

CHAPTER 1.

Visual and
Auditory
Materials
in Teaching

THIS IS A BOOK about teaching. It is a book about teaching with what we call audio-visual materials—a term we shall describe later. Before we can discuss these materials we must be clear as to what we mean by the word “teach.”

What does it mean to teach? There are several ways of finding the answer. We might consult the dictionary or ask a professor of education. Or, better still, we might visit classrooms and see what teachers really do.

During the past years the author has visited hundreds of classrooms. These visits provided an unusual opportunity to see what teachers mean by teaching. Too often, in the so-called “subject-matter fields,” the term *to teach* means to try to impart information which has been classified and systematized into “study” units in a textbook.

Under this conception of teaching the subject-matter has already been settled. It consists of “facts”—the hundred arithmetic combinations, some three to four thousand spelling words, facts about the eight parts of speech, thousands of poorly related facts in history and geography. Some of these facts, of course, are extremely valuable in themselves and are easily transferred to life situations outside the school. But altogether too many of them have importance only in the eyes of the teacher and within the four walls of the schoolroom.

For example, in one class I saw students spending two periods working problems on telephone rates, which involved the question of whether it would be more economical to pay a flat rate or to take a service which charged for all calls above a certain minimum. No one in the class inquired about the local telephone rates. There was no local telephone book in the classroom. In this

Materials in Teaching

situation to *teach* meant to work the rate problems in the textbook with complete disregard for the real purpose of such instruction, namely, to learn how to work local telephone-rate problems.

Here is an example of a different kind which suggests another definition of what it means to teach: I recently attended a meeting at which the high school curriculum was explained to parents. This particular school holds the “vestibule theory” of secondary education—that high school is a passageway to college. Throughout the entire evening not a single teacher or administrator present ever suggested that high school in itself had anything to do with rich and intelligent living, with health, with fine arts, with civic participation, with economic competence, with actually doing something in concrete life situations. To teach in this school means to do those things which prepare students for college.

What do you discover when you go to the students themselves and ask what they mean by “good teaching” or “a good teacher”? Two traits rank high on their list. Students say that they like teachers who are “sympathetic” and who can “explain things well.”

Here we are on the trail of a satisfying definition of what it means to teach. Webster defines sympathy as “reciprocal liking and understanding arising from community of interests.” Teaching, then, is a two-direction process, a sharing process—intercommunication: the reaction and interaction of minds. Learning blossoms in a mood of mutuality. Such a mood must permeate the classroom, the shop, the home, or wherever else teaching takes place, if it is to be good teaching. Good teaching involves the feelings as well as the intellect.

But that other trait so highly prized by students—what about this matter of “explaining things well”? To explain is to make plain. The word derives from *explanare*, which means *to spread out*. The teacher, in cooperation with her pupils, helps to make plain what the learning job is. When the learning job is “spread out” the pupils can see clearly what it is that must be done.

“Explaining,” then, is the service that the youngsters expect of a good teacher. The pupils may explain to one another by discussion. The teacher may have certain explanations visualized for them by means of a still picture, a motion picture, a graph, or a chart. She may give them a demonstration as a means of explaining. She may arrange a field trip, if such an undertaking will produce the best explanation of the particular subject under study. In short the good teacher will make use of the most effective means of explaining.

But good means available for teaching does not necessarily assure good use of the means. The most illuminating motion picture in the world will not “explain things well” if the teacher fails to use it properly. Here, for example, are some of the comments that we hear today when an effective teaching

device is used improperly. "The children were brought into an auditorium to see a film. There was no preparation or follow-up." "We have to see a certain film at a certain time, whether we are ready for it or not." "There was no real discussion afterward, only questions and answers." "The teacher as well as the pupils apparently accepted the biased material in the film without question."

Clearly this criticism is justified because such teachers have wrong conceptions of the use of audio-visual materials as well as of teaching itself. No course or book on audio-visual teaching materials will help a teacher to teach well if her fundamental ideas about teaching are wrong. She will merely learn to do more efficiently what she ought not to be doing at all. But if a teacher has a sound understanding of good teaching she will recognize and use all teaching materials as media—as agencies which help transmit understandings. She will realize that audio-visual materials are usually means and not ends.

The use of these materials calls for more than a mastery of the mechanics and for more than an understanding of their power as teaching techniques. The teacher must also have a sense of proportion. She must be clear about her purposes and their relative values. For if the process (of audio-visual materials) is confused with the product (effective learning), audio-visual materials may actually become the curriculum.

Teachers may ignore individual differences among pupils and use these sensory materials mechanically with little regard for their rôle in a cooperative sharing of ideas. Indeed the very concreteness and specificity of certain audio-visual materials may truly make them more authoritarian, more hide-bound, than the old-fashioned textbook. They may be used merely as a one-way communication process—from the teacher to the pupils—rather than as an agency for intercommunication.

No such dangers are likely to occur with a teacher who understands her rôle as that of guide and counselor. There will be little misuse of any teaching method in a classroom pervaded by sympathy and conducted by an adult who strives to "explain things well." For such a teacher will rarely lose sight of the over-all objective. She will use audio-visual materials properly because she appreciates their great value in making the learning experience of her pupils more meaningful and thus better remembered.

The teacher will not only equip herself to use these tools, but she will find herself quite naturally thinking of new applications and new techniques. Once she gets the "know-how" of audio-visual materials she will realize their great possibilities. Aware of how well these materials can be made to "work," she will want to experiment in making wider applications. And if she learns about these sensory materials from this book she will know without being reminded that no writer on the subject can hope to do more than equip her with technical guidance and examples and say "Go to it!"



Is this "good teaching"? However you define the term, there can be no doubt that these students at the Glencoe, Ill., Central High School are enjoying their study of volcanic phenomena.

▲ SOME CAUTIONS

This book is founded upon the principle that all teaching, from the first grade through the college level, can be greatly improved by visual and auditory materials because these teaching materials can make the learning experience far more concrete and memorable.

Let us examine this central idea so that it is not taken to mean any more or less than intended. The author does not mean that sensory materials must be introduced into every teaching situation. He does not suggest that all teaching methods which do not use a variety of these materials should be discarded. Indeed he regards the process of reading as of even greater importance than it is usually thought to be, and he would give much more attention to effective reading in all curricula.

On the other hand, the author believes that a great many teaching problems can be solved, partly or wholly, by the proper use of the rich experience which can be gained by certain methods of teaching to be described later. He does not offer these methods as a cure-all for every teaching problem. Being a teacher himself, he is only too well aware of many baffling problems faced by teachers. But he is no less certain that visual and auditory techniques offer great *opportunities for improving* learning; opportunities which we can scarcely envisage since the subject itself is so new.

Ten years ago advocates of "visual education" had not quite passed the pioneering stage. They had to convince many people that these new methods would really produce results. Today few people publicly oppose the use of audio-visual materials in education. The change has come about not only because of successful use of audio-visual techniques in teaching the armed forces, but also because these teaching materials have accomplished remarkable results in the classrooms of the nation during the last ten years.

However, the advocate of sensory materials has to be on his guard and so must the student who undertakes to learn how to use these techniques in teaching. Like every shining new gift, sensory devices may dazzle one into all kinds of wishful thinking. Hearing of the results achieved by visual instruction in training soldiers and sailors, some of us might decide that *all* teaching methods of the pre-war days were "all wrong," "obsolete," and "wasteful"; that textbooks should be eliminated and teaching principles completely overhauled. This is an extreme view, by no means justified by the facts about the new media.

Audio-visual materials must be understood in their relationship to teaching as a whole and to the learning process as a whole. Unless the teacher grasps this relationship, she can scarcely expect to make intelligent or fruitful use of

these techniques that offer her so much help in her daily tasks. Above all she must recognize that audio-visual methods are one group of methods designed to improve teaching—one group of methods and an enormously promising group, but not the only group.

The teacher must understand that it is worth mastering the methods of audio-visual instruction because they can promote good teaching when used properly. That is the best reason why she should equip herself to use them; in the last analysis it is the only reason. If she thoroughly understands and assimilates this principle, she will not make the mistake of regarding visual and auditory techniques as an end in themselves. She will know that they are merely a powerful means toward achieving her major purpose—good teaching.

▲ SOME QUESTIONS TO THINK ABOUT

1. Does the author maintain that audio-visual materials can solve all problems of teaching? Does he suggest that these methods be applied to every teaching situation?
2. What is your candid opinion of most textbooks used in high schools and in colleges? Do you think they should always contain many illustrations? Are you prejudiced in favor of or against any textbook that has a great many subheads? many charts and diagrams? many informal sketches? Why or why not?
3. If you were teaching the parable of the Good Samaritan, would you use comic strips as a last resort with a pupil who proved unwilling, despite all your efforts, to read the text itself?
4. What do you think the author has omitted in his discussion of what it means to teach?

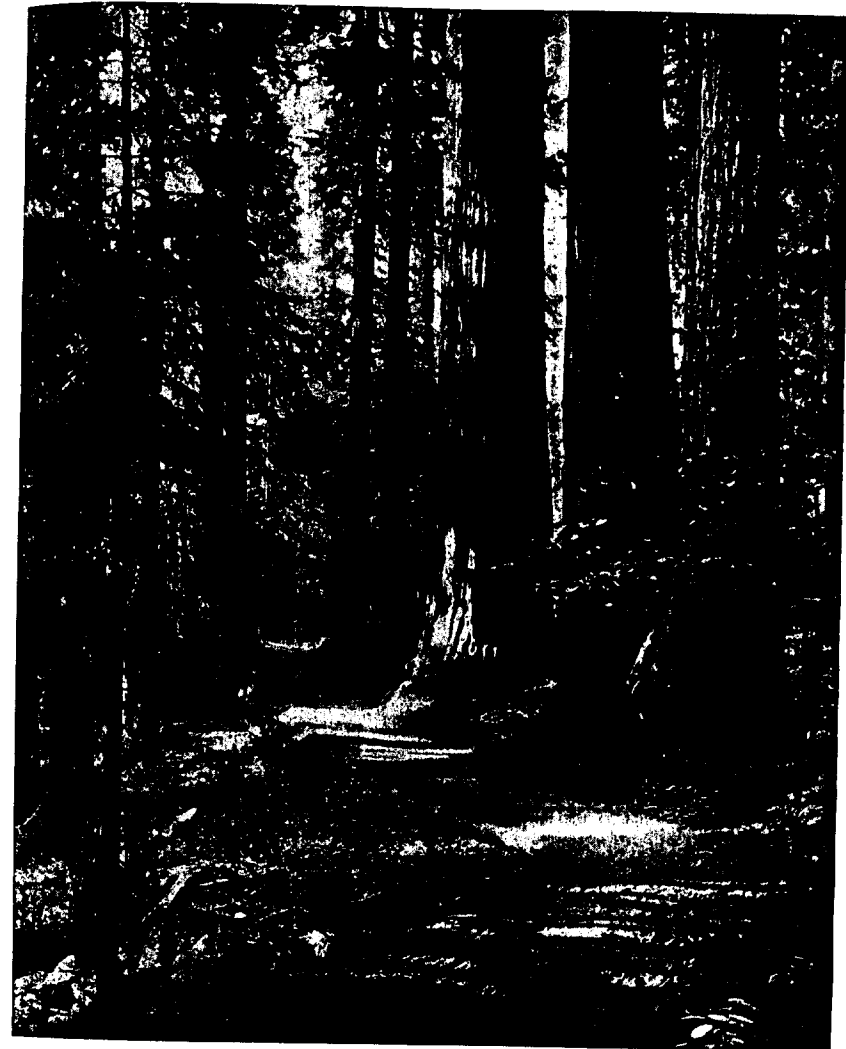
Education for "Permanent" Learning

WHY DO MY PUPILS forget so much of what I try to teach them?" This perplexing question that teachers ask themselves, is echoed by the pupils: "How can I remember more and forget less of what I have been taught?"

These questions are not new. Indeed, for as long as there have been records of teachers and schools, men and women have been striving for the answers. Some of us, concerned with this need for making learning more "permanent," turn to all kinds of possible sources for a solution. We ask ourselves why it is that sometimes we remember a speech we heard in our childhood as vividly as though it had been delivered yesterday. Why does something we read ten or twenty years ago come sharply into focus, but something we read last week seems vague? Is there some unusual ingredient in the effective speech or paragraph? Can we put our finger on it and set it to work in our effort to make learning "permanent"?

We may find some clues by examining a few typical instances of learning that somehow has never been forgotten. A group of college students volunteered from their own experiences a number of examples of "permanent" learning. Here are several, in their own words:

(1) I will always remember a lesson we had on atmospheric pressure. Instead of stopping with just one example of atmospheric pressure—such as the Magdeburg hemispheres, which stick tightly together when the air is exhausted from them—this particular science instructor gave at least ten additional illustrations. He used various methods, including some demonstrations that he performed before us in the classroom. He projected on a screen some drawings he had



This halftone reproduction of "The Three Graces" in the Sequoia National Park is far less memorable than a walk through these beautiful woods, but a fine picture can stir the imagination and deeply impress the mind.

made on etched glass. He also had our whole class do some experiments—simple ones—of our own.

(2) I never have any trouble remembering when to use “there” and “their.” I even remember the lesson I had on it in the fourth grade. The teacher said that an “heir” was an owner, and that “t-heir” showed ownership.

She told us to notice the word “here” in “t-here,” and to remember that “there” meant a place. Next, she put both words on the board and underlined “heir” and “here” in red crayon. She added, if the word does not mean ownership, you use “there.”

(3) I was a spectator in a fifth grade class that was having a demonstration lesson on the trapdoor spider. This happened at least five years ago, but I still remember the photographs that the teacher used, her drawings on the blackboard, and the movie she showed to the class. To top it off, she had the trapdoor nest itself demonstrated to the whole class by one of the pupils.

The lesson moved along largely by questions which the children asked each other and the teacher, and which the teacher asked of them. I not only saw a good and long-remembered lesson on the trapdoor spider, but I got an unforgettable lesson on how to teach simply and effectively.

(4) One day our instructor in a teaching methods class started his lecture in an unusual way. He kept twirling his watch—an Ingersoll. One minute we were afraid it would come off the chain, and the next minute we hoped it would. But he kept right on lecturing.

