she inherit all the brains in the family?” The child deals with himself in much the same ways he deals with other objects and relations. He makes up appropriate rules. In making up the self rules, he starts with the premise that his father is always right. If the father says he is stupid, he must be stupid. And he proceeds to prove it to himself by being deliberately stupid.

A trained observer can quickly spot a child who has been led to believe that he is stupid. The child will manage to give the wrong response even if the task is relatively easy for him. When he is asked a question he tenses up because he *knows* what is going to happen. He knows that the wrong answer will slip out, and that he won’t be able to hold it back. He pauses and his eyes dart. He fights down several words; then he says the wrong answer and he seems almost relieved. “I don’t know that,” he says. “I keep forgetting.”

A child of 5 with a distorted self-image can be rehabilitated. He can gain confidence and achieve reasonable adjustment, but it takes time and the rehabilitated child will never be as quick as an uncrippled child.

A wide variety of teaching methods can achieve reasonable results. Some of these are very permissive and “child centered.” Others are quite directed and stern. Some use teaching machines, others rely on teachers. But they all have one thing in common. They help the child to believe that he *is* capable and *can* succeed. Unless the learning task is presented in this way, a long-range learning program will fail.

Conversely, a teacher can make up for a host of mistakes by enlisting the child’s total resources, and getting him involved in the learning situation. Dorothy’s case history is typical. When we gave Dorothy her initial reading lesson, she was in first grade, rapidly becoming a candidate for the remedial group. She came from a large working-class family. She was quiet and shy. While her mother had not yet completely destroyed Dorothy’s image of herself, she was working at it. “I’m afraid she’s going to be like the oldest, Henry. Never could seem to catch on to reading.” Dorothy had received no grade on her first report card because “There was nothing to grade,” her teacher said. “No response.”

Six weeks later, Dorothy had been promoted out of the slow reading group. Her mother was now dragging Dorothy around the neighborhood, reading book in hand. “You ought to hear this young lady read!” she would announce. And unless you were pretty quick on your feet, you *would* hear her read. And she wasn’t bad. In fact, the results achieved with Dorothy were phenomenal. But these results had far less to do with the method we used to teach reading than the method we used to teach *Dorothy.* The secret formula was the *pride* we instilled in her. We spent most of the early lessons convincing her that she was intelligent. At first she resisted. But soon she grew to like the idea what *we* thought she was smart. She wouldn’t let us down. She would work hard so that we would not find out the truth. She worked as hard as anyone we have ever seen. Then it seemed as if she realized one day that she was actually doing the things she wanted us to think she could do. She could read. She *was* smart.

Before long, even her mother admitted it. Dorothy was saved. All it took to save her was the truth. Dorothy was intelligent. All healthy children are.

The platitude, “Learning involves the entire child,” is true. The child makes up rules about everything in his world, including himself. Self rules are particularly important because they deal with the competence of the rule-maker. They influence his entire output of rules.

In making up self rules, the child tries to see his reflection in the environment. And he thinks he succeeds, because he does see something out there. He doesn’t know that he is actually looking at a model of himself. He doesn’t know that this model may be only a hideous caricature. He sees it and treats it in the same way he treats all other things in his world. He makes up rules that seem to conform to what he sees. If he sees a miserable failure, a child who can’t please, can’t succeed, he will make up the appropriate rules and he’ll respect them.

The human animal is the only one on earth so intelligent that it can actually *learn* to be stupid.

How Specific Are the Rules?

In 1935, Dr. H. W. Nissen was testing West African natives who failed miserably on simple visual-perception tests such as the form-board test. The object is to fit the appropriate block into the appropriate hole (the square block in the square hole, and so forth). Despite the terrible performance of the natives, however, Dr. Nissen was reluctant to conclude that these natives were actually inferior in visual perception. Why? Simply because Dr. Nissen himself was quite a source of entertainment for the villagers. Even the very old native women could see signs in the bush that completely escaped him.

The notion of general visual perception is an illusion. We don’t merely learn to *see.* We learn to see specific things. The tennis player sees certain motions of his opponent that tell him where the ball will go; the adult reader sees whole words; Dr. Nissen’s natives see signs in the bush.

To get an idea of how detailed, how specific the rules are for learning to see, come back to the early 1930s. The operation for removing congenital cataracts has been perfected only recently and it provides a rare opportunity for studying exactly what is involved in seeing. The operation enables adults with congenital cataracts to see them for the first time. These adults can tell us what they're experiencing. They can follow instructions.

The investigator enters the hospital room, greets the patient, and places a cube of sugar on the table in front of him. The patient studies it and says, "Sugar cube." The investigator then picks up the sugar cube, places it in his other hand and asks, "Can you tell what is in my hand?"

The patient strains. Finally, he says, "Sugar cube."

The investigator now suspends the cube from a string. "Can you tell me what this is?"

The patient squints. He cocks his head one way and then the other. After perhaps a minute, he says, "I don't know what it is."

The investigator turns a colored light on in the room and again places the sugar cube on the table. "Can you tell me what this is?"

"No."

This patient received his sight *eleven months ago* and he is still unable to identify something as visually simple as a cube in any but the most familiar visual circumstances.

Let's visit another patient. This one has received two weeks of intensive training in distinguishing a square from a triangle. Most learning theories assume these are simple configurations that are perceived as wholes. Let's see.

The investigator presents a card with a triangle on it. "Can you tell me what this is?" she asks.

The patient nods his head. "One." He pauses and nods again. "Two." He repeats the procedure. "Three. It's a triangle."

The investigator says, "Can't you identify it without counting the corners? Look at it."

"No, I'm sorry."

A simple configuration? No. A triangle is the sum of many specific rules that tell about the triangle, and about the different ways it can be distorted by changing its position or the setting in which it appears.

Man's complex abilities are the product of his complex experiences. This axiom holds for any complex ability. Man has the capacity to remember, but what he remembers is strongly influenced by his experiences. Consider Silas and Clem, two fictitious characters who demonstrate the influence of experience on memories. Silas is a city boy, a first-class sissy. He is an only child and is not allowed to play with other boys, because his disposition is far too sensitive. He is "encouraged" to do a great deal of reading and to be very quiet at home and in school. He has an IQ of 136 and has never received a mark lower than A—or a bad mark in his deportment. Clem is a country boy. He spends most of his time with his two older brothers. He's helped his dad overhaul the truck and the tractor, and he helped build the new barn. Clem is a joker in school. He plays the class clown and he's good at it. He sings in the church choir. He has an IQ of 92.