Then he walked over to the window ledge and picked up an electric bulb. As he lectured, he kept throwing the bulb into the air and catching it in an unconcerned manner. Then he got careless and it crashed on the floor with a big pop.

Then he said, rather quietly, “Now it is perfectly clear to all of you that little things such as I have been doing today can be very distracting. You don’t remember what I have been talking about.” Then he proceeded to describe some other annoying mannerisms of teachers. We all got the point. I have never forgotten it.

(5) One day the village drunkard sat down with me on an express wagon while I was waiting for my train to take me to the University. He said, “I’ll tell you something those professors mayn’t have told you and that you mustn’t ever forget.” I waited for him to go on. “You see that section-hand down there on the track?” I nodded. “Well,” he continued, “He can teach you something . . . I don’t know what. But whenever you sit down with anybody, anywhere, anytime, just remember that you can learn something from him.”

Later, when I was reading philosophy, I discovered that Emerson had said practically the same thing—“Do you know the secret of the true scholar? In every man there is something wherein I may learn of him; and in that I am his pupil.”

(6) My Brooks Fourth Reader had a picture in color of Dick Whittington on his way to London. I can still see it. I also remember another picture of a desert oasis in the same book.

These six examples, chosen from a great many other incidents of memorable

“Permanent” Learning

learning experiences, are clear enough in themselves. They are concrete experiences and each one makes its point simply. You have already made a generalization about each incident—you have already drawn inferences as to why these learning experiences have been vividly remembered. Each of them was a rich and meaningful event in the life of the reporter. There was “something” about each of these six episodes that fixed them indelibly in the memory—that made them “permanent” learning. But before attempting to set down the key elements in a memorable experience, let us attack the problem from another angle: *Why do we forget?*

To put it specifically, why do we forget so much and remember so little? Many students who have had two or more years of Latin cannot even translate “Post hoc, ergo propter hoc,” which they ought to have learned even if they had never studied Latin. Some even have trouble with “e pluribus unum.”

Students who have had a year of chemistry in high school often admit that they can remember only three or four formulas, usually NaCl , H_2SO_4 , HNO_3 , and H_2O . (By the way, how many do you recall at the moment?) Those who studied physics may have trouble with the formula $s = vt$. They are confused about the meanings of *ohm*, *ampere*, *watt*, and *volt*. Some are not quite sure about *latitude* and *longitude*. One, they know, measures the distance east and west of Greenwich, but which is it?

Some have studied the phases of the moon but they cannot recall why there are full, half, and quarter moons. They mistakenly believe that they are caused by the earth’s shadow (which produces an eclipse of the moon). They know that the earth is tipped on its axis $23\frac{1}{2}^\circ$ but if you ask them “Tipped in relation to what?” they cannot remember. Some do not recall that they once learned that in the northern hemisphere the earth is closer to the sun in winter than in summer. If you ask them to explain this apparent inconsistency of things remembered and things forgotten, they are at a loss.

Perhaps we may find some clues to this question of forgetting, by listening to some explanations from college students:

(1) I had a course in geography in college. We had to remember in detail exactly what each country exported, imported, as well as their raw materials and minerals. I passed the course with a high grade, but for the life of me I can’t recall a fourth of these facts today. Most of us thought, at the time, that this detailed cramming of facts wasn’t the way to teach geography. We thought it too abstract and mechanical and, of course, really unrelated to our interests.

(2) My instructor in mathematics never seemed able to give very good explanations of new topics. He didn’t even work out some of the new examples for us or the next problems, so that we could get a really clear idea of what we were supposed to be doing. When I got together with other members of my class to do the assignment, I found that we were all about equally hazy as to how to go about it.

(3) I never could see the value of memorizing all the state capitals. Some capital cities, of course, are important, but others have no meaning except to residents of their particular state.

(4) I never got a clear picture of the Articles of Confederation. I memorized the paragraph or two which the American History book had on this topic, but I never understood just why the Articles of Confederation were followed by a constitution. But I shall never forget a scene I once saw in a historical pageant that I went to some years later. It showed farmers of New Jersey being stopped at the New York border and being required to pay a tariff on their goods before they could go across the state line. I could then understand the need for a constitution which could really regulate interstate commerce and prevent tariff barriers between states. Why can't methods like this pageant be used in teaching?

From these four reports (and hundreds of others) we can make certain generalizations as to why we forget what we are taught in school:

▲ 1. We forget when what we are to learn *does not seem important* to us, either because it lacks importance in itself or because we fail to see any apparent relationship between this new piece of information and things that we already know.

▲ 2. We forget when we *do not see clearly* what it is that we are supposed to be learning or when we are not properly shown how to use this new item.

▲ 3. We forget when we *do not make use* of what we have been asked to learn in our daily living.

Of course, students do not forget everything they are taught in school. But they forget, they lose, much more than need be forgotten and lost. If a skill or an attitude or a piece of information is important, well-taught, and used in everyday living, it should become a "permanent" acquisition.

When you consider the cost of forgotten learning, the waste looms large. Think of the pupil and teacher time lost in teaching material that will be forgotten—forgotten without any intellectual deposit in the form of general ideas or in ways of doing things. Think how much difference it would make to you if you remembered 5% or 10% more than you do now. Think what it would mean to you as a teacher if you could teach a given fact, principle, skill, or attitude in 10%, 20%, or 30% less time. We would revolutionize teaching.

▲ EFFECTIVE LEARNING

Does the author of this book think it possible to revolutionize teaching methods? Does he think that the adoption of the suggestions in this and the following chapters will help to decrease the amount of forgetting and increase the permanence of what is taught?

I do. I believe we already know enough about the psychology of teaching

"Permanent" Learning

Extremely effective is the Cleveland Health Museum's transparent model of "Man himself, of all the wonders on earth, the most wonderful."



and learning to effect a real revolution in methods. We have not yet begun to apply to teaching even half of what we know about improving learning. I believe that this generation of teachers, principals, and superintendents is going to make breath-taking improvements in education. But how?

How do we foster the most effective learning? There are three conditions under which learning proceeds best:

▲ 1. Proper motivation—the why

▲ 2. Clear goals—the what

▲ 3. Adequate use—the how.

When one or more of these parts of the learning process is missing—proper motivation, clear goals, adequate practice—the chances of forgetting are high.

Let us look at this statement more closely. We said before that forgetting is accounted for by three factors. (1) We forget when the motive for learning is absent, when the thing to be learned appears unimportant, when it seems to lack any relationship to our lives; in short, when it has *no significance* for us. (2) We forget when we do not clearly see what we are supposed to learn or when we are not properly shown how to perform a new skill; in short, when learning is *befogged by confusion*. (3) We forget when we do not use what

we have tried to learn; that is, when we *fail to put it into practice*. Putting all three factors together, we can say that "you learn what you live."

It will be worth our time to look into these matters of proper motivation, clear goals, and adequate use from various angles. Sidney L. Pressey, in his *Psychology and the New Education*, observes:

Other things being equal, material will be remembered in proportion as it is meaningful, and it is the meaningful element in any given unit of subject-matter which is best remembered. Learning will last in proportion as it is made significant to the learner. That a great deal of subject-matter is so rapidly forgotten is thus a comment on its value to the pupil.*

Learning that is mechanically memorized stands little chance of being retained, particularly when we blindly memorize what a textbook *says*. If, however, we thoughtfully learn what the textbook passage *means*, we are likely to remember it. Cramming for an examination illustrates the same principle. You have probably had the experience of "boning up" for an important test, making a good mark, and soon forgetting much of what you had crammed into your head. You quickly forgot this material because you were interested in acquiring it for a temporary purpose and not in order to make use of it in your everyday life.

Motivation, therefore, explains why this crammed learning is readily lost. It is *bookish* learning, as contrasted with *real* learning. Bookish learning may be defined as the kind which is motivated chiefly by such things as marks, competition, passing a final exam, and the thoughtless and unquestioning memorizing of what the textbook "says." Real learning, on the other hand, though it makes use of books, places the emphasis not on parroting or memorizing book statements but on evaluating them—on relating them to what we already know and on using them as part of our daily life. This real learning is retained because we want to learn it, because what it says and implies is real and vital and necessary in our life.

To a marked degree you can control the temporariness or permanence of what you set out to learn. For instance, you can memorize this book in order to pass an examination. Or you can remember its central ideas because you have thought about them, argued about them, and used them in your own teaching. You can remember parts of this book temporarily or permanently—whichever you yourself choose. In other words, you can decide for yourself between mere memorizing and real learning.

An illiterate Negro once told me that he had never been to school, that he had no "learning." Curious to find out how much an illiterate knew about the world in which he lived, I asked him how much money he would receive

* Harper, 1944, p. 407.

"Permanent" Learning

if he worked for six hours at 35¢ an hour. (This was a long time ago.) Without a moment's hesitation he answered, "Two dollars and ten cents."

How did he do it? First he divided 35¢ into a quarter and a dime. Then he visualized six quarters, which he knew were \$1.50. Then he said to himself, "I put the dollar and a half in one pile." He next visualized six dimes as 60¢ and put them in a second pile. Now he had to put the two piles—the \$1.50 and the 60¢—together. How did he do that?

In his mind he took a half-dollar away from the \$1.50 pile. He also took a half-dollar away from the 60¢ pile. Then he put both half-dollars into an imaginary middle pile. This meant that he had \$1 in one pile, \$1 in a second pile, and 10¢ in a third pile. These three piles gave him the answer: \$2.10.

I said to him, "You told me that you didn't have any 'learning,' and yet you got the correct answer right away."

He replied, "Mister, that ain't learning. That's mother-wit."

This illiterate fellow had acquired real learning—"mother wit"—not by having memorized arithmetic from a textbook but through certain concrete life experiences with money, which he *thought* about—about which he made conclusions and generalizations. These generalizations had equipped him with methods for meeting new life experiences. When our learnings are hammered out on the anvil of real experiences they are scarcely ever forgotten. This illiterate Negro needed no one to prove to him that arithmetic was important. He knew that unless he could calculate correctly and quickly enough, he was unable to get along in the world.

Turning from these considerations of proper motivation to our second point—clear goals—we meet some amusing situations. When a teacher asks pupils to memorize without understanding, she should be prepared for curious results. I once taught a seventh-grade history class which found in their textbook the statement that a certain document had been printed on *vellum*. The whole class dutifully reported that fact in a recitation period, but not a single pupil had the faintest notion of what *vellum* was. This reminded me of my own experience in high school, when one of my classmates reported that the Crusaders were people of a religious "sex." The word "sect," which he had listened to in class, had meant nothing to him—our teacher had not taken time to explain it, and my classmate's amusing "boner" was an almost inevitable result.

A seventh-grade pupil of mine once wrote on an examination paper that "the Chinese people worshipped their aunt's sisters." It helped me to understand that "ancestor" had no meaning to this boy but that its rough homonym did.

In a current events test given at the Abraham Lincoln High School in Council Bluffs, Iowa, a boy reported that "Alcatraz was a huge bird of ocean-

going tendencies." Another stated that "Dionne is the god of love." I heard from a teacher in North High School, Columbus, Ohio, that one of her students defined a haycock as "a rooster that nested in the hay" and bedrock as "a rock you took to bed with you." These examples of confused learning helped the teachers recognize the needs for "explaining well" items that had not seemed to cause trouble.

Sometimes these confusions are anticipated by teachers, who prepare themselves for misunderstandings. A sixth-grade instructor in a Middle Western school gave me an interesting example. Aware of the old joke about the boy who reported that "the equator is a menagerie lion running around the earth," she set out to teach the equator concept as concretely as possible. But she did not succeed with all her pupils. When, at the end of her explanation, she asked mock-seriously "Why couldn't a monkey hang by his tail from the equator?" one of the boys volunteered "Because the equator would be too hot."

(By the way, how would you explain the equator to a sixth-grade class? Would it help or confuse to point out the location of Ecuador and the English meaning of its Spanish name [*el Ecuador* = the equator]? How would you explain the North Pole? If you are studying this book as a member of a class, you might hold a discussion on how to teach these two abstract ideas. You might postpone this discussion until you have completed Chapter 2 of Part III.)

There was a college instructor who learned from an examination paper that "the American Revolution wrote nasty letters to the French Revolution." It seems that the textbook at one point stated that the "American Revolution corresponded roughly with the French Revolution."

▲ VERBALISM

Verbalism—the use of words which are not understood—is a disease usually caught in school. Young children are not seriously infected with it. The 2,000 or so words that they know before enrolling in the first grade were learned through handling, seeing, hearing, tasting, and talking with others—and before they learned to read. These 2,000 words are never forgotten. Of course, this is partly explained by the fact that they are frequently repeated common words. But even so, the method used in learning these 2,000 words is one which makes for real understanding. The method, for the most part, is through direct, concrete experience.

When a child learns to read, verbalism becomes a steady danger, for he can correctly pronounce words that he does not understand. This problem has been widely discussed by educators and it is, of course, particularly studied by educational psychologists and advocates of audio-visual materials. A pertinent

"Permanent" Learning



It is one thing to read and memorize that the earth moves around the sun; it is quite another to "see it happen" by means of a model such as these Glencoe, Ill., boys are manipulating.

comment appears in a discussion of "Increasing the Effectiveness of Voluntary Reading," by Donald D. Durrell:

A second difficulty that works against right use of reading is the lack of association between verbal subjects and life outside the schoolroom. Unless the reading is attached to actual sensory-motor and associational experiences at the time of teaching, we cannot expect these ties to be made spontaneously.

The world of the child, particularly in the elementary school, is a sensory-motor world; he is interested in things that he can see, hear, touch, taste, plan, make, do, and try. A child shows very little concern about experiences that are

remote in time or distance and that do not concern his immediate welfare. Much of the social-studies material falls into this category of remoteness, despite the fact that its final objective is appreciation of or participation in community life.

Our reading program might be more effective, especially in the elementary grades and probably in the secondary school as well, if it were allied to subjects with which more intimate contact might be provided. Such subjects should include music, art, and other fine arts; crafts in great variety; the various brands of physical science, such as aviation, radio, geology, astronomy; the biological sciences; nature study, experimental gardening, etc.; consumer education in a great variety and social problems which are encountered in daily life.†

Note that Dr. Durrell says nothing whatever about memorizing as a method of learning. He talks instead of having children see, hear, touch, taste, plan, make, do, and try.

He asks for "experiencing" as a method of learning, and in so doing he puts his finger on the key idea of this book. It may be stated in these words: Education must become the rich, active, personal, and adventuresome thing it is when a father teaches his son how to fish, or a mother teaches her daughter how to bake a cake, or a scout leader explains to youngsters how to find their way in the woods without a compass, or a dramatic teacher coaches a play. For in all these situations learning has motivation, clarity, and use to such a degree that permanence can almost be taken for granted. It has, in addition, a train of other qualities—such as pleasureableness, emotional gratification, and a sense of personal accomplishment—which strongly reinforce the learning.

If our teaching is to strive for this quality of learning, we must become personal where we have been impersonal, we must become concrete where we have been vague, we must become active where we have been passive. We must become creative where we have been dominated by routine.

At this point, experienced teachers may feel annoyed. They may ask, "Do you expect me to teach arithmetic as a series of hairbreadth escapes?" Of course, this isn't possible, and if it were, it would be rather exhausting. But let us not make the other mistake of teaching hairbreadth escapes as though they were formal arithmetic. Clearly, every item of learning cannot be transmitted in precisely the rich, personal, and adventuresome manner that we have cited as the ideal teaching method. But the amount of improvement possible with a great proportion of subject-matter is so large that we may soberly regard this ideal as a realistic goal capable of achievement most of the time. Certainly there is no sensible reason for believing that education cannot be made rich, personal, and memorable.

Can school be made as interesting as listening to a lumberjack tell a yarn
† *Harvard Educational Review*, 9:311-312, May 1939.

"Permanent" Learning

in the bunk shack? Can it be as interesting as a movie or a radio drama? Can it be as interesting as a hike in the woods? Can the experience of going to school be made an interesting, continued story? Not very easily—day in and day out; but school will become an interesting place if it proves to be a place where pupils have interesting experiences—where they "see, hear, touch, taste, plan, make, do, and try." Schools can become effective learning places if they provide many of these rich, direct experiences.

▲ WHAT IS A RICH EXPERIENCE?

College students are sometimes at a loss when asked to report some of the "rich" experiences in their lives. Let us consider a few examples in our effort to set down the characteristics of a rich experience, using reports of both students and adults:

(1) This may seem strange, but one of my richest experiences is in cooking. I like to try experimenting with salads and especially to get different effects in color schemes and arrangements. Sometimes my salads look a lot better than they taste, but I still get huge enjoyment out of trying something new.

(2) I'll always remember the first time I went to the circus. I can't possibly put into words the poignancy and richness of this experience of seeing as real, live animals what had previously been pictures in a geography book.

(3) One of my richest childhood memories is my first ice cream cone. I can remember exactly the spot near the confectionery store where I stood as I ate the cone. I wish things I now eat could taste as good.

(4) Gardening is a very rich experience for me. I like to enrich the soil with material from the compost pile I've made. I get enjoyment out of spading the soft, black earth. I like to see things grow, and I like to spray to get at the insect pests. It's all a kind of game, with the outcome always in doubt.

(5) I like to teach friends how to cast. It's quite a thrill to watch their awkward movements change into skillful, graceful ones. And it's even more of a thrill to see them cast the plug right next to a lily-pod, get a strike, and then land the fish without letting it get off the hook.

(6) I like to explain a complicated subject to my class so clearly that I can see their faces light up as they understand it. I always get a kick out of explaining something to a person who doesn't understand it and to make the explanation so simple that hardly anyone could miss it.

(7) The first time I went out in a sail-canoe and capsized is one of my richest memories. Not only was it a thrill to catch the wind in the sails and cut sideways into the waves, but the possibility of miscalculating and capsizing added to the excitement. When I finally was thrown into the water, I still wasn't "conquered" by the elements, because I had a fairly easy time swimming back to shore. And that same afternoon, I tried it again.

Let us stop with these seven reports. My files provide dozens of similar statements from college students and all of them taken together do not provide material for completely satisfactory generalizations about the characteristics of a rich experience. Clearly, what is rich for one person may be poor or meager for another—depending upon the inclinations of the person, the incident itself, and many additional factors. In any event, it is very hard to get people to tell others of rich experiences that they have had and to put their fingers on the reasons for the richness. Novelists, poets, and playwrights present vast and varied quantities of rich experience—it is indeed their business, and we can analyze creative literature in search of the characteristic qualities. For our present purposes it will be sufficient to set down the major elements that seem to be common to most rich experiences:

▲ 1. "Sense" experience is often strongly involved. With children, it is especially important—we must never forget that they have eyes, ears, noses, and muscles, and that they like to use them. Edward Vernon reported in the *British Weekly* the answers he received when he asked children to respond to his question: "What are the loveliest things you know, persons not counted?" Some of the replies are:

The smell of rain.	Street lights on the river.
Cool wind on a hot day.	Red velvet.
An organ playing.	The feel of running.
The feel of clean clothes.	The moon in clouds.
Red roofs in trees.	Looking into deep clear water.
Climbing uphill and looking down.	The taste of strawberries.
Smoke rising.	A swallow flying.
Hot-water bottle in bed.	A mounted policeman's horse.
Rain on your cheeks.	An express train rushing.
Our dog's eyes.	The feel of a dive.
A builder's crane lifting something heavy.	A thrush singing.
Water being cut at the bow of a boat.	The smell of new-mown hay.
The scrunch of dry leaves when you walk through them.	

If you happen to be acquainted with Rupert Brooke's "The Great Lover," you will recall that the body of this poem is little more than a catalog of items similar to those that Edward Vernon reported. Like the replies of the children, Brooke's listing of "rich experiences" is proof of the rôle played by sensation.

▲ 2. There will be a quality of *newness* about it, a feeling of discovery, of freshness. A national magazine has built a huge circulation by printing articles designed to make readers exclaim, "Why, I never knew that before!" Something



Puppetry involves many rich experiences: choosing or writing the play, planning and making the costumes, and finally learning to manipulate the puppets. (Madison, Wis., Public Schools)

you never knew before is news. Note that our seven reports imply a sense of perennial freshness and novelty—the unexpected, the discovery.

The spirit of adventure and experiment, then, is often present. The root of the word *experience* comes from *experiri*, meaning to "try out." When we try out things, we must be active, not passive. "Nothing ventured, nothing gained." People whose lives are narrowed in routine often turn to escapist literature, radio, or movies for adventure and excitement. They "passively" accept these experiences which others have acted. Though such vicarious living provides satisfaction, the active participant usually has a much richer experience. A complete diet of living through the lives of others can become stultifying

and eventually uninteresting, though novels and plays serve admirable purposes of illumination and enrichment. Nevertheless, the richest experiences are almost always personal adventures, in which the outcome has the appeal of the unpredictable.

▲ 3. A rich experience has a marked *emotional tone*. It may be a gay or a tragic one: it is never neutral. Heightened feeling is always a characteristic, though it may come much later than the time at which the experience occurred. We say "It meant so much to me," "It was a highlight in my life," "The experience was so overwhelming that tears actually came into my eyes," and the like. Note that the word *motivation* has the same root as *emotion*—it means to "move." A rich experience is a *moving* experience, hence one that is remembered.

▲ 4. A rich experience is often the *culmination or fulfilment* of other experiences. The memorableness of an event depends on what you bring to it. Many people who go to Europe expecting to have rich experiences find the trip dull or wearisome. They spend hours in museums, which they would never enter at home. They are not prepared to get out of the experience what it holds for others adequately equipped. Auguste Rodin had thought and studied so much about the sculptures of the Chartres cathedral that when he finally beheld it with his own eyes he fainted. American tourists, however, not infrequently fail to "see" why the stone-workers of Chartres are so famous. What you get out of a new experience depends on what you bring to it, consciously and otherwise. In a sense, then, the richest of our experiences may be a synthesis or combination of past experiences into new and meaningful combinations.

▲ 5. A rich experience often carries with it a sense of *personal achievement*. There is exciting satisfaction in having done well something that we are eager to do. Every one of the seven experiences reported implies this pleasure in personal accomplishment, even though the reporter does not necessarily say so. Some experiences are rich chiefly because we discovered that we were capable of doing something remarkable that we had not known possible.

▲ SUMMARY

Everyone involved in education is particularly troubled by the problems of forgetting. We all seek a formula for helping us to learn well and to teach well. Learning is likely to be "permanent" if it is (1) well motivated, (2) if its purpose and value are clear, and (3) if there is practice, application, use.

Teaching often substitutes bookish, unreal, abstract material for real-life situations. Learning that is acquired mechanically is almost always forgotten, whereas rich experiences are almost always retained, as memorable events in

"Permanent" Learning

themselves or in the form of intellectual deposits. If learning can become a rich experience, the problem of forgetting can be managed.

Rich experiences, though they vary in kind and degree, are often flavored with direct sense-experience. They have a quality of newness, freshness, creativeness, and adventure, and they are marked by emotion. Some of our richest experiences are combinations of previous experiences into new and suddenly important insights.

▲ SOME QUESTIONS TO THINK ABOUT

1. Do you disagree with the statement that much more is forgotten than should be forgotten, or do you think that pupils retain nearly all that should be remembered? Where do you draw the line between learning that should be retained or discarded?

2. If we are learning to work certain arithmetic problems, should we try to remember certain actual examples? If not, what should we remember? Why?

3. If you have not recently read Keats's "On Looking into Chapman's Homer," reread that sonnet: Have you ever had a rich experience in discovery comparable to the one reported by Keats? Did you keep it to yourself or were you eager to tell someone else about it? If so, why?

4. Can you add some important characteristics of a rich experience? Can you recall from your own life any rich experiences in which you had a sense of personal failure? of physical discomfort? of boredom?

Making Experiences Usable

IN OUR LAST CHAPTER, we distinguished certain characteristics of remembering and forgetting. Three of these may be usefully restated before we inquire as to how experiences are made usable. (1) We do not always remember the facts or concepts that we try hardest to memorize. (2) We often find ourselves recalling with remarkable vividness many rich experiences that we had never made any effort to memorize. (3) We do our best learning and remember longest when motivation is strong, when the learning purpose is clear, and when the use of the learning is thoughtful and meaningful.

Of course, we do not want to remember all our experiences. We do not want our pupils to remember all the specific arithmetic problems they worked when they learned how to add, multiply, divide, and subtract fractions, for example. But we do want them to remember the *principles* involved in working these arithmetic problems. Similarly, we do not ask our pupils to remember the model sentences used to illustrate the agreement of subject and predicate, but we do want them to remember the rule—the generalization. In brief, the thousands of unrelated specifics of information in the curriculum should be discarded by the pupils as soon as they have transformed these specific experiences into usable form.

How are experiences made usable? This question can be answered in a simple sentence but one whose meanings require elaboration: We make experiences usable by giving them names, by crystallizing them into generalizations, rules, principles, concepts, habits, sayings, and the like. The process progresses from the simple name that a child attaches to an object, all the way to an

extremely abstract mathematical formula. It begins with direct experience and travels to the pinnacle of the “cone,” if we wish to consider the whole in terms of a “visual aid.” Such a device would begin with a broad base and steadily narrow as it rises to a point—the broad base is “direct experience” and the pinnacle, that kind of experience as far removed as possible from direct contact with objects. As one moves upward on the cone, one travels from “the most direct experience” to the “most indirect experience”—for example, from the experience of a child’s first use of a name for an object to, let us say, the Quantum Theory. If we bear in mind this progress, we shall understand something of the general manner in which human beings make experiences usable.

A little child can point to something he wants even before he learns to speak the name of the object. But when he wants the thing and it is absent from the room, he must find some means of naming it. Before long, he learns its name and speaks the word. Once he is able to use the word, he has made his learning experience usable.

Words are the names that we give to experiences. A word is not the thing itself but the name for the thing or the idea. It is a kind of verbal shorthand. Instead of carrying around objects with us, for example, we can accomplish as much by speaking its name. We take words so much for granted that we scarcely realize their rôle in our culture or in the learning process.

Words are somewhat like money. Money, you know, is a medium for the exchange of goods. If you lack money, you must barter the goods themselves—butter for flour, trinkets for a muskrat skin, eggs for overalls. The goods must be physically present. But when you use money you change all goods into a common denominator. You trade in money terms instead of goods. And just as money stands for a certain amount of goods, so words stand for certain objects and ideas.

Furthermore, just as the value of money depends upon what stands back of it, so the meaning of words depends on what stands back of them—the things or the ideas to which they refer. Words, then, are the medium of exchange that we use when we express ourselves—when we talk or read or write—and if words are to mean anything, there must be something tangible behind them.

Helping pupils to attach the right names to the right things and ideas is one of the teacher’s big jobs. When a concrete object is involved, there is not much difficulty. Everybody will agree on what a *pencil* means. But when we attach a name to an idea, a concept, an abstraction, the problem becomes complicated.

Thus while everybody agrees on the meaning of *pencil*, most of us may disagree on the meaning of *freedom*. The one is tangible, the other intangible. It is easy to determine what a *pencil* is and much harder to determine what *freedom* is. The experience out of which the word-name *pencil* is learned occurs

at the base of our "cone." The experience out of which the word-name *freedom* derives is indirect. It occurs higher up on the "cone." It is a concept which is the end-product of a number of direct experiences. It is the result of our ability to make generalizations of increasing complexity.

▲ BUILDING CONCEPTS

Education involves the making of suitable classifications of our experiences. Such classifications may be called *concepts*. The process of building concepts operates quite naturally from the time a child begins to draw certain conclusions from experience and applies these conclusions to a new situation. It continues thereafter as he makes new generalizations from new experiences and from experiences in which new and old are combined. The over-all activity of building concepts, therefore, is a realistic definition of education because classifying of experience proceeds in school and out of school. Wherever the child learns something new and is able to *use* this new something, he is building or refining a concept.

One of the earliest words that a child may learn is the name for the shaggy thing that barks. It is called *Rover*. Next he learns that *Rover* is like *Fido* and *Shep*, and finally that things that look and act like them are called *dogs*.