An examination of their IQ tests shows that Silas scores much higher than Clem on "memory items." Can we conclude that Silas has the superior memory? Certainly, as far as a kind of verbal learning is concerned. But an IQ test provides a pretty narrow definition of "memory." Let's broaden it somewhat.

First, let's see which boy can remember the most about spoken German after a month's training. This is a test of memory on verbal items. Yet Clem wins.

Now let's see which boy is best at learning and remembering the lyrics of a song he has never heard before. Clem wins again.

Next, a test to see who is best at remembering a tune. Clem wins (this time by default, because Silas can't carry a tune).

A test to see who is better at remembering a route that leads to a log cabin way back in the woods. Clem finds the cabin after only one trial. Silas gets lost after eight.

The next test involves learning three smutty jokes. Clem, the class clown, wins again.

Finally, the boys are tested to see who can remember most about the relationship of the parts in an electric motor. The motor is disassembled and the boys are quizzed about the various parts. Clem wins by a country mile.

All of these tests clearly involve "memory." Yet each one is relatively independent of the others. Telephone operators score high on those IQ questions that measure the ability to repeat a series of numbers, "2 5 6 3 4 8 0 1." However, idiot savants (severely retarded children who have developed a strange set of rules about language) exhibit almost fantastic rote "memories." It would not be unusual for one to repeat these numbers, in order: 2 8 5 7 3 4 0 1 6 3 7 3 2. Or perhaps he'll recite them in *reverse order.* Yet, this same individual may not be able to remember a three-word sentence that is repeated a dozen times. The point is this: there is no such thing as "memory" or "perception" or "learning speed" apart from specific tasks. And a child's performance on a given task is predictable if you know something about the *experiences* he has had. He doesn't merely *learn;* he learns specific facts and relations.

The Illusion of General Learning

In addition to specific fact-type learning, there seems to be a more general "intuitive learning." However, this is an illusion, much like the illusion that all motives are conscious.

The feeling of intuition is actually nothing more than the by-product of a very sloppy learning situation. It can be induced merely by presenting a concept in such a way that the learner must spend an unnecessary amount of time trying to learn it. The intuitive feeling can be eliminated by improving the presentation, thereby reducing the amount of time required to learn the concept. Since most of a person's basic concepts were acquired in a rather sloppy learning situation, these concepts demonstrate the point nicely. People generally cannot do a very good job of defining such concepts as *behind, fast, same*—concepts from which very important conclusions and deductions derive. In fact, people will rarely admit that they use certain definitions of these words, even after it has been demonstrated that these definitions are absolutely essential to the understanding of the concepts. These people have an illusion of what the concepts mean; and this illusion interferes with the intelligent use of the concept. It is difficult to draw conclusions from something if you aren't sure what it is that you're drawing from.

Let's go back to the child who is trying to learn *fast-slow,* and see how this illusion gets started. She is sending out many possible explanations: some have to do with the light coming through the window, others with the dress her mother is wearing, others with her posture and feeling. In the midst of this activity, she sends out the core rule, the rule for *fast-slow* that works. It tells her to "say 'fast' if she covers the distance in less time."

But the child does not limit herself to this rule. Instead she fuses *all* of the hypotheses that are going on at the time into one molten tangle. Why not? The environment didn't indicate that these other ideas were unfit. So everything that hasn't been rejected gets used. The resulting rule may contain an awareness of an itchy shoulder blade, a command for the child to bob her head, a dark unconscious equation about anger and "fast," a feeling of soft light, a pattern of color that appears on the mother's dress, a few isolated words, and somewhere in the scramble the core rule. This rule works. *But it doesn't work as well as a more streamlined rule would,* simply because the rule has too many unnecessary parts.

Here's what happens to the child who has learned a sloppy rule for *fast-slow* when she tries to learn the concept *acceleration.* Her mind starts manufacturing thoughts. It knows that *acceleration* is blood-kin to *fast-slow,* but that's all it knows. It doesn't know which part of *fast-slow* acceleration is related to. So it has to test all of the parts. It has to manufacture thoughts that relate acceleration to the yellow flower pattern, to the soft light, and to every other part of the original rule. It doesn't know ahead of time that acceleration is related to the distance-time part of the original rule. The more parts there are to the original rule, the longer the testing process will take. The longer the testing process takes, the more *irrelevant rules* the mind will have made up. Those that aren't rejected by the environment will become attached to the concept of *acceleration.*

The cycle is self-perpetuating. Rules with many irrelevant parts beget rules with many irrelevant parts. Sloppy learning begets sloppy learning.

Transfer and Generalization: The Lazy Person's Way to Learn

Not everything the mind learns is direct learning. There is also the kind of learning that is called "transfer" or "generalization." The child transfers or generalizes when he does such things as putting an *ed* ending on past-tense verbs. He has somehow generalized the *ed* principle.

Learning theorists generally regard transfer and generalization as "nonspecific" phenomena. What transfers is supposed to be some kind of vague strategy.

There is only one rather crushing drawback to this position. How can a child's behavior be quite specific if what he's using is "nonspecific?" Look at the child. He doesn't put *ed* endings on nouns. He doesn't say, "I sitted in the chaired." He may say, "I sitted," but not "in the chaired." And he always puts it on the end of verbs, never at the beginning: "I edsit in the chair."

If what transferred were nonspecific, he'd have no basis for using it, and his behavior would be completely accidental and unpredictable. When the child transfers or generalizes, he's actually using the same approach he uses when he makes up new rules, with one exception. He doesn't make up anything new. Instead, he takes a part of a rule, without the slightest revision, and plugs it into a new situation. Sometimes the process works, in which case it is a terrific time saver. Other times, the result is something like the word "sitted."

Nobody has to teach a child to transfer or generalize. The trick is to direct him, to provide the rules that will lead to the most productive generalizations and transferences. The more irrelevant the details that are fused into the core rule, the more possible directions in which generalizations can go. However, the environment specifies only a few acceptable directions. Any deviation from these directions merely consumes time and contributes to a system that is awkward and slow in dealing with intellectual tasks. The greater the deviation, the slower the system—the slower the child.

Meaning What?

The teacher points to the picture of sheep. "See? Here are three sheep. One . . . two . . . three. Now look what happens when we add two more sheep. We have *five* sheep." The teacher believes that she has done a good thing. She has taken horrible addition and explained it in terms of something the child can comprehend—sheep. She has taken an abstract meaningless notion and transformed it into the concrete. She has made the experience meaningful for the child.

Or has she?