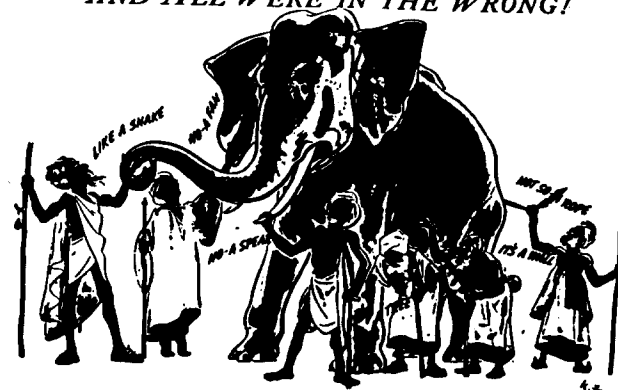
Now he may move in either or both of two directions in his classification-building. He may refine the classification by learning that there are terriers, St. Bernards, shepherds, poodles, and the like. And he may subdivide terriers into wire-hairs, Boston, rat, etc. He can also go in the direction of more general classification. He may learn that a dog is a quadruped, an animal, a vertebrate, and a mammal.

If he continues as far as possible, he may arrive at classifications used by the zoologist, involving abstractions that are extensive, exact and, increasingly complex. There are, of course, a variety of other paths that crisscross the two chief directions we have indicated, in the course of which his concept of *dog* grows ever richer.

Little children put their experiences into a relatively small number of "baskets," since their vocabulary is limited. Adults, however, use literally tens of thousands of baskets. Little children give the same label to many experiences. A very small child will call almost any man *papa* or *daddy*. An older child classifies male grownups in a great variety of ways: *uncle*, *grandpa*, *teacher*, *carpenter*, *brother*, and the like. But he also may classify all these persons as *relatives*.

A little child may call any roofed place which he enters, by the word *house*. He has only one basket into which he can put all "house experience."

AND ALL WERE IN THE WRONG!



Good Presentation Should Be Susceptible to Only One Interpretation

It was six men of Indostan
To learning much inclined,
Who went to see the Elephant
(Though all of them were blind.)
That each by observation
Might satisfy his mind.

The First (side) "Is very like a wall!"

The Second (tusk) "Is very like a spear!"

The Third (trunk) "Is very like a snake!"

The Fourth (knee) "Is very like a tree!"

The Fifth (ear) "Is mighty like a fan!"

The Sixth (tail) "Is very like a rope!"

And so these men of Indostan
Disputed loud and long,
Each in his own opinion
Exceeding stiff and strong,
Though each was partly in the right,
And all were in the wrong!

(From "The Blind Men and the Elephant," by John Godfrey Saxe.)

In time he will acquire a number of baskets and *house* experience will be classified under the names *office*, *bank*, *school*, *factory*, *cottage*, *domicile*, *dwelling*, *hovel*, *residence*, etc. In time he will put elements from these baskets into another large basket—a more abstract concept—called *housing*.

A concept, then, summarizes a group of our past experiences. The summary may be highly refined or crude, highly differentiated or gross. The aim of education, of course, is to make our concepts more accurate and more generally useful.

One of education's hazards lies in the way by which words are "learned." Often they are floating items unattached to real experience, and as a result the knowledge is merely verbal. The shell of meaning is there, but the kernel is

missing. Though we can sometimes supply the meaning later, we usually either forget the concept altogether or get merely a hazy notion about it.

This verbal learning often occurs with textbooks when students fail to read intelligently. Reading is not only the process of taking meaning *out of* the printed page. It also involves putting meaning *into* the printed page. And unless we can put meaning into the words as we read, meager sense or even confusion will be inevitable. This is another way of stating that a reader or listener must possess some background of experience which can be tied to the words he reads or hears—for otherwise they can mean very little indeed.

For example, if I were to ask you to adjust a hame strap on a harness, you might not know what to do. You might not know what a *hame* is. But if we had the horse and harness present, the learning would be simple. We would merely to have attach a label to a concrete visual experience.

On the other hand, if we were to discuss a term like *national sovereignty*, we could not quickly draw on concrete experiences of sovereignty. It is not tangible, you cannot put your finger on it. You must go back into an entire series of baskets-within-baskets to find the concrete experiences that stand back of the word *sovereignty*. And you cannot eliminate this experiencing process.

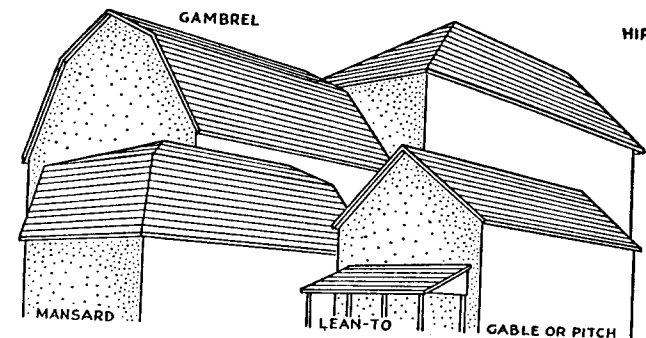
The learning process is complicated when we deal with words that are charged with emotional overtones because of controversial contexts: *dictatorship, bureaucracy, socialism, communism, conservative, reactionary, states rights, government ownership, cartel, monopoly*, etc. With such words we have two difficulties: lack of concrete experience plus an emotional attitude that is either pro or con.

▲ USING EXPERIENCES THROUGH GENERALIZING

We have seen that two elements are involved in building concepts: (1) we must have a certain amount of concrete experience and (2) we must be able to combine and recombine these concrete experiences in many ways. Now, we do not become educated merely by adding one new concrete experience to a previous one. We must also classify and generalize upon the experiences we have had. We must, in other words, put them to work.

One day a ten-year-old who was washing dishes noticed that if he pressed the water into a glass, a volume of air still remained in it. The more he pressed, the harder he had to press, since the air was being compressed into the glass itself. This boy happened to be interested in submarines and under-water diving, and so that afternoon he took his mother's mop-bucket and used it as a source of air by jumping into a swimming pool and pulling the bucket over his head.

He was actually using the principle of the diving bell, of which he was



Can you describe these types of roofs easily and satisfactorily by means of words? How old would one have to be to understand the concepts: gambrel, mansard, lean-to, and gable?

unaware. What steps were involved in his procedure? First, the new concrete experience—that air caught into a glass is compressed and it is not completely displaced by the water; secondly, the previous knowledge—that air is useful for breathing. The concrete experience of the air in the glass was only the starter—many of us have seen the same thing in washing dishes. It was this boy's use of the concrete experience in a new setting which produced a very valuable generalization. He combined a previous abstraction with a new concrete experience and arrived at a new and more inclusive generalization.

Learning is an interacting process. We move from the concrete to the abstract and back again to the concrete. It is a shuttling back and forth, in which generalizations help us to understand new concrete experiences. The concrete experiences in turn help us to improve our generalizations or to build better ones. In short, we reconstruct our experience. If we understand this *dynamic relationship* between the concrete experience and the generalization, we can get a fresh view of concept-building in the schoolroom.

Let us now take up a few examples in arithmetic, geography, and grammar. Note how the principles of concept-building are further defined.

▲ CONCEPTS IN ARITHMETIC

If you add 3 and 4, it is the same as adding 4 and 3. The mathematician makes a generalization and calls it a rule: "If a second number be added to any given number, the result is the same as if the first number had been added to the second number." He very likely would say this by writing: $X + Y = Y + X$.

He calls any general fact, rule, or principle expressed in algebraic symbols a formula. This formula is a shorthand which puts into condensed form a conclusion which we have made about a wide variety of experiences with numbers. *But the formula cannot mean anything to you, unless it condenses your experiences too.*

Arithmetic involves a large range of concepts. The number system itself, based on the system of tens, is one of the most useful systems of abstraction ever invented. And these abstractions are harder to learn than we adults commonly realize. Even the Romans, for all their intelligence, used a cumbersome system. (If you doubt it, try multiplying XCCCVII by XIX.) The Arabic system was the end-result of thousands of years of generalizing number experiences. (Note, for example, that many English words for 2 of a particular kind show that a separate word was required: two horses are a team, two mules are a span, two people a couple, two ducks a brace, two shoes a pair.) We did not always generalize the number 2, but gave it special names. Why, then, should we be surprised to find youngsters requiring a long time to understand the idea of five-ness?

If you ask first-graders to count the dots in the following line, they would probably laboriously count from 1 to 10.

.

As an adult, you see at once that there are 2 fives here. This is a concept—an abstraction—which calls for a great deal of previous concrete experience. "Five-ness" is easy for you but it takes the child a long time to learn.

You probably think of the number 11 as being simple. But consider all the different ideas which you as an adult have learned about it. Think of all the meanings compressed into the simple "11." You know that $11 = 10 + 1$. It is also 9 and 2, 8 and 3, 4 and 7, 3 and 8, 5 and 6. It is the number that comes after 10 in a series and just before 12. Eleven is the only number that goes two times into 22, three times into 33, etc. It is one less than 12, and 500 less than 511, etc. It is an odd number. You know all these facts *because you experienced them*. A child faced with learning these things has a considerable body of facts to cope with and many generalizations to build.

Perhaps these examples are sufficient to show that children are not necessarily unintelligent or indifferent when they fail to learn arithmetic as well as you think they should. Perhaps they are not well taught. Perhaps they must be given more concrete arithmetic experience and a great deal more help in generalizing than you have thought necessary. You may be sure of one thing: if arithmetic makes sense to your pupils, it will probably be remembered. If it does not, it will probably be forgotten. And by providing sense experience, you

help arithmetic to make sense to pupils—which is another way of saying that concrete experiences will help to make meaningful to pupils the highly abstract subject-matter of arithmetic.

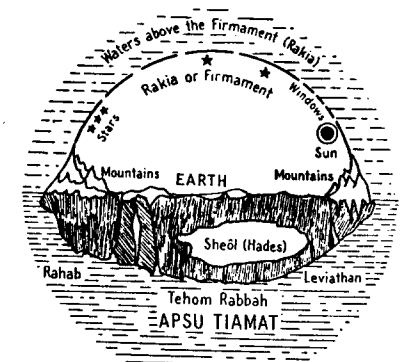
▲ CONCEPTS IN GEOGRAPHY

Glacier, latitude, longitude, climate, topography, are typical of many words that we teach in geography. We teach other facts that are classified under a name like *Great Britain, Tibet, India, and Switzerland*.

I sometimes have asked my classes to list their associations with the word *Switzerland*. Almost always I am given such terms as *democracy, chalet, cheese, funicular, League of Nations, watches, skiing, glacier, neutral, William Tell*.

Such concepts as *glacier, latitude*, and the like can be made concrete because visual materials are immediately involved; and a concept like *Switzerland* amasses a variety of concrete associations in the course of learning. Such words present much less difficulty than social-studies terms like *interdependence, world trade, barter, laissez-faire, balance of power, cordon sanitaire, amendment, charter, constitutions*, for these are more generalized. They mean something to you only if you have developed meanings out of concrete experience.

Take the term *world trade*. It includes the concrete detail of loading and shipping bags of coffee from Brazil to the United States, tin from Bolivia, sugar from Cuba, as well as the conclusion that we must "trade" goods or services for these imports if world trade is to continue. But you must also understand several other terms, such as *bill of exchange, draft, balance of trade*, etc. Some of these are quite concrete, others more general and abstract. If *world trade* is to be a meaningful concept, the elements that compose it must be meaningful and real.



This Babylonian concept of the structure of the universe, now seen as naive, was based on sense experience plus conjecture.

The word *cotton*, used in geography, economics, and consumer education, may be rich with meaning or vague and textbookish. If it has rich meaning to you, you probably had some of the following learning experiences. You were shown that some of your dresses or shirts are made of cotton. You may have seen cotton growing or have picked it, or you may have seen movies or pictures of cotton. Someone may have brought some cotton bolls to class, so that you were able to appreciate Eli Whitney's invention of a cotton gin that could remove the seeds. You may have seen an exhibit of the diversified products made from cotton, including photographic film, explosives, margarine, cottonseed oil, etc. If the concept *cotton* is well taught, pupils will carry within them a rich cluster of experiences—ready for any possible use.

▲ CONCEPTS IN GRAMMAR

In grammar we deal with general names like *noun*, *pronoun*, *adjective*, *verb*, *adverb*, *preposition*, *interjection*, and *conjunction*. We call them *parts of speech*, but we could just as properly call them parts of writing or parts of language. We make subdivisions under each of these headings—*abstract* and *concrete* nouns, *regular* and *irregular* verbs, etc. We may even talk of *declensions*, *conjugations*, and *paradigms*.

When should we teach grammar and how should we teach it? We still debate these questions and you can readily see why. A person may speak or write grammatically without knowing a single formal rule, without being able to tell you anything about the parts of speech or declensions. Nevertheless, we often introduce grammar to children by ordering them to memorize definitions like "A verb is a word which affirms or predicates something," or "A verb is a part of speech which expresses action, occurrence, or state of being."

Such definitions, of course, are quickly forgotten, for they are difficult and mature generalizations that carry meaning only as the end-result of much reflection on concrete experience. The rules of grammar will never help a pupil—and of what use are rules if they do not help?—unless he does his own generalizing about language as a result of his own experiences with it.

▲ EDUCATION INVOLVES THE BUILDING OF CONCEPTS

Although a wide variety of rich experience is essential, in itself it is not enough. For an education is not a mere collection of specific, concrete experiences. You must put these experiences into manageable form by classifying them, organizing, relating, and distinguishing among them. In sum, we manage them by classifying them into general ideas known as *concepts*.



Is the term "Colonial life" meaningful to these Whitefish Bay, Wis., children as they reconstruct some of its colorful elements? How would you test their understanding?

There is nothing more important for a teacher to understand than the processes by which sound, accurate, rich, meaningful concepts are formed. The level of your educational development can be gauged by the quality and level of the concepts you have mastered. An anthropologist measures the degree of "culture" among primitive peoples by noting the level of the abstractions they have developed. A primitive language, for example, contains many names for individual objects. One anthropologist has pointed out that some savage peoples have names for a *pine* or an *oak* but no word for *tree*, which is a higher abstraction than either pine or oak. And some tribes may have the term *tree* but not the higher abstraction *woods*.

In a civilization as complex as ours, you could not live successfully without abstractions of a high order—indeed, a complex civilization is defined by them. But we must never forget that some abstractions are hard to learn and that they must develop out of experience. Mere memorizing of an abstraction or a definition means nothing so far as the power to *use* it is concerned. And if it cannot be used, has it really been learned?

The philosopher John Dewey has offered some generalizations about concept-formation. One reading of the following passage will not bring you all its meaning. You could read it with profit again and again:

Concepts enable us to generalize, to extend and carry over our understanding from one thing to another. . . . It is plain that conceptions, since they represent the whole class or set of things, economize our intellectual efforts tremendously. . . .

Conceptions standardize our knowledge. They introduce solidity into what otherwise would be formless, and permanence into what would otherwise be shifting. . . .

It would be impossible to over-estimate the educational importance of arriving at conceptions: that is, of meanings that are *general* because applicable in a variety of instances in spite of their difference: that are constant, uniform, or self-identical in what they refer to, and that are standardized, known points of reference by which to get our bearings when we are plunged into the strange and unknown. . . . Young children cannot, of course, acquire and employ the same conceptions that persons of riper experience use. But at every *stage* of development, each lesson, in order to be educative, should lead up to a certain amount of conceptualizing of impressions and ideas.

Without this conceptualizing or intellectualizing, nothing is gained that can be carried over to the better understanding of new experiences. The deposit is what counts, educationally speaking.*

Dr. Charles H. Judd puts this another way, in his *Psychology of Secondary Education*: "Words are records of generalization, and their use implies the power to apply to new experiences the established classifications in language."

In John Dewey's words, it is "the deposit that counts." Many people go through life and have varied concrete experiences but fail to pull them together into meaningful generalizations. They do not accumulate a deposit of technical terms, principles of living, scientific discoveries. They fail to link together their different learnings because they have failed to see the interrelationships of experiences. They miss the insights that come from noting similarities and distinctions. They keep their residues of experiences in tightly sealed compartments. They may have had a great deal of direct experience, but they have learned very little, for they have not built a collection of usable generalizations out of the common fund of all that they have experienced.

It is, we may repeat, "the deposit that counts." It may be a new word, like *habeas corpus* or *diaspora* or *antimony*. It may be a rule of conduct, such as "Investigate before you invest." It may be a philosophical insight, such as "There are real losses in this world. We are not always compensated for harm or injury that comes to us." It may be Shakespeare's "Ripeness is all." But whatever the deposited generalization, it must be something that is our very own.

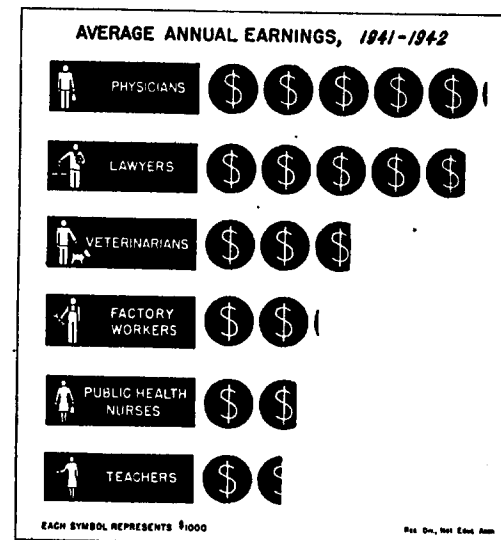
* *How We Think*, Heath, 1933, p. 77.

▲ SUMMARY

It should be clear that education must be made both more concrete and more general. (1) It must be made more concrete in providing a body of experience out of which generalizations are developed. The road to fruitful learning is well paved with concrete experience. Education's greatest weakness appears when pupils are made to memorize general rules and concepts when they have never had the experience to understand them.

(2) Our teaching must become more general. Teachers fail their pupils if they do not encourage them to make better and better generalizations about the world and the life about them—philosophical, scientific, linguistic, mathematical, ethical generalizations. These must be carefully made, logically developed and skillfully tested.

We keep growing intellectually not only by getting "more" experience but by making better use of the experience we have already accumulated. As William James has observed, "For when all is said and done, the fact remains



Is the use of visual symbols an effective way of showing the meagerness of teachers' salaries when compared with those of physicians and lawyers? What concept can be drawn from this graph prepared by the National Education Association?

that verbal material is, on the whole, the handiest and most useful material in which thinking can be carried on. Abstract concepts are far and away the most economical instruments of thought, and abstract conceptions are fixed and incarnated for us in words.” •

How can we make our experiences more usable? By building them into generalizations, concepts, principles, rules, or methods. The concrete thus becomes more abstract. But sound generalizations can grow only in the rich soil of concrete experience.

The use of a wide variety of teaching aids in the school enables education to be more concrete—and therefore to build better abstractions. Intelligent, well-grounded abstractions are impossible without rich, meaningful, concrete experiences. And well-organized concepts and generalizations enable us to manage new concrete experiences with increased skill.

▲ SOME PROBLEMS TO THINK ABOUT

1. Is the size of your vocabulary a good indication of the extent of your education? Shakespeare is supposed to have used a vocabulary of 43,566 different words, according to Eilert Eckwall of Upsala University.
2. The vocabulary possessed by an individual is the best single index of his mental test score. Why is this true?
3. If vocabulary is so important, why don't we have students memorize a few new words every day?
4. What is the difference between learning a new word like “flagellate” as a synonym for “whip” and learning the meaning of “surd” or “osmosis”? How long does it take to learn the meaning of the word “algebra”?
5. Should teachers spend more time tying together experiences that pupils have already had as contrasted with gaining additional experiences? What would this mean, specifically, in the classroom?
6. Do you know anyone whose English is practically flawless and who never studied grammar? If so, have you ever tried to explain his “mastery of grammar”?
7. Teachers are sometimes “ribbed” about their so-called “educational jargon.” Is this unique to the teaching profession or do many professional groups develop a “trade language”? Do these words serve a real purpose?

• *Talks on Psychology and Life's Ideals*, Chap. XII, pp. 131-2.

CHAPTER 4 •

The “Cone of Experience”

WE ARE NOW EQUIPPED to consider audio-visual materials against the background of our first three chapters. Much of what we have found to be true of direct and indirect experience, and of concrete and abstract experience, can be summarized in a pictorial device. We call it the “Cone of Experience,” but it is not offered as a perfect or mechanically flawless picture to be taken with absolute literalness in its simplified form. It is merely a visual aid to explain the inter-relationships of the various types of audio-visual materials, as well as their individual positions in the learning process. Even the hastiest glance at the cone shows that sensory materials can be readily classified as they move from the most direct to the most abstract kind of learning.

As you study the cone, you recognize that each division represents a stage between the two extremes—between direct experience and pure abstraction. As you travel up the cone from its base, you move in the order of decreasing directness. Thus, a “contrived experience” is one stage more direct than “dramatic participation”; “dramatic participation” is one stage more direct than “field trips,” and so on. Similarly, if you travel down the cone from its pinnacle, you move in the order of decreasing abstractness: “verbal symbols” are more abstract than “visual symbols”; and “visual symbols” are more abstract than “one-sense aids,” and so on.

However, you will make a dangerous error if you regard these bands on the cone as rigid, inflexible divisions. For the different kind of sensory aids often interlap and sometimes blend into one another. A few examples will register this important fact. Motion pictures can be silent or they can combine

sight and sound. A dramatization is often something which you view as a spectator—and yet you might participate in it as an actor. Students may merely view a demonstration, or they may view it and then participate in it. In other words, the device of the cone must be taken for nothing more than it is: a visual metaphor of learning experiences, in which the various kinds of audio-visual materials appear in the order of increasing abstraction as one proceeds from direct experience. And remember that an abstraction is not necessarily "hard." All words used by little children or mature adults are abstractions.

Part II of this book considers each of the ten divisions in extended form. In the present chapter we shall merely define them and then take into account some related ideas to which our discussion inevitably leads. For the sake of logical simplicity, we shall consider the ten divisions starting with the base.

▲ DIRECT, PURPOSEFUL EXPERIENCE

The base of the cone represents direct reality itself as we experience it at first-hand. It is the rich, full-bodied experience that is the bed-rock of all education. It is the purposeful experience that is seen, handled, tasted, felt, touched, smelled. It is the unabridged version of life itself—tangible experience, which we commonly refer to as "something you can get your fingers on," "something you can sink your teeth into," etc.

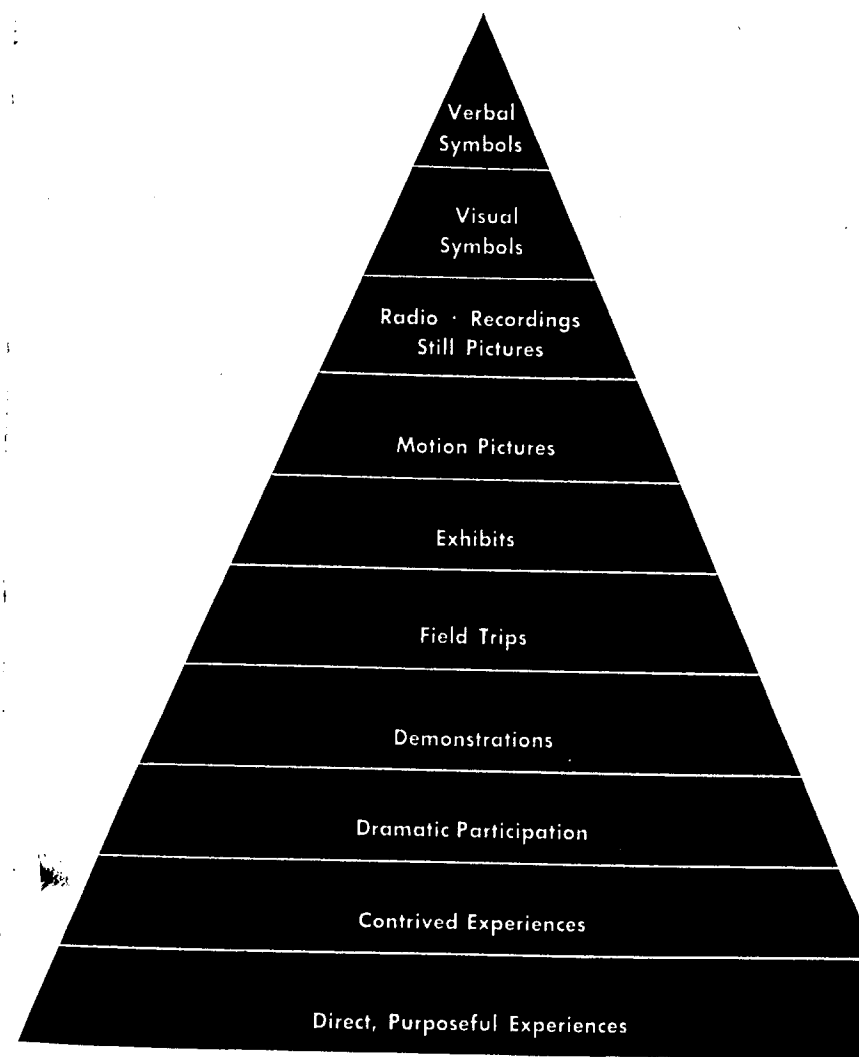
It is going to the bank, preparing meals, taking a walk, taking a trip, making a piece of furniture, performing a laboratory experiment. *It is learning by direct participation with responsibility for the outcome.*

You might do well to think seriously about this purposeful direct experience and its rôle, not merely in the educational process, but in your own life. When you recall your childhood, your sharpest, richest memories are evoked by direct experiences—the first meadowlark's nest found on the prairie, the worm desk in the fourth-grade room in Public School 51, the earliest wild strawberries in the field, and as many other different incidents as there are lives and sensibilities. It is worth noting that this division constitutes the base of the cone, for it is in reality the *basis* of all effective learning.

But life cannot always be lived on this direct, concrete, sensory level. Even our earliest experiences involve some degree of abstraction. As very young children we learn to talk about the doll or the dog or the man or the rabbit which is not physically present. Inevitably our direct, concrete experiencing soon becomes associated with abstractions.

▲ CONTRIVED EXPERIENCES

The second stage in the development of increasingly abstract experience may be illustrated by the working model. It differs from the original either in size or



complexity; we *simplify* it by a working model. For teaching purposes, the model may be easier to understand than the thing it stands for.

A contrived experience is "*editing*" of *reality*, an editing which makes the reality easier to grasp. The clutch on an automobile is hard to understand when you sit in the driver's seat and press down the pedal, but a simplified model or a cutaway model shows clearly and simply how the clutch mechanism works. For teaching purposes, therefore, the imitation is better than the reality which it imitates.

A gasoline refinery sprawling over many acres may be baffling to a visitor. It is too much for the eye to take in. But a working model of that refinery can make the processes far simpler to understand.

A "model" city presented through models often helps immensely in teaching city planning. Initially it is a better teaching method than the aimless traveling over miles of streets and viewing scores of buildings, parks, and the like. The contrived experience is a much more fruitful teaching device.

Many similar examples come to mind. Few boys and girls, for example, get the opportunity to operate the controls of an airplane. But a model which they can "fly" explains certain basic mechanisms by omitting many distracting details. A miniature working model of Eli Whitney's cotton gin instantly shows the pupils the enormous savings in time secured by this device for removing seeds from cotton.

Business firms recognize the value of this teaching device. Salesmen of kitchen equipment often carry models with them to show the anxious housewife just how the new kitchen will look. Store windows frequently display small working models of washing machines. Manufacturers of machinery can usually depend on attracting crowds of fascinated onlookers when they show, for example, how paper is made by operating a miniature paper-mill at a printers' convention.

The United States Army produced a wide variety of contrived experiences as part of its aviation instruction. To learn the lighting system of a Flying Fortress first-hand is complicated and baffling. Wires are hidden, the distances between the lights are great. The Army produced a so-called "mock-up," in order to show the working of the lighting system in simplified form.