What kind of "meaning" is she trying to implant? Is she trying to clarify the core of the concept, or is she trying to show specific relations? Probably a little of both. Primarily, however, she is trying to instill the *illusion* of meaning. She is trying to make the experience meaningful in the same way she feels its meaning. Unfortunately her feelings have little place in content education because they have no public significance. She is dealing with something that is quite specific, but it is hidden in a morass of personal meaning. She believes that this formless meaning is an essential part of what she's trying to teach, but she is wrong.

When the teacher tries to make material meaningful in this sense, she is contributing *nothing* to the understanding of the concept. In fact, she's helping to teach the child to learn a clumsy concept. The real meaning of the concept she's trying to convey is the core meaning. Although this type of meaning is not generally recognized by educators, it is the one of primary importance in any learning situation. The core meaning is simply the essential part of the total meaning stripped of irrelevants.

Core meanings don't exist in vacuums. They are different for different tasks. The only way to find the core meaning is to start with a specific task, such as addition. Then play a game of "Can we do without you?" Take the most obvious parts of the total meaning and ask yourself, "Can we teach addition without referring to sheep? Can we teach addition without referring to cows?" And so forth. Every time you answer "yes," you have eliminated a part of the total meaning from the core meaning. Every time you say "no," you have found a part of the total meaning that is essential to the understanding of addition. This means that addition can be comprehended without understanding how addition relates specifically to sheep. You can teach addition in terms of sheep, but you'll be teaching a relationship that is not essential to the understanding of addition.

All of those concepts that *cannot* be eliminated through the "Can we do without you?" game are essential to the understanding of addition. No matter how much they are obscured under the crust of irrelevant detail and "oblique" meanings, they are *essential.* Without them, there can be *no* understanding of addition! As you will see in later sections they do not resemble the concepts normally considered as necessary prerequisites to addition. Instead they bear a striking resemblance to the logical structure of addition. The concepts that are essential to the explanation are a great deal like the concepts the theoretical mathematician uses.

Language, the Concept Carrier

The usual interpretation of language holds that words are the only source of meaning. Not so. Statements have a meaning that goes far beyond the meaning of the individual words. Statements are actually formulas for understanding the patterns in the environment's repertoire of concepts. These formulas allow the child to draw conclusions about ten little Indian boys or a forest full of pixies without having to assemble these objects.

The idea that the statements in the language have a meaning all their own may be a little hard to swallow. The following demonstration may soften it up a bit. Consider this argument:

All elephants have a trunk.

Farouk is an elephant.

Therefore Farouk has a trunk.

Obviously, you don't have to assemble a pack of pachyderms to determine the validity of the conclusion. It's true. Buy why? Its truth doesn't stem from the individual words and it doesn't necessarily stem from the "form" of the argument (although logicians would give quite a battle on this point). It stems from the basic assumptions of these statements. The conclusion is true because the argument expresses a truth about the structure of the physical world. In other words, it is true because it is true. And it is true regardless of what words you plug into it. It is true even when the words have no significance at all.

All fertwerts have youps.

Clarence is a fertwert.

Therefore Clarence has a youp.

The conclusion follows. You know that if the concepts *fertwerts* and *youps* meant something consistent with the statements, the conclusion would have to be true.

This truth certainly does not come from the words. Therefore it must somehow come from the basic assumptions of language.

The average reasonably advantaged child learns at least *one hundred* of these formulas *by the time she's 6!* And she uses them. The child in the extremely active environment learns them in a more precise manner and uses them in a broader range of situations. She therefore becomes more adept at drawing conclusions and making up productive analogies. Language is premised on a set of assumptions that link statements to events n the physical world, so obviously the child who has a broader knowledge of language formulas can draw a greater range of conclusions with a great deal less effort. Language is symbolic, not merely in its concepts, but in its operations. It enables the child to perform in seconds what it would take a languageless being days or perhaps centuries to achieve.

An Active Environment, a Cleaner Learning Program

Earlier we mentioned that the primary role of the active environment was not so much to teach specific facts but to guarantee that the child's mental rail system was progressing in the right directions and wouldn't have to be torn up.

Now we can expand on this idea. During the infant's initial learning, the active social environment is almost helpless in directing learning. The child must start with raw feelings and make sense out of them, and no power can simplify the job, reduce the amount of chance in the learning situation, or provide a shortcut. The child must grind away in all directions until he works out the right combination of rules. But every time the infant learns something, the direction of the next step becomes more clearly defined. When the 14-month-old infant wants to learn to say "bye-bye," he no longer has to grind away in all directions, just one. "Bye-bye" has to grow out of the rule for making the voice behave. All thought-manufacturing efforts must therefore be concentrated in this direction. Learning takes place faster.

With each step the potential of the social environment to influence the child becomes stronger. This doesn't mean that the social environment will necessarily exercise its influence; it merely means that the potential is there.

Some environments never flex their muscles and take advantage of the child's increasing ability to receive. The active environment does, however.

It works in two ways.

1. It pushes the child forward whenever possible. The human race required thousands of years to move up from the caves without outside assistance. The child doesn't have that much time. If he is left on his own, he may never learn the concepts he will need, and the chances are overwhelming that the concepts he learns will be so tangled with irrelevant detail that they will be quite clumsy in generating related concepts.

2. The active environment also assures cleaner rules by presenting concepts in a cleaner manner. The presentation is designed to *isolate* the concept from the irrelevant aspects of the situation. Illustration: The teacher in the active environment does not simply walk across the floor when trying to teach *fast.* She carefully rules out as many areas of possible misunderstanding as she can. She shows that *fast* is not another word for "mother" or for "walking" by showing that fast can be used *in connection* with these words. "See? Mother's *walking.* Mother's *walking fast."* Now she takes a toy car and scoots it across the floor to show that fast is more than a property of mother. "This car is moving, *fast.*" She has isolated the concept by showing that is doesn't belong to mothers, or walking, or cars. The child can now pinpoint his rule production. He will spend less time learning *fast-slow* and his total rule will contain fewer irrelevant details. By presenting a greater number of rules, and by presenting them in a cleaner manner, the active environment reduces the number of dead-end rails the mind will lay. It limits the direction of the mind's output and provides the mind with the kind of track-laying tools that will serve it throughout its existence. This is the active environment's primary role in increasing the child's capacity to learn.

Summing Up

Understanding the theoretical side of learning is not difficult if you start out with the unyielding premise that there is no magic in the world. Face that fact that not one shred of what the child learns is or can be given to her. No outside power can provide her with specific *facts* and specific *assumptions* about a specific interpretation of a specific environment. She must somehow provide the interpretation, the specifics.

Once you accept this position, then you can direct your efforts to explaining learning phenomena in the most unmagical manner possible. Yes, the working of the mind is cryptic on the neurological and electrochemical levels. Yes, sometimes it is even confusing on the behavioral level. But a great deal of this confusion can be stripped away if you realize what has to be. A child has to deal with rules of action and only rules of action. She has to deal with specifics. These specifics have to tell her both about her environment and herself.

The environment has to bear the responsibility for the kind of rules the child makes up. It presents the raw material from which the child must build her rules, and it rejects rules that aren't adequate.

The differences in environmental presentations have to account for the range of differences observed in the human animal throughout the world. The environment has to be empowered with the capacity to transform the "universal baby" into a Trukese or an upper-class American, into a moron or a genius. A child is the product of what he learns. Her intelligence, capacity and range of skills reflect his environment—her teachers.

Chapter IV—What You Must Know

From what is known about the nature of the child and the nature of the learning situation, we can arrive at rules that create the proper intellectual climate for the child, both during lesson periods and during the rest of the day. These rules are important. Familiarize yourself with them before you start working with your child.

Recognize the Fact That the Concepts the Child Learns Before His Fifth Birthday Are Among the Most Difficult He'll Ever Encounter

Evidence that the normal child is potentially gifted is offered by the concepts he learns during his preschool years. He learns such extremely relative, abstract relations as *me* and *you.* "When I talk about me, I refer to either me, myself, or I. When others talk about the same entity, they refer to he, himself, him, you, or George Hansen." Here's another: "When you face me, your left is my right, but your up is my up." There is nothing trivial about these concepts. For the equipment the child has when he tackles them, they are as difficult as any concept he'll ever encounter. Don't ever minimize them. Don't ever assume that they are easy.

Recognize the Importance of Rote Learning

If a child is to learn a complex skill, she must move in essential steps. Each step is not merely interesting or important, but absolutely necessary. What follows depends on it. So it must be learned; it must be taught. Sometimes it can be taught by analogy; sometimes by context. But in many instances it must be treated as a raw irreducible element, in which case it has to be taught by sheer rote. Educators are generally anti-rote. But their position is inconsistent and stems from a failure to realize that certain steps are essential prerequisites to a concept. They think that the child can "get the general idea." She can't. She learns only specifics. Please note: We are not advocating a memorization approach. We advocate the fastest, most productive way of climbing the ladder of abstraction. If certain rote elements are *essential,* we advocate teaching them. If, on the other hand, they are unessential (like the hordes of multiplication and division facts teachers feed children in a school mathematics program) we suggest not teaching them.

Recognize the Importance of Language

The child can take the words and formulas of language and construct rules from them. Language is the quickest and most certain way to teach the higher abstractions a child should learn.

Recognize That the World of Concepts Does Not Have a Completely Consistent Pattern

An impatient father is trying to teach his extremely talented 5-year-old son how to tell time. The father instructs the child to refer to the right side of the clockface as the “after side” and the left side as the “before side.” The child can’t seem to keep them straight. After his fourth or fifth mistake, the father blows up, “Damn it,” he says. “How many times do I have to tell you? THE RIGHT SIDE IS THE AFTER SIDE!” He continues in this vein for several minutes. When he’s finished, the child, who is in tears, gingerly touches the left side of the clockface and says in a high, strained voice, “But Dad, this is the clock’s right side.” It all makes sense to the father now. But his insight comes a little late. People have a right side to their face. Why shouldn’t a clock have a right side to its face?

This is not a singular example. A child’s incorrect rules aren’t the reflection of an inferior mind or native slowness. Usually these rules are quite intelligent. They stem from specific confusion about how far a rule should be extended.

Recognize That the Child's Rules Can Always Be Inferred and Expressed in Words

The child isn't going to wave a flag and say, "Look, I'm extending the notion of reversal to something that can't be reversed." But his behavior will give him away. A teacher should be primed to make inferences from his behavior, not about what a stupid kid he is, but about the specific areas in which he is confused. As you will see in the following sections, these inferences are not too difficult to draw if you know what you're looking for and if you start out with the idea that a child's mistakes can be expressed in words and boiled down into a simple statement of his rule.

Present Minimum Necessary Rules

The child can turn verbal statements into rules just as you can change his rules into verbal statements. That's because the cores of the thought and the verbally stated concept are identical. To the teacher this means that she can present stripped-down streamlined concepts, reduced to their logical core. She can present them as a series of statements. The child can take these and transform them into streamlined near-minimum rules, free of irrelevant detail and yet perfectly adequate for the tasks that will follow.

All skills can be taught from verbal rule-type statements, whether these skills deal with learning to judge the trajectory of an oncoming ball, learning to stand on your head, or learning to solve a problem in solid geometry. But they apply especially to verbal, symbolic learning. And when skills are taught this way, as minimum essential cores, they are handier. They are better deductive tools. They lead to the generation of cleaner ideas. They simplify future learning.

Try to Appreciate the Meaning a Concept Has for a Child

One of the most disastrous mistakes educators make is in assuming that a child who does not “understand” something in the way they understand it has no understanding at all. They assume that a child does not fully understand the notion of “time” until the child has had a great variety of time experiences. This mistake is the result of confusing the “felt meaningfulness” of a situation with the core meaning. Do not make this mistake. Remember that a child can have a very narrow understanding of “time” and still deal effectively with certain time problems. The core meaning derives from specific tasks, not from amorphous feeling. Granted, the ultimate goal of education is to provide the child with a very broad understanding of concepts. But this goal should be achieved through ordering different tasks and building the core meaning in planned stages.

Recognize the Threat of the Learning Situation

Look at learning from the child’s point of view. One day she identifies the letter *K* and you praise her. A few days later, she says “K” and you nod. A few days later she says “K” and you reply, “Yes, but what *sound* does it make?” What has happened? She said it just as well as she ever had, but now, for some reason, the answer won’t do. When you ask a child to learn, you’re asking her to abandon responses that are known and experiment with ones that are unknown. You are asking her to change her world when she would rather dig her nails into it and hang on. The potential rewards for her sacrifice are praise and a strong sense of accomplishment.

The promise of rewards must overbalance the inevitable threat of the learning situation. Until it does, the child will not be an eager learner. She cannot appreciate the rewards of learning until she’s experienced them. Therefore, you must *push her.* Only about one out of ten children would learn much if the decision to learn or not to learn rested with them. They would go along with the learning situation until they felt threatened. Then they would decide that learning was not for them after all. Despite the common-sense assumption offered by many educators, children are not good judges of what they can learn or when they are ready to learn it.