The system is set up on an exhibit board in "mock" form. However, the switches and all the rest of the equipment used are real. If you pull a particular switch, certain things happen, and they happen before your very eyes. You could not see these results if you were operating the lighting system in the airplane, but you cannot fail to see them on the mock-up. By spreading out the whole lighting plan, the Army could teach it easily. The mock-up simplifies reality.

A wrecked B-17 provided one airfield with a mock-up for teaching many facts about this plane. It was sliced in two. You could walk alongside it in the

classroom and have your attention called to many details that would have been either invisible or not easily seen in the real plane.

A mock-up, then, is a device which changes and simplifies the details of the real object in order to make it more teachable. It simplifies by eliminating unnecessary detail. It emphasizes the key points. Undoubtedly this relatively new teaching device will be increasingly used both in schools and industry.

▲ DRAMATIC PARTICIPATION

There are a great many things we cannot possibly experience at first-hand. Life is too short. Restrictions of time and place make it impossible for any of us to experience directly much of what we need to know if we are to be educated. Besides, we cannot experience directly something that has already happened. Furthermore, some matters cannot be reduced to a contrived experience, and some ideas must of necessity be somewhat abstract and symbolic.

Dramatic participation can help us get as close as possible to certain realities that we cannot reach at first-hand. We participate in a reconstructed experience, not the original one. We re-live the hardships of Washington and his men at Valley Forge, or Jefferson at Monticello, by assuming the rôles of these characters and their associates in a play, tableau, or pageant. It is, of course, commonplace for schools to dramatize the first Thanksgiving, the Mayflower Compact, the adoption of the Constitution, Lincoln's Gettysburg Address, and many other historical events. But dramatizations could be used to far greater advantage in the classroom and for teaching purposes of varied kinds.

Though it is not the thing itself, though it stands for something else, a dramatization may have certain teaching advantages over the real-life situation. It can eliminate many elements that mean little and distract attention. It can sharpen and emphasize the important ideas. By reconstructing the experience, we can focus upon the things that "matter"; thus manipulating the subject-matter for teaching purposes.

There is a distinction between participating in a dramatization and watching it. Both experiences can be fruitful, but a pupil who plays a part in dramatic reconstruction gets closer to the direct experience than a pupil who merely looks on. Thus, if we were to divide this band of our cone into two parts, "Dramatization by participation" would be the lower one (because it is a more direct experience) and "Dramatization by observation" would be the higher one. The spectator is farther away from the original reality than the participants who re-live the scenes.

The three stages that we have discussed so far all involve *doing*. The direct experience, the securing of contrived experience through the use of working

models and mock-ups, and the experience of reconstructing reality by acting it out in a dramatization—in these three the individual is not a spectator but a participant.

In the next five stages on the cone, the individual is an observer. He no longer participates actively with responsibility for the outcome—he merely watches. But, as we pointed out earlier, audio-visual materials often blend into one another and interlap. Thus, the third stage of our "doing" group—dramatic participation—blends into our "observing" group, when the pupil merely watches a dramatization. He can do little to change the experiences with which he is confronted in the next five bands on the cone—demonstrations, field trips, exhibits, motion pictures, radio, recordings, and still pictures.

▲ DEMONSTRATIONS

A demonstration is another means whereby pupils can see how certain things are done. A coach demonstrates how to pass a football; a science teacher demonstrates the separation of hydrogen from oxygen by electrolysis; an arithmetic teacher demonstrates a short-cut method for multiplying.

Demonstrations may require nothing more than observation on the part of the pupil, or he may be asked to do what he has just been shown how to do. Whether the demonstration is to be followed by this "doing" on the part of the pupil, depends on the nature of the teaching problem. It may be enough for the teacher to show by electrolysis how hydrogen can be separated from oxygen. But a short-cut method in multiplying is not demonstrated by the teacher until the pupils need to use the new knowledge themselves.

You can readily see now that the cone of experience cannot be taken too literally. While the device is true as a whole, it does not imply any restrictions upon use. On the contrary, in any teaching program a variety of levels of abstraction may be effectively mixed. Indeed, in any continuous program of teaching, even in a single lesson, there will be a wide range—from direct, responsible sense-participation to a high-order level of abstraction.

▲ FIELD TRIPS

When we make a school journey, excursion, or field trip we often see other people doing things. We watch them and note the meaning of their actions. As spectators, we are not responsible for what happens—we are on the sidelines, without authority or ability to alter the event. We merely watch it unfold.

This kind of sensory experience is so well known that extended comment at this point is unnecessary. Many schools in the eastern part of the country visit



The United States armed forces found the mock-up invaluable in the training program. By "editing" and simplifying, one can focus all the attention on learning the key points.

Washington, D.C. They watch the Congress at work; they go to the Mint and look on as money is printed.

If, however, they go one stage beyond observation—for example, if they interview government officials—the field trip gains in directness. When observation is combined with participation the field trip becomes more meaningful. Such a variation of the field trip indicates again how the bands of the cone interlap and blend into one another. We are beginning to see that our cone is by no means a perfect representation of the different levels of abstraction but merely a teaching device to accent certain points.

▲ EXHIBITS

Where shall we place "Exhibits" on the cone? Sometimes they consist only of working models arranged in a meaningful display. Sometimes they are a series of photographs, or of photographs mixed with models and charts. Sometimes they include a demonstration or a motion picture. We shall keep our bearings if we remember that an exhibit is essentially something one sees as a spectator. A mock-up is seen by a spectator, but the spectator also operates some of the spread-out materials, or is otherwise engaged in doing. Usually one is not involved in handling anything or working the materials, though some complicated exhibits include such added sensory experiences. When they do, of course, the learning can become that much more meaningful.

▲ MOTION PICTURES

Our next band, motion pictures, includes a number of variations of a single type. We may see a motion picture that is silent, or one that combines sight and sound, or one that combines sound with three-dimensional sight, and with full color.

The motion picture experience, unlike the field trip, unfolds with a compression of time and space. All the experience is not there. But this loss in directness and this compressed experience has compensating advantages. The motion picture can omit unnecessary and unimportant material and concentrate upon a few selected points. For example, in a field trip to a pottery we usually see the entire process from beginning to end. But a film on pottery-making can quickly pass over certain less important processes and emphasize the more significant ones. Besides, the mechanical devices for slow-motion enable us to sharpen up the key ideas. With slow motion, of course, we expand space and time.

Let us not forget, however, that we are *spectators* before a motion picture. We are some distance from touching, tasting, handling, feeling, from directly experiencing. We are no longer participants in the event. Neither do we get a direct or contrived experience. We are merely watching an event—perhaps seeing other people do things—and through an edited version of their experiences, in which time and space have been altered.

This is another way of saying that motion pictures present an abstracted version of the real event, with consequent losses as well as gains. It may be easier to understand than a more direct experience. A deliberate and contrived order has been imposed on the material, different from the reality itself. We can, if desirable, see the finished vase at the start of the picture and then go back to the steps involved in arriving at this result.

The motion picture can also dramatize events so effectively that we feel as though we are present at the reality itself. This is a great educational boon. For example, how clear are you as to the thinking and action in the Revolutionary period from, let us say, 1765 to 1800—a thirty-five year era unusually rich in historical meaning? Can you recall many of these events in full detail? Is Tom Paine a real flesh-and-blood character? Can you see him trudging down the streets of Philadelphia, taunted by small boys and scorned by the Tories of his time? Or is he just a vague, misty, verbal symbol?

Motion pictures can reconstruct this period with such dramatic intensity, with such realism and poignancy, that even the slowest child will react to its meaning. Unfortunately, we have not yet sufficiently used the motion picture to build a rich, memorable understanding of a great past.

Is it hard for you to think of a time when there was no such thing as capitalism? Can you visualize life in a feudal village? You have seen what a feudal

castle looks like and you know something about the early methods of making clothes, tools, and the like—but can you reconstruct the ideals, attitudes, outlook, and values of feudal lord and feudal serf?

For example, can you see these things as clearly as you saw colonial life in Williamsburg in the four-reel film produced by the Eastman Kodak Company under the direction of Kenneth Edwards? Probably you cannot, because only few such materials have been made available as yet. But more undoubtedly will come, before very long, and they will be effectively used for the enrichment of both pupil and teacher.

▲ STILL PICTURES, RADIO, RECORDINGS

Our next stage on the cone includes a number of devices that might be classified roughly as "one-dimensional" aids. Take motion out of the three-dimensional motion picture and you have the equivalent of a three-dimensional stereograph. If you remove the depth dimension, you have the filmstrip, the glass slide, and the photograph. The filmstrip, however, differs from both the glass slide and the photograph by using photographs in a fixed order. Radio and recordings are one-dimensional aids with similar differences as to imposed or free sequence.

These materials are roughly classified as "one-dimensional," though in terms of the central nervous system no experience can be so named. A stimulus may start through the eyes or ears, but when the impulse reaches the association centers of the brain, other neural areas are involved. The chief difference between these still pictures and the sound film is, for example, this: the still pictures are not presented in an imposed sequence. The experience of seeing them is less ordered and less formalized. Your file of pictures on Africa, consisting, let us say, of 100 separate photographs, can be used in any order you desire, and you can repeat any of them and omit as many as you wish. You can do the same, of course, with phonograph records.

It may be worth pointing out an intrinsic advantage of the projected glass slide or filmstrip: magnification. Though the pupil handles no material and is merely a spectator, he nevertheless experiences the view with more intensity. The image is large and impressive and the darkened room removes distractions and enables him to focus his attention on the subject itself.

▲ VISUAL SYMBOLS: CHARTS, GRAPHS, MAPS, ETC.

When we enter the next stage on the cone, we no longer have the realistic picture of the thing itself but an abstract representation. With charts, graphs, and

maps, we no longer deal with literal reality but with substitutes. We communicate by means of a new language—visual symbols. A chart may use a dollar sign or a drawing of a coin to represent money, or a silhouette of a dejected workingman to symbolize one-million unemployed. It may use a pie to represent \$1 of federal tax money, and a slice of the pie (part of the \$1) for federal expenditure on military equipment. A graph may use a line to show growth and progress—a line which shows a rise or fall in income, production of coal, changing birth-rate, and the like.

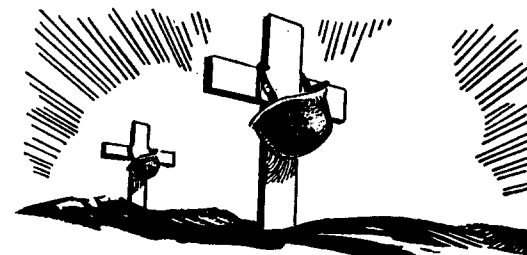
Only the simplest kinds of visual symbols are easily understood by elementary school children. High school pupils often have trouble with simple charts and graphs and may read them incorrectly. Map-reading, too, can be complicated, when many symbols are involved, and particularly when those standing for north and south, mountains and rivers, and the like are not instantly grasped. Teachers must be on guard to see that the symbolic aid is geared to the level of the pupils—that they are ready to use the new language of visual symbols.

Many purposes can be served by graphs, maps, and charts, and particularly the last. Time charts can show the progress of events over any desired period of time. Charts or diagrams can portray the stages in the operation of a gasoline engine. A chart can indicate how material progresses through a factory from the raw stuff to the finished product. A diagram may clarify the sequence of ideas in a paragraph or speech, or the organizational structure of the Congress of the United States, or the stages through which a bill becomes a law, or the plan of an association for world peace. A chart or diagram can be used whenever such a visualization can assist a pupil to understand an idea, an event, a process.

▲ VERBAL SYMBOLS—PINNACLE OF THE CONE

The next and final stage brings us to verbal symbols—designations that have no resemblance to the objects or ideas for which they stand. All appearances have been removed from the original. The word *cat* does not look like a cat or sound like a cat or feel like a cat. The term *credit* does not reproduce the hundreds of specific experiences directly related to its meaning. At the pinnacle of the cone, we have abstracted everything from the original except the meaning of the term, and on this meaning we have reached more or less common agreement.

The verbal symbol may be a word (like *cat*), an idea (like *beauty*), a concept (like *credit*), a scientific principle (like the law of gravity), a formula (like H_2O), a philosophic aphorism (like *Honesty is the best policy*), and any other representation of experience that has been classified in some verbal symbolism. The range is limitless, from the elementary word *cat* to such terms as *democracy* or *truth* and *justice*. The important fact is the absolute abstractness of the



Universal symbols are few, but this helmet on a cross is easily understood by citizens of Western civilization. Can you think of other symbols equally communicative?

symbol. Though certain words are held to be imitations of the things they stand for (onomatopoeic words like *whir*, *swish*, *crackle*), once they are conveyed through verbal symbols transcribed on paper, they have lost their last trace of direct reality. Thus, the pinnacle of the cone is not a rarefied height frequented only by the great intellects, for a child who can read and write *cat* is a user of verbal symbols. Indeed, the reading-writing processes begin at the pinnacle of the cone.

▲ WHAT THE CONE IS AND IS NOT

If we realize now that the bands on the cone frequently interlap and blend into one another, and that a child who can read and write can use verbal symbols, there will be no mistaking our cone-device for a hierarchy or rank order of learning processes. It is understood for its intention—to show how sensory aids are classified in terms of more or less concreteness and abstractness. Clearly, our experiences vary all the way from direct, purposeful sense experience to the purely symbolic representations of such experiences. Certain mistaken impressions, however, may have already arisen, and it is worth our effort to remove them at once.

▲ 1. Intellectual life is impossible without abstractions and symbolizations. Through words we socialize and communicate experiences that are direct, personal, and otherwise incommunicable. But a word can stand for no more nor less than its kernel of meaning. Hence, no abstraction can be worth much if the kernel is missing—it will literally be an *empty* word.

How does this apply to the classroom? A common method of transmitting ideas from the expert to the inexperienced is through reading. But the reader can get

no meaning from the verbal symbol unless he puts meaning into it. Absolutely and inescapably the reading content depends on the reactions aroused in the reader.

A youngster in Iowa who has never left his state and who has not had rich pictorial experience may find it hard to put much real meaning into the phrase about the "stern and rockbound coast." And a child living in such a New England area might have similar trouble with a phrase about a "swirling dust storm." Similarly, most adults have difficulty putting rich, concrete meaning into a term like "dialectical materialism." Empty words—empty meanings. To change our figure, verbal symbols, in order to be meaningful, must have underpinnings of concrete experience.