Stick to a Regular Teaching Schedule

Children of 2 or 3 years are fairly rigid in their behavior. Their rigidity is simply a defense against a world that's too full or surprises and squashed expectations. A rigid schedule lets them know precisely what's going to happen next. As they grow older, they usually realize that their rigid behavior slows them down, just as their security blanket held them back when they wanted to play outdoors. So they relax their rigid hold. You should encourage them to do just that.

You should be on guard for signs of over-rigidity, but you should also make use of the child's rigid tendencies. Make lessons a rigid part of his daily schedule and you will not only reduce the threat of the learning situation; you will make the lessons a necessary part of the child's day.

When the child begins formal instruction, have lessons at least five days a week, at a special time (such as immediately after breakfast) in a special place. As the child gets older, become a little more flexible about the place and time.

Keep Your Explanations Short and Simple

Remember that the child's knowledge of the world is fragile and skeletal. He understands things only in terms of this bony framework. It's a drastic mistake to assume that he knows much more.

He cannot follow you when you go into more than a two- or three-sentence elaboration on a subject, because when you start to elaborate, you're no longer talking in terms of familiar rules, or you're no longer talking about these rules in a familiar manner. Explanations make much more sense when they're reduced to a simple statement about a single issue. You will probably discover that when your child makes persistent mistakes, you are presenting more than one task for him to learn. It may seem to you that there is only one, but if you examine your explanation, you'll see that you probably weren't talking in simple statements, but complex ones that required learning more than one skill.

Isolate the Concept You're Presenting

Here is the general formula for making presentations that *should* allow the child to take one clean, quick step:

1. Consider how you can present the concept in its simplest form. Use the fewest number of props, the shortest explanation, the simplest situation. Reduce the variables and you reduce the number of possible blind alleys.

2. Anticipate the possible wrong interpretations the child can make. If there are four elements in your demonstration, there are at least four possible kinds of mistakes. Try to find them. After you have worked with the child you will be able to make pretty good guesses about the possible areas of difficulty.

3. Rule out all of the blind alleys but one. If you're teaching *fast-slow,* for instance, use the procedure we mentioned earlier to rule out the possibility that the concept has to do with anything but an object in motion, and rule out the possibility that the concept belongs to a particular object in motion.

4. When you find that the child is going down a blind alley, correct his mistake immediately, and try to infer the kind of rule he must be using. You can't always rule out blind alleys beforehand—in fact, you'll be doing well if you can rule them out half of the time. Usually there is only one rule that can account for mistakes. Use whatever is handy to create a contradiction between his rule and the one you want to get across. Show him that his rule can't survive. Do it gracefully, but dramatically.

We are talking in rather abstract terms here. But in the following sections we will present many examples of how the formula applies to specific learning tasks. Remember the general formula, however, You will have many occasions to apply it.

Require the Maximum Number of Responses

Misconceptions are the worst flaws a teaching program can have. They are symptoms of an entire association track that must be uprooted and replaced. If the misconception has been used for any length of time, the uprooting becomes extremely difficult. And the rerouted system will have to be laid over scars. It will never be as smooth as the original.

Private tutoring is far superior to the classroom in reducing the number of misconceptions a child develops, and private tutoring produces noticeable IQ gains, not uncommonly fifteen to twenty-five points after a year of such tutoring, regardless of the method used. These gains are not solely the result of reduced misconceptions, but the reduction of misconceptions plays a vital role.

Take advantage of the tutoring situation by requiring the maximum number of responses. Remember the child's correct responses will reinforce rules he is learning.

"There are seven days in a week. Say it . . ."

"There are seven days in a week."

"Very good. Are there thirty days in a week?"

"No."

"How do you know? You know because there are *seven* days in a week. Are there 360 days in a week?"

"No."

"How do you know? Because . . ."

"There are seven days in a week."

"Very good."

Recognize the Effects of Stress on Learning

When a rule works for a child, he invests emotion and part of himself in it. It becomes a predictive tool that he relies on. The more he relies on it, the more self he has invested in it. Fundamental rules, such as “Falling from a high place results in hurts” are never questioned. They are too loaded with “self.”

Rules that are being learned don’t normally have a great deal of self-investment in them. The child hasn’t learned to rely on them yet. But when stress is introduced, the situation changes. Emotion and feelings of self become attached to new rules. Since these rules are loaded with “self,” the child confuses them with rules that he has learned to rely on.

The net result of this process is that the child in a stress situation tends to repeat the same mistakes, over and over. The more vehemently you try to extinguish the incorrect response, the more persistently he will hang onto it. When he behaves in this manner he is not being willful or stupid. He is giving the response that seems correct to him, the response that is loaded with self and should therefore work.

Try to avoid stress in the learning situation. Keep the number of incorrect responses down. And always try to correct a child’s responses in a way that will introduce the least amount of stress.

“Seven days in a *month?* I know what happened here. You remembered two statements at once. Let’s see if we can straighten them out. How many days are in a *week?”*

“Seven days in a week.”

“Sure. So there can’t be seven days in a month. There are thirty days in a month. Say it . . .”

This approach is much better from a learning standpoint than the more natural and traditional “NO!” approach. Failure words (such as *no*) slow down learning by increasing stress. Use them sparingly.

Never end the lesson a sour note. There will be times when your patience will run short and stress will enter the learning situation. When these situations occur, remember to provide a solution for the child. Show him that he can work his way through stress situations. This is important. Always end the lesson on a pleasant note, even if it has been a complete flop. Just as the last thing you eat usually leaves the most vivid taste in your mouth after a meal, the last part of the lesson is the most vivid for the child. So always make sure that the child leaves the learning situation with a sense of mastery—not failure and bewilderment.

Allow the Child to Learn a Full Range of Abstractions

Introductory explanations on any subject should deal with the raw core—no flourishes and nuances, just the bare rudiments in the simplest, most dramatic manner possible. As the child progresses—as she begins to put some meat on the bony skeleton of original rules—explanations can become more casual, more relaxed. Ultimately, the child should learn to handle abstractions on all levels, from the precise approach used for beginners to the very casual inarticulate approach used for graduate students. The child who learns to handle explanations on only a few levels is in trouble.

Actually, you won't have to worry too much about introducing the more casual approaches. This comes naturally. You will probably find it much more difficult working out the precise explanations tailored for the beginner.

Teach the Child a Set of Rules That Works

This is the primary aim of any educational program. But to achieve it, you've got to extend the teaching situation far past those few minutes each day that are devoted to formal teaching. If the child is to have a workable set of rules, he has to know more than how to read on a third grade level or how to solve algebra problems. He has to understand his place in the family and in the universe of the neighborhood. The image that he learns at home should fit. He should see himself not as a member of royalty, but as a child—a smart child but nevertheless a child. He should understand quite firmly that he is not the pivotal point of the universe. He should see the ways in which he's like other children.