▲ 2. Does the cone device mean that all experience must somehow or other "travel up" this routine from base to pinnacle? Clearly and emphatically no. There were many intelligent and learned people in the world before photography was invented and used for communicating experiences. We have seen that small children grasp simple abstractions. Before entering school they have mastered about 2,000 words, each of which is an abstraction. But abstractions range from the simplest to the most complex. Abstractions must be combined, if we are to have rich, full, deep, and broad experience and understanding. In brief, we ought to use *all the ways of experiencing* that we can.

This principle is extremely important for teachers preparing to apply audio-visual aids. Ralph Tyler's observation is well worth studying:

The experiments in the teaching of zoology show that some students effectively learn the principles of zoology through certain types of laboratory projects, others through demonstrations and problems, others through other kinds of experiences. No one series of learning activities has proved equally effective with all students. This fact seems to me to demand a much wider range of materials in college work; that is, the learning activities in which students may engage need to be extended greatly. Furthermore, this expansion of possible learning activities should be supplemented by a means of discovering for the students where their difficulties are and of suggesting what kinds of activities will be most helpful to them in overcoming these difficulties in learning.*

▲ 3. Sometimes in discussing audio-visual materials, claims are made about the value of one sense over another. Actually, of course, our sensory experiences are mixed. When we listen to a speaker and think we are getting only aural experience, we are also reading lips and bodily expressions. When we look at an object with a view to picking it up, we may think we are involved exclusively in a visual experience, but we are also making judgments about its weight, feel, position, etc.

* "Prevailing Misconceptions," in *Journal of Higher Education*, June 1933, p. 288.



Children in Kansas and other midwestern states need pictures of "the stern and rockbound coast," just as New England children need pictures of "out where the West begins."

Have you ever been handed a beaker filled with mercury? You did more than "see." Your muscles were adjusted to ordinary weight and you found the beaker much heavier than your eyes had led you to expect. Similarly you may pick up a piece of something that looks heavy but is actually very light: your hand flies up quickly because you had made an incorrect muscular response. We look at a glistening object and call it "shiny," believing that it would be smooth to the touch—thus tying up touch with sight.

Experiences cannot be exclusively visual. Some extremely brilliant people have been blind from birth. This fact alone proves that one can learn effectively without sight. The following comment by Arthur I. Gates should be illuminating.

Other things being equal, we learn quite as readily through one sense as another, with the exception, of course, of individuals whose receiving, connecting, or central mechanisms are defective. Other conditions, consequently, determine which avenue of presentation is to be preferred. Very young children learn new words better, for example, when they are presented to the ear than when

presented to the eye, for the reason that their early word experience is auditory and not visual. If they have attended school, by the average age of eight or thereabouts children memorize better material presented visually. This is mainly due to the fact that during reading the child can regulate the speed of reacting to the words to suit his capacity; he can attempt recall when and where he pleases; he can stop and repeat the especially difficult items, and disregard those already mastered.

The relative values of moving pictures, graphs, diagrams, mechanical instruments, verbal explanations, and clay models are similarly determined by past experience and mechanical advantages. The main questions are: Which method makes most clear the thing to be learned and which does it most interestingly and most economically of time, space, and money? †

▲ 4. You may now ask yourself: If methods other than reading are effective, why are book-reading and book-recitation so commonly used in schools? Why has this procedure retained its hold, if it has the weaknesses discussed in this chapter?

To answer this question, you must remember that through almost all of human history people have learned by direct experience and by stories passed down from father to son, from one generation to another. Learning has been a kind of apprentice system. The son learned to make shoes by apprenticeship to his father, the daughter helped her mother spin and weave. It is only in the last century that book-reading has become a common learning method for wide sections of the population. And yet even today less than half the people in the world can read and write. Indeed in some parts of the United States illiteracy is high and children are not compelled to attend school.

Textbooks are commonly used because they offer a means for teaching the vastly increased numbers of pupils in school. With their neat division of subject-matter into chapters, with subheads and questions, textbooks give the teacher a feeling of security. But the difficulty arises when one tests the quality and quantity of the learning. We have not been testing in terms of performance, of the ability of the pupil to do. We have been asking him, not "What can you do?" but "What do you remember?" And, as we have all come to realize, education involves the ability to make experiences usable.

Specialists in audio-visual materials are by no means unique in maintaining that reading and reciting on books is not enough. Extra-curricular activities, steadily on the increase throughout the country, reflect the identical conclusion. The use of great amounts of audio-visual materials in United States Army teaching, and their results, convinced countless Americans that there are excellent teaching methods that do not depend entirely on textbooks. Furthermore, able teachers interested in improving reading ability are among the most vigorous

† *Psychology for Students of Education*. Macmillan, 1930, pp. 333 f.



"No one would stand for it, afoot. But in driving . . ." reads this cartoon published by the American Automobile Association. Will people who see it change their driving habits?

advocates of non-verbal materials. They know that you cannot read well or intelligently unless you have a sound base of experience.

▲ 5. But can we overemphasize immediate knowledge? Can we spend too much time on direct, first-hand experience? Are we in as much danger of getting our feet stuck in the concrete as we are of getting our heads lost in the clouds of abstraction? I do not think the danger is as great, but it is a danger. John Dewey, for example, points out:

While direct impression has the advantage of being first-hand, it also has the disadvantage of being limited in range. Direct acquaintance with the natural surroundings of the home environment, as a means of making real ideas about portions of the earth beyond the reach of the sense and as a means of arousing intellectual curiosity, is one thing. As an end-all and be-all of geographical knowledge it is fatally restricted. . . . Just as the race developed especial symbols as tools of calculation and mathematical reasoning, because the use of the fingers as numerical symbols got in the way, so the individual must progress from concrete to abstract symbols—that is, symbols whose meaning is realized only through conceptual thinking.*

▲ SUMMARY

Experiences vary all the way from direct testing, handling, or seeing of concrete objects to the purely indirect manipulation through words and other symbols. We can roughly grade experiences in accordance with their degree of abstractness. A well-educated person has a mind stocked with a rich variety of concepts,

* *Democracy and Education*. Macmillan, 1916, p. 315.

grounded in concrete personal experiences. And such experiences are classifiable through a pictorial device—a metaphorical "cone of experience."

The cone, of course, is merely an aid to understanding this subject. It is not a mechanically flawless diagram but rather something to help explain the relationship of the various types of sensory materials, as they move from direct experience to the most abstract kind of learning. These bands on the cone, of course, interlap and frequently blend into one another. The cone as a whole conveniently subdivides into three major groups:

(1) Direct experiences	}	involve DOING
(2) Contrived experiences		in order of de-
(3) Dramatic participation		creasing directness
(4) Demonstrations	}	involve OBSERVING
(5) Field trips		in order of de-
(6) Exhibits		creasing directness
(7) Motion pictures		
(8) Radio, Recordings Still Pictures		
(9) Visual symbols	}	involve SYMBOLIZING
(10) Verbal symbols		in order of increasing abstractness

▲ SOME PROBLEMS TO THINK ABOUT

1. Are there some disagreements you would make about the sequence of the bands on the cone? How would you revise this device? Why?
2. As we become more mature, can we concentrate on abstract and symbolic experience, and consider the getting of direct, concrete experience as something to be done in childhood?
3. Take a textbook in any given field and test it for the kind of concreteness that we have been discussing. How would you improve it?
4. Examine a textbook for points at which examples and illustrations should have been given by the author. Compare your criticisms with those of others in your class, on the basis of the same textbook.
5. Are there some points in this chapter which should have had more examples and illustrations?

CHAPTER 5 ◦

Moving Forward by Looking Backward

"**H**OW LONG HAS THIS been going on?" students sometimes ask at the close of a lecture on the barren and verbalistic quality of so much teaching. The answer, of course, is "Too long!" but that does not satisfy them. On the contrary, they are disturbed to discover that almost every educational reformer from Aristotle to Dewey has been deeply concerned about the use of words-without-meaning. Sometimes they say, "If the problem hasn't been solved in the last 500 years, what hope have I to solve it in my classes?"

There is no point in minimizing the difficulties in this endless battle against the use of meaningless words. Not only is the problem still with us, but the danger that it will grow more complicated is greater today than ever. We can distinguish at least eight reasons why school as well as life tends to fill up with words that carry the shadow of meaning but not the substance, the shell of understanding but not the kernel.

▲ 1. The very act of setting up a special institution like the school promotes verbalism. Whenever we substitute verbally described experience for the real article, a hazard is involved; and a large number of vital, direct experiences are usually not provided within the confines of the school. Moreover, when experience is described in verbal abstractions, the danger of verbalism increases.

Knowing in the classroom is not the same thing as *doing* outside. Clearly, every effort must be made at all times to keep the school from becoming narrow and academic. Such means as making a better integration of subject-matter, building of community schools, and introducing multi-sensory aids prevent schools from being impractical.

▲ 2. Life today is far more complicated than it was even 75 years ago. Before society became industrialized, children had a great amount of direct experience in spinning, weaving, dyeing, tanning, preserving food, caring for animals, growing crops, and the like. Today a child can grow up to maturity without ever seeing a cow. He may not have the slightest notion of how cloth is made. A boy in Liverpool, when asked how you could tell when Spring came, replied: "It's simple. It's Spring in Liverpool when the tar bubbles up in the sidewalk."

▲ 3. Seventy-five years ago the amount of subject-matter taught in common schools was much smaller than it is today. We now teach much more arithmetic, history, geography, and the like. Besides, having divided the elementary school into eight grades, we are under pressure to cover a certain amount of ground every year. Children are thus forced to move at a lockstep pace, and the appearance of learning is often accepted for the reality. To aggravate matters, typical school tests do not measure long-time learning but rather the amount retained for a comparatively short time.

▲ 4. In a simpler, rural society almost every adult had an opportunity to participate in the governing of the town. Political issues were more commonly the intimate concern of every household. Today we find (from a Gallup poll) that half of our voting adults are ignorant of the names of both their senators. Clearly, if parents no longer have a close relationship with their local, state, or national government, their children will be even more remote from social, political, and governmental concerns. In short, the content of civics and history today might be far more verbalistic than would have been true 75 or 100 years ago.

▲ 5. A textbook, for all its distinct advantages, carries certain dangers of verbalism. In far too many classrooms I have observed teachers placing entirely too much reliance on the textbook. They fail to supplement the often meager explanations on the printed page and do very little to demonstrate the point under study. The young, immature teacher—of whom there are very many—"clings" to the book in determining what and how to teach. What starts out to be her temporary crutch often becomes an indispensable fixture. Too many teachers assume that the textbook offers all the necessary material and that their rôle is to "stick to the text" and nothing more.

▲ 6. The sheer bulk of recorded knowledge has grown enormously during the last century. One Sunday issue of *The New York Times* contains enough material to fill two books. The *Encyclopedia of the Social Sciences* runs to 15 volumes. Even children's encyclopedias are enormous compendia. But in addition to printed matter, contemporary articles like the automobile introduce large, specialized vocabularies. When we add to these taken-for-granted facts the recollection that there are still only 24 hours per day, we face two conclusions: We must vastly increase the individual's ability to learn faster or we must do

far more selecting of what knowledge is worth learning—or we must do both. In any event, we must be careful not to increase our range by memorizing—and later forget what we memorized.

▲ 7. Our textbooks are often written by specialists in a particular subject. A biologist writes a biology textbook, an historian our history textbook, a mathematician prepares our teaching materials in mathematics. Unfortunately, one can be an expert in a particular subject and be quite inexperienced at communicating it skillfully through words. One can also be both expert in a subject and comparatively inexperienced in teaching methods. Hence we find textbooks sometimes filled with abstractions and principles whose meaning is clear to fellow-specialists but practically incomprehensible to the pupil. Publishers, of course, are trying to overcome such meaningless verbalism, as are textbook authors, some of whom wisely insist on trying out their text in the classroom before publishing it.

▲ 8. Over-verbalization comes in part from an unfortunately long tradition: the assumption that mere memorization and drill should be the most important teaching methods. This attitude is hundreds of years old and by no means dead. So important are its residues that we may profitably consider it at some length.

Our earliest school books were brief—quite unlike contemporary textbooks in which principles are illustrated by examples. They were patterned on teaching methods of schools maintained by the monks of the Middle Ages. Printing from movable type had not yet been invented. Books were scarce. Hence it was usual for teachers to dictate the material to be learned, explaining as they dictated. The pupils wrote down the dictated matter, then memorized it. Graves gives us an example of how such a recitation might have taken place:

What part of speech is arma?

A noun.

Of what sort?

Common.

Of what class?

Abstract.

Of what gender?

Neuter.

Why neuter?

Because all nouns whose plurals end in "a" are neuter.

Why is not the singular used?

Because this noun expresses many different things.*

The schoolmaster often had to read a page repeatedly, so that it could be grasped by the entire class. Graves points out that there was considerable objection to rapid reading, that universities made regulations preventing a teacher from lecturing so fast that full notes could not be taken.

* Graves, *A History of Education During the Middle Ages*. Macmillan, 1914, p. 19.

The Jesuit order, founded in 1534 by Loyola, firmly emphasized memorization, even to the exclusion of reasoning. Often a day's work was limited to three or four lines of a Latin author and was practically an unbroken recitation. Reviews were systematic and frequent. The motto was "repetition is the mother of studies." In Graves's words: "Each day began with a review of the preceding day's work and closed with a review of the work just accomplished. Each week ended with a repetition of all that had been covered in that time. The last month of every year reviewed the course of the year, except in the three lowest classes, where the whole last half of the year was a repetition of the first half."

▲ SOME ATTEMPTS TO MAKE EDUCATION REALISTIC

We call this chapter "Moving Forward by Looking Backward." Let us see how educational methods changed with respect to what we often designate as "modern educational procedures."

The Dutch scholar, Erasmus (1466-1536), combatted verbalism by advocating certain "new" ideas. Children should be acquainted with familiar objects and animals through informal methods—stories, pictures, games, and objective teaching rather than mere memory. He was interested in building a *grasp* of ideas and content, not merely the study of language and form. One could not learn to speak a language by learning rules, he held. One had to practice it with those who expressed themselves with exactness and refinement, and in addition one had to read widely in the best authors.

But despite Erasmus, education grew more and more formal. Leaders like Comenius (1592-1670), Rousseau (1712-1778), Pestalozzi (1746-1827), and Froebel (1782-1852) fought against many of the strait-jacket methods. They criticized the barren memorization program and suggested that schools pay greater attention to the interests of the child. Their efforts are well worth some consideration here.

John Amos Comenius, convinced that a graduated series of textbooks and illustrative materials was absolutely necessary for improved instruction, prepared the first visualized textbook in history: *Orbis Pictus*. Page 77 is devoted to the tailor, and the picture presents some typical operations. Some 150 pictures make up the volume and each was the topic of a lesson. Included were such items as "Making of Gardens," "Bread Making," "Brewing," "Ravenous Birds." Though planned as a textbook for learning Latin, *Orbis Pictus* was also used to teach the reading of the vernacular.

Comenius' preface contains statements as modern as anything that could be said about *Life, Look, or Building America*. We shall discuss five:

(77)

The Taylor.

LXII.

Sartor.



The Taylor, 1. cutteth Cloth, 2. with Shears, 3. and seweth it together with a Needle and double thread, 4.

Then he presseth the Seams with a Pressing-iron, 5. And thus he maketh Coats, 6.

with Plaits, 7.

in which the Border, 8. is below with Laces, 9.

Cloaks, 10.

with a Cape, 11.

and Sleeve Coats, 12.

Doublets, 13.

with Buttons, 14.

and Cuffs, 15.

Breeches, 16.

sometimes with Ribbons, 17.

Stockings, 18.

Gloves, 19.

Sartor, 1. discindit Pannum, 2. Forfice, 3. consuitque Acu & Filo duplicato, 4.

Postea complanat Suras Ferramento, 5.

Sicque conficit Tunicas, 6.

Plicatas, 7.

in quibus infra est Fimbria, 8. cum Institis, 9.

Pallia, 10.

cum Patagio, 11.

& Togas Manicatas, 12.

Thoraces, 13.

cum Globulis, 14.

& Manicis, 15.

Caligas, 16. ali-

quando cum Lemniscis, 17.

Tibialia, 18.

Chirothecas, 19.

Does this material produced in 1658 compare favorably with modern pictorial teaching materials? Why has it taken so long for pictures to have become widely and intelligently used?

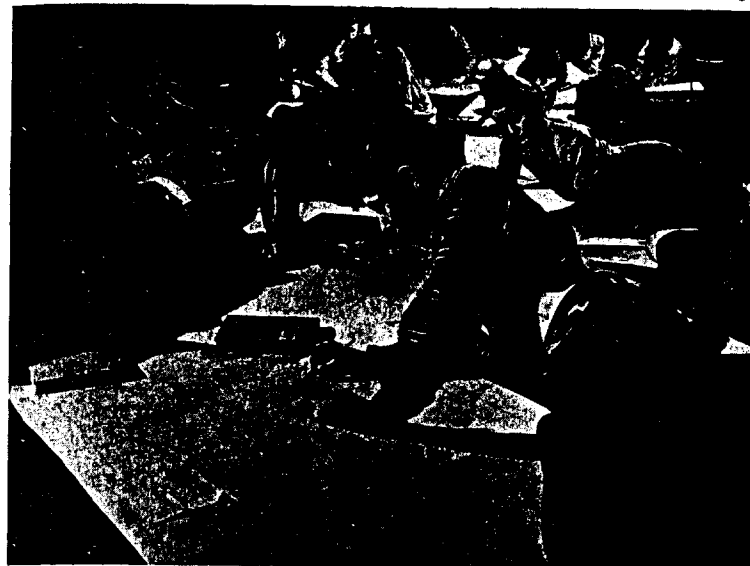
(1) *"Let it be given to children into their hands to delight themselves withal as they please, with the sight of the pictures, and making them as familiar to themselves as may be, and that even at home before they be put into school."* In this revealing statement, Comenius asks that pictures be a source of delight for children, and that they become familiar with them before they enter school. This was written three centuries ago, and yet today many children lack a rich variety of picture books at home, despite our advances in printing. Some teachers today also think that "delight" and "discipline" are diametrically opposed terms, and that if a child is enjoying himself he cannot possibly be learning anything worthwhile.

(2) *"Then let them be examined ever and anon (especially now in school) what this thing or that thing is, and is called, so that they may see nothing which they know not how to name, and they can name nothing which they cannot show."* Comenius asks that the person looking at the picture generalize about it, put it into usable form by giving it a name. Thus a child when asked the name of an animal is able to give it, and when the animal's name is given, he can find the picture. Today we call this "vocabulary-building through the use of pictures." It is the process of conceptualizing that we discussed in Chapter 3.

(3) *"And let the things named them be shewed, not only in the pictures, but also in themselves; for example, the parts of the body, clothes, books, the house, utensils, etc."* Comenius warns us not to make education merely pictorial. We must make it clear to pupils that pictures stand for particular things. We must tie up the symbol with the object. If we do, we shall avoid "verbalistic" teaching.

(4) *"Let them be suffered also to imitate the pictures by hand, if they will. Nay, rather, let them be encouraged that they may be willing . . . first, thus to quicken the attention also toward the things and to observe the proportion of the parts one toward another, and lastly, to practice the nimbleness of the hand, which is good for many things."* Did you ever try to draw a horse or a particular chair or house from memory? You soon discovered that you really did not quite know what it looked like. Think—but don't look!—how your hand would appear if you were going to draw a picture of it now. What is the pattern made by the knuckles? Can you see clearly in your mind just what your hand looks like? If you can, you can probably draw it. As for Comenius' other point—that drawing promotes nimbleness of the hand—he is on more questionable ground, for it is not safe to assume that drawing skill creates a general dexterity.

(5) *" . . . things rare and not easy to be met withal at home might be kept ready in every great school, that they may be shewed also, as often as any words are to be made of them, to the scholars. Thus at last this school would indeed become a school of things obvious to the senses, an entrance to the school in-*



These Madison, Wis., students are mapping land areas studied at first-hand. Would Rousseau have approved of the ease and informality of this classroom?

tellectual." Comenius suggests that schools provide experiences not readily available to pupils in their homes. If we follow his advice, we will have exhibits of various kinds—picture collections, motion pictures, maps, globes, models. Note also: he emphasizes that when these things are shown, "words are to be made of them." This is the same point we stressed in Chapter 3, namely, that experiences must be crystallized into words, ideas, principles, and rules. Furthermore, Comenius wishes to go beyond sense experience and provide "an entrance to the school intellectual," which is a further restatement of the principle of generalizing experiences, of intellectualizing them.

Jean-Jacques Rousseau (1712-1778), a century after Comenius, maintained that if we conducted education according to the nature of children, we would be far more successful. He went so far in criticizing the verbalism of his day—the memorizing of facts and principles by children before they could understand what they were saying—that he ventured: "Take the reverse of the current practice and you will almost always do right." Rousseau wanted children to learn

directly from nature. "Make your child attentive to natural phenomena and you will soon make him curious."

Johann Heinrich Pestalozzi, a German-Swiss contemporary of Jefferson, was interested in social reform and wanted to use education to improve the wretched living conditions of the peasants in his native Switzerland. Aware that the formal teaching methods of his time would not work, he became much interested in the method of sense perception, sometimes called the "object method." In his novel *Leonard and Gertrude*, he discusses Gertrude and her children as follows:

The instruction she gave them in the rudiments of arithmetic was intimately connected with the realities of life. She taught them to count the number of steps from one end of the room to the other, and two of the rows of five panes each, in one of the windows, gave her an opportunity to unfold the decimal relation of numbers. She also made them count their threads while spinning, and the number of turns of the reel, when they wound the yarn into skeins. Above all, in every occupation of life she taught them an accurate and intelligent observation of common objects and the forces of nature.†

The Pestalozzi movement considerably affected education in America as well as Germany. For example, Professor C. E. Stowe, husband of Harriet Beecher Stowe, reported on it to the Ohio legislature in 1839 in his "Elementary Education in Europe."

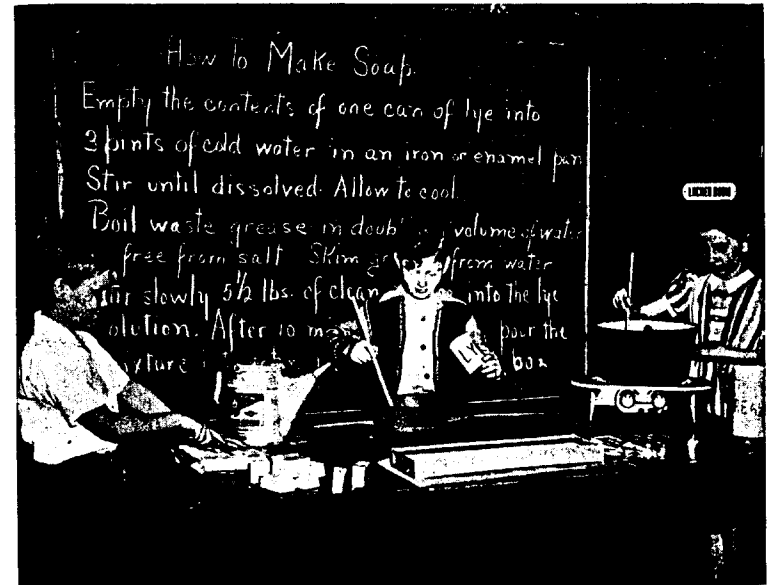
But, unfortunately, educational ideas are sometimes carried too far and made too formal. One kind of formalism comes to replace another. And even Pestalozzi himself did not always follow his own advice. He had children memorize long lists of names. In geography, according to Samuel Chester Parker, "The children memorized long alphabetical lists of the names of German towns before learning their location on the map. Many other examples of such absurd practices could be cited, which were utterly inconsistent with the theory of basing all instruction on sense perception, that Pestalozzi emphasized."[•]

Charles Dickens satirized the extremes to which formal object lessons were carried in British schools. The following passage is from *Hard Times*:

Mr. Gradgrind, the town magnate and school patron, is present in the modern school of his own creation, where Mr. McChoakumchild surcharges the youthful Coke-townners with grim facts. After a preliminary address to the teachers in this vein—

"Now what I want is facts. Teach these boys and girls nothing but facts. Facts alone are wanted in life. Plant nothing else, and root out everything else. You can only form the mind of reasoning animals upon facts; nothing else ever will be of any service to them. This is the principle upon which I bring up my

† Translated and edited by Eva Channing. Boston, 1885, pp. 130 f.
• *History of Modern Elementary Education*. Ginn, 1912, p. 362.



Note the variety of visual media used here. We can conclude that these Cincinnati boys and girls and their observing classmates will understand the process of making soap.

own children, and this is the principle upon which I bring up these children. Stick to facts, Sir!"

Having thus relieved himself, that his self-love may be gratified by witnessing the triumphs of his own educational scheming, he calls out, by an appropriate management and catechizing, its distinctive features.

Sissy Jupe, Girl No. 20, the daughter of a strolling circus actor, whose knowledge of horse, generic and specific, extends back as far as memory reaches; familiar with the form and food, the powers and habits and everything relating to the horse; knowing it through several senses; Sissy Jupe has been asked to define horse.

Astonished at hearing her father stigmatized as a veterinary surgeon, a farrier, and horse-breaker; bewildered by the striking want of resemblance between the horse of her own conceptions and the prescribed formula that represents the animal in the books of the Home and Colonial Society, she dares not trust herself with the confusing description, and shrinks from it in silence and alarm.

"Girl No. 20 unable to define a horse," said Mr. Gradgrind.

Girl No. 20 is declared possessed of no facts in reference to one of the commonest of animals, and appeal is made to one red-eyed Bitzer, who knows

practically only as he has seen a picture of a horse, or as he has, perhaps, sometimes safely weathered the perils of a crowded street-crossing.

"Bitzer," said Thomas Gradgrind, "your definition of a horse!"

"Quadruped. Graminivorous. Forty teeth, namely, twenty-four grinders, four eye-teeth, and twelve incisive. Sheds coat in the Spring; in marshy countries sheds hoofs too. Hoofs hard, but requiring to be shod with iron. Age known by marks in mouth." Thus (and much more) Bitzer.

"Now Girl No. 20," said Mr. Gradgrind, "you know what a horse is."

▲ SUMMARY

The history of education is a record of battles against the use of words without understanding. It is also, unfortunately, a record of reforms that become over-formalized and over-systematized, when the followers of the reformers miss the substance of the new contribution.

Teachers-in-service and teachers-in-training who wish to be vigilant against the kind of teaching that permits verbalism must make certain that the level of abstraction used in the classroom is the level which the pupils have attained. Since so many factors combine to promote verbalism, no teacher can be too zealous to combat this educational disease.

While education might conceivably become "too concrete," the danger of its growing over-verbalistic is vastly greater. If after looking backward, we prepare ourselves to move forward, we must remember that new departures in education exhibit a tendency to become extreme and to lose sight of the central objective of all teaching. It is conceivable, at least, that by making education "too concrete," we might not rise to a more generalized level of understanding quickly enough. But today this danger is theoretical only, for we have not yet begun to make our teaching nearly as concrete as it should be. The real danger is the same one that has always threatened teaching: verbalism, speaking and writing in what is, for all practical purposes, an unknown tongue.

▲ SOME QUESTIONS TO THINK ABOUT

1. How are some of the controversies on the subject of "Progressive Education," related to the material in this chapter?
2. Do you see any ways in which summer experiences might be used to provide a corrective to highly academic education? How?
3. Which of the following words that you may once have learned, have you forgotten? And why?—saprophyte, ohm, neutron, hypothecate, osmosis, HNO₃, rhetoric, venal, mot juste, Scylla, tendentious, surd, loess, adiabatic.
4. Socrates was able to teach well, without movies and radio. How?

PROBLEMS IN AUDIO-VISUAL INSTRUCTION

For several years the writer has made use of a number of problems in audio-visual instruction. These were handed out as regular assignments to class members. Since they proved so productive of thinking, and were so well accepted by all students, a set of twelve of these problems is included here:

Do not try to work out all the problems and do not prepare