If he sees himself as others outside the family will see him, if he knows what to expect, he won't be disappointed or hurt when he ventures outside the family circle. He will have a set of rules that work.

1. *Be consistent yet human.* There has been a great deal of emphasis on parental consistency in child rearing. It has stemmed from the findings that children who are subjected to grossly inconsistent behavior become severely disturbed. This is quite true. A certain amount of consistency is necessary. However, it does not follow that parents should try to behave in an ultra-consistent manner. Ultra-consistency, in fact, encourages the child to learn an oversimplified set of rules about the world, because ultra-consistency allows her to live in a world that is artificially predictable. What she learns in the home will not serve her outside the home when she faces the irrational, subtle, unpredictable side of humanity.

During lessons, be patient, consistent and predictable. At other times, be pretty much yourself, and try to be reasonably consistent.

2. *Don't lie to the child.* "Mommy? Why do I have this belly button?"

"Oh, darling! *Must* you ask such questions?"

There are many ways to lie. This mother has just demonstrated one of them. She indicated through her social evasion that the child's question is not a proper one. This is a lie.

Lies should be avoided whenever possible for the simple reason that they lead the child to learn unproductive rules. When he learns that great areas of life should not be questioned, he's learning one of the most unproductive rules imaginable. For a child to develop creatively and not merely mechanically, he should know that anything, *anything,* in the world of thought can be questioned. This doesn't mean that he should be allowed to spout questions in an incontinent stream or that he should use them as a transparent device to interrupt your conversations with other adults. He should understand the restrictions on question-asking, but he should know that any question is legitimate.

3. *Don't over-answer questions.* Don't try to turn questions of policy into something reasonable.

"Why do I have to take a nap?"

The mother answers with reasons. "Naps are good for growing children, and I think you'll be grouchy if you don't take one."

“But what if I don’t want to take a nap?”

That is a question of policy. She should give the most accurate policy reason. “You have to because I say so and I’m the boss. When you grow up, you can be boss. But until then, you’ll have to do what I say. To bed.”

These frank statements make a lot more sense to a child than an argument that never seems to strike a reasonable, plausible note. Satisfy the child’s need to know, but don’t over-answer with windy explanations and don’t conceal the real answer with rationalizations.

4. *Don’t be afraid to show your ignorance.* If you set yourself up as an idol, you will just encourage the child to learn a let of rules about you that she’ll have to unlearn—painfully—when she’s older. Let her know that everybody makes mistakes. A child will ask many questions that will be beyond you. “Why do seeds grow up?” “What’s this thing on the washing machine for?” “Why does Daddy have whiskers?”

If you don’t know, there’s only one answer: “I don’t know.” The answer to some questions may be found in reference books. If so, you may want to look up the answer with the child, thus demonstrating that even very smart mothers and fathers learn new things.

5. *Give the child plenty of free time.* We’ve stressed the point that the most active environment is the one that produces the greatest learning gains. Please don’t interpret this to mean that you should ride herd on your child all day long. Mothers who do this aren’t actually providing an environment with greater vistas of learning. They’re sifting many dimensions out of a rich environment and funneling everything through an oversimplified, artificial medium—Mother. They’re robbing the child of a great part of his education.

Let the child work out rules for handling life, not simply the child-mother phase of it. Let him learn from wagons and skates, from taking the role of the bad guy in a game of cowboys and Indians, from watching stones form rings on a puddle of water, from trying to make up rhymes, from watching ants in the grass, and from being teased by older children.

Formal lessons should not consume more than one to one and a half hours of the child's day. In the remaining time, he should be free to think, to play, to be a child.

6. *Help your child develop a positive (but realistic) image of himself.* We've mentioned this point before, several times. But it warrants another reminder. Rig the learning situation so that the child feels that he has succeeded, that he is smart. And tell him he's smart. *Never* tell him he's stupid; *never* make adverse comparisons with other children. And *never* allow his brothers and sisters to suggest that he's stupid.

7. *Help the child to develop desirable personality characteristics.* Harold charges into the kitchen. "I want a cookie," he announces.

"Sorry," his mother says, "that's not the way to ask for it."

"Please!" Harold says.

"No, not in that tone of voice."

Harold flashes a frozen grin. "May I please have a cookie?"

She hands him a cookie.

"I can do a trick," he says. He motions for her to bend over. Then he hugs her and kisses her on the cheek. She gives him another cookie, and he runs outside.

Harold's mother has a rule: Only one cookie in the afternoon. But this rule is not like the one about taking a nap or crossing the street. This rule is made to be broken. Harold's mother uses it to encourage Harold to develop desirable personality characteristics. She is showing him that *some* rules (and only *some*) can be broken with "charm."

Teaching, when it is stripped of its mysticism and sentimentality, is the cold, hard business of reinforcing desirable responses and extinguishing undesirable ones. No parent wants to look at teaching his child with such a calculating eye—few parents can. But the fact remains that the parent has to mold the child. Part of this molding process involves the child's personality and general approach to the world. A parent who thinks he's saving his child a portion of pain or anguish is completely misguided if his child learns that he can punish people merely by thrusting out his lower lip and stalking off to a corner. In the big wide world, nobody will care. The parent, therefore, should not allow the child to learn such rules.

Encourage persistence. “You are a hard trier. You just keep on being that way, and you’ll be able to do anything you wish.” When the child works on a job to completion, let him know that he’s done well. Reward him. Perseverance is probably the most valuable intellectual asset any human can have. Also reward humor, kindness and other personality traits you think are valuable.

Do not reward crying, pouting and irritating baby-like behavior.

8. *Help the child to develop physical as well as mental skills.* Granted, physical skills don’t have a very direct relationship to mental skills. But there is an important relationship. If the child’s physical skills are not up to par, she will not be equipped to associate with children her own age. So she will retreat to the soft predictability of home. And she will slip further and further behind. The further behind she slips, the less she has in common with her peers and the less she wants to associate with them.

A child must learn a great deal from her peers. She must learn how to argue, how to play, how to pretend, how to belong. She must learn conventions and taboos, status symbols and subtle cues. If she doesn’t learn much of this from her peers, she isn’t going to learn it.

Teach your child to throw a ball and turn somersaults. Roughhouse with her, and see to it that she plays with other children. Physical skills are helpful in assuring acceptance from the child’s peers. So they occupy an important position in any learning program.

Recognize Your Limitations

Most parents can be very effective teachers even if they blunder through their presentations, spend too many words on explanations, fail to interpret mistakes properly, and are generally weak in the technical aspects of teaching. They can compensate for a host of blunders by showing the child that they are on his side, even when the going is tough. But some parents cannot compensate for their mistakes because they cannot demonstrate to the child that they are on his side. They lose perspective, usually in one of two ways. Either they start to become a part of the child or they treat him as a kind of enemy who must be brought under control. The parents who become a part of the child can’t l et the child alone. They intrude into every facet of the child’s existence. They must know everything the child does and must share every experience. They can’t let go. They smother the child.

The parents who think of their child as an enemy can’t control themselves very well during the teaching session because they think that the child is being willful when he makes a mistake. So they scold him and punish him for his mistakes. They produce an unsure, unhappy child.

Neither type of parent can help himself. Probably both could benefit from psychiatric help. If you find yourself becoming too involved or too hateful, don’t teach, or if you do, teach on a more limited basis than we suggest in this book. Try to find out why you feel the way you do. The theory that rational understanding can cure behavioral patterns is grossly overestimated, but if you have an idea of why you act the way you do, you will have a base to start working from. Then you can begin to develop a new outlook. It takes time and work, but it can be done.

The Grand Principle

Give your children an active and realistic environment, not one that’s stereotyped and oversimplified, not one that neglects important skills or intellectual dimensions, not one that encourages patterns of behavior that won’t work outside the home. Give them an environment in which they learn who they are, what their role is, an environment in which they learn that they are loved, in which they becomes outfitted with all of the equipment—both physical and mental—necessary to meet the challenge of life.

PART TWO

The Preschool Curriculum

On the following pages is a fairly detailed description of what to teach the preschool child and how to teach him, a program designed to give you the information you'll need to be effective. This program is based on the "minimum-essential" concept. Its goal is to teach the greatest number of concepts and applications with the fewest number of rules and conventions. Therefore, teaching techniques are "extended" whenever possible. What this means, simply, is that if two methods of presenting a new concept work about equally well and one method has been used before, that one will be used again.

Naturally, you can deviate from the suggested presentation plan if you wish. We make no claim that this program is the ultimate achievement in preschool education. However, if you plan to deviate from it, please check ahead in the book to make sure that you are not bypassing concepts or methods that will be extended later. Space limitations prevent us from explaining the logic behind each element and the manner in which it will be extended.

The curriculum is divided into four parts, each part covering a specific age. These are: birth to 18 months; 18 months to 3 years; 3 years to 4 years; 4 years to 5 years. While there is a crude basis in developmental characteristics for this division, it was adopted primarily for convenience. It is easier to discuss the child's learning program year by year or stage by stage than it is subject by subject. The periods are arbitrary. There are no sharp lines in development.

Some progress norms are indicated throughout the training program. The primary purpose of these is to give you a *rough* idea of what to expect. They are designed to show you that some concepts, although they seem easy, require a great deal of time. Teaching counting to a 3-year-old, for instance, requires not a few days or weeks but almost a *year.* Don't pay any attention to the norms unless you train your child according to the method outlined. You can't work with a child twice a week and expect him to perform according to a five-day-a-week standard.

And don’t be surprised if your child deviates from these norms. The biggest differences should occur in subjects that are “sloppy” in their deductive structure, such as reading. In extremely slick deductive subjects, such as arithmetic, the child should stay fairly close to the norms throughout (except perhaps at the beginning).

Chapter V—Birth to Eighteen Months

The average 18-month-old infant has a vocabulary of about ten distinct words and a dozen others that don't quite make the grade. She is able to obey a few verbal commands, such as "Wave bye-bye," and she is socially responsive. The baby raised in a carefully controlled, active environment speaks a few more words and obeys a wider range of commands. However, the gains of the active environment are meager and represent a meager return in terms of the investment, the additional amount of time spent with the child.

Why spend it, then? Three reasons:

1. The child doesn't merely learn spoken words and responses to commands during this period. She learns what she is, where she is, and most important, who cares. She learns basic attitudes. Will she be cautious in approaching the world, afraid to try new things—or daring? The roots of her approach grow out of this period.

2. The child isn't the only one who learns. The teacher does also. She learns about her pupil. She watches him grow, and she observes him. She notes how much exposure he requires to learn such simple tasks as grasping a rattle. She thereby gains an appreciation of what he must go through to master more complex tasks. She practices teaching, and she learns tricks for holding attention. She interprets his responses, and she begins to appreciate how the world must look to him. What she learns during this period is as important as what the child learns.

3. Small gains during this period snowball into larger gains in following periods. If a preschool education is measured according to the amount of time required to teach given skills, one would have to conclude that preschool educations are worthless. Traditional learning theorists fell into serious error on this point. They said, "Look, a seven-year-old kid can learn to read in far less time than a four-year-old kid. So let's wait until he's seven." *This reasoning rests on the idea that the child is not learning anything in the interim that will interfere with his ability to become a good reader.* The absolute level of performance is what is

primarily important. If you can elevate the child to a high level of performance by the time he's 5 years old, he will be gifted, and the amount of time spent on various tasks doesn't matter too much.

Actually, we can't evaluate the meager gains of the active environment during the first eighteen months. But they are gains, and the maxim of the preschool education is that small gains become greatly magnified as the child matures. A small gain means that the child is pointing in the proper direction and that he is one step closer to the absolute level of performance he should achieve before he's 5.

The active environment concentrates on four major areas of learning during the child's first eighteen months.

1. It helps the child develop a positive image of himself and his world.
2. It provides plenty of sensory stimulation.
3. It provides adequate physical stimulation.
4. It teaches the necessary ground rules of language.

Help the Child Develop a Positive Image of Himself and His World

Love your baby, and let her know that you love her. Love is the handmaiden of education; it is a source—a most important source—of motivation. When the child is older, you will present learning situations that are potentially threatening to her security. But this threat is counterbalanced if she goes into the learning situation with somebody who radiates a sense of security strong enough to see her over the rough spots.

Emotional experiences are very important to the baby. If you play a record of obscure music every time you feed the infant, he will prefer that piece over other equally obscure pieces when he is tested later in life. (And as you might expect, he will not remember having heard the piece before.) We're not suggesting that a mother is no more than a piece of obscure music, but the same principle holds. She will influence his attitudes and capacity to learn more than any other person in the world, whether she teaches formal subjects or not. She will paint his emotions and help focus his eyes on what is "important."

She is his most logical teacher. She will be a much better teacher if the child learns to associate her with pleasant experiences.

So give him those experiences. Have fun with him. Pamper him. Show him he's an important person. Behave the way the typical loving parent should behave, and you'll teach the child some of the broadest and must useful facts of life he'll ever learn.

Provide Plenty of Sensory Stimulation

Parent to child: "Okay, now when you want to look at something close, you sort of cross your eyes a little more. Here, watch me. . . . Now it's your turn." Obviously, the child isn't going to learn to focus his eyes from this kind of experience. You can't reach him directly because he hasn't yet learned the rules necessary for communication. But you can reach him indirectly by providing lots of interesting things to look at, feel, taste, smell. Open his various "windows" of feeling, his sense organs. Bombard him with sensory experiences.

1. Acquaint him with a range of experiences. Create different moods. Let him explore both hard corners and soft pillows. Hang rattles over his crib. Move him from scene to scene. Change his position—prop him up, lay him on his belly, put him on his back, carry him.

2. Make sure that the intensity of the sensory experience changes from time to time. To bombard the child doesn't mean to have seven parts of the environment competing for his attention. It means to have ten one time, and one the next. People who work in factories with a high noise level develop a functional deafness. You don't want the baby to do that. So keep the sensory experiences from being mere noise. Do this by changing pace.

3. Maintain a reasonably high noise level, even when the child is sleeping. At this age he can learn quite easily to sleep with the radio on—and ability to sleep in noisy surroundings teaches the child how to concentrate under noisy

conditions. Both sleeping and concentrating on a mental task require a blotting out of the surroundings. If you suspend all activity and tiptoe around the house when the baby is napping, you're not doing him a favor.

Provide Adequate Physical Stimulation

Early physical stimulation helps muscles grow properly. Provide it by massaging the newborn infant's limbs every other day or so. Also tickle her. When she gets older, play roughhouse games in which she hangs and uses different muscles. The infant who strains a great deal with have better muscle development when she is older. This is the principle on which isometric exercises are based. (The placid baby should be helped with physical stimulation more than the physically active baby.)

Teach the Necessary Ground Rules of Language

An 18-month-old baby touches a ball and says, "Ball." This task seems to stand at the bottom of the ladder of abstraction. But it is not. It is the product of much learning.

Although you cannot do much to teach language directly to the infant, you can present language so that he learns its basic assumptions. And you can present tasks that enable the infant to learn a great deal about language before he actually begins speaking.

1. Teach the child to point to objects. You can point to things in an infant's surroundings for hours and he won't know what you're trying to do, because he's looking at one tangled nothing. But if you touch *him,* and name the part of the body you're touching, he can *feel* the significance of what you're doing. Although he probably won't distill the correct concept from your presentation, he'll have the scope narrowed considerably. Name the parts of his body while you are changing him. "This is your *hand. Hand.* I'll hold it up here where you can see it. *Hand.* And this is your foot. Here it is down here . . . *Foot."*

After the child is a year or a little older, have *him* point to various parts of his body on command. “Can you touch your foot? *Touch* your *foot.”* Show him how. Take his hand and touch his foot. “There. You’re touching your foot.”

Soon the child will have the idea that language is supposed to point things out. Extend the pointing tasks accordingly. Give him the name of any object he points to. “I’m taking off your waterproofs. Off they come. Oh, you’re pointing to your *waterproofs.* Good.”

Extend his knowledge of his body to your body.

“Can you point to *my* nose? Good . . .”

Next, extend pointing to the breakfast table, the bathtub and so forth. “Can you point to your *spoon?* Your dish? Can you point to the wall? . . . the ceiling? Good boy.”

Always reinforce a correct answer with a word of praise. Handle mistakes gracefully. If he touches your mouth instead of your nose (which he will probably do) say something like this: “Oh, I see. You want to show me my *mouth.* Yes, *mouth.* That’s good. But can you show me my *nose?* My nose? You want me to show you? Here it is . . . nose. I found it.”

2. Acquaint the child with the expressive qualities of language. Use different inflections to indicate different moods. Don’t use baby language, because it leads to a dead end. Instead, use regular words and an expressive tone. By changing inflections and moods you point out to the child that talking is not mere noise. It is related to things that are happening.

3. Teach the child that actions can always be translated into words. The culturally deprived child does not understand this maxim. As a result, she sees no contradiction in pushing down on a bar and saying, “I’m pushing up.” She doesn’t understand that this action is generating the statement “Pushing down,” and that her conclusion must be consistent with this statement. She can’t reason effectively with language because she can’t see how language is related to the physical world.

This relationship can be taught very easily during the infant’s first eighteen months (although the education does not end at eighteen months). Teach the infant that words can be transformed into actions and that actions can be transformed into words. Teach the first transformation by having her follow orders. In addition to pointing at various things, teach her "bring me" "kiss," "bye-bye" and so forth. The second transformation is achieved by describing what the child is doing, so that she learns that her actions can be transformed into words. "Oh, you're bringing me a book. That's the girl. Give Daddy a big kiss." "Look at that boy knock down blocks . . . and pick them up . . . and *throw* them at this moth—"

Show him that you've got words for every action.

4. Define the purpose of language. You are a model for the baby. You define the language for him. Is it something sparse and sterile? Is it so much chatter and noise? His conclusions will be based pretty much on your behavior. Ideally, he should learn that language is a *human activity,* something that people should do. He should learn that it is purposeful activity, and that it is an attempt to reach other people. He will learn this if you use language as it should be used, with inflections, and moods, familiar words and actions. Talk to the child; he'll listen and learn.

Caution. This period of childhood is the most difficult for parents. Babies come through it in fine condition. It is far more telling on the parents. The baby cries and they want to know why. Unfortunately the baby can't tell them, so their imaginations run wild. Before the baby is 1 ½ years old, they have probably worn out one copy of Dr. Spock and have their second copy well on its way.

To worry is natural. But try not to worry too much about his development. Individual differences among infants are great, because of neurological factors and because of sheer chance. The baby who happens to figure out the correct fundamental rules will be a long way ahead of the baby who doesn't. To speak about averages during this period is dangerous. The average baby walks at about 13 months, but the variation in performance is tremendous. Girl babies are usually ahead of boys in all early development—from grasping to talking. But a given girl may be considerably behind a given boy. Don't worry about slowness unless the child's departure from the norms is quite drastic. If you're in doubt, consult your doctor. Probably the best book for gauging the development of the infant is the Gesell Institute book entitled *Child Behavior.* The explanations of development are thoroughly ridiculous, but the norms and charts on behavior to 2 or 2 ½ years are very good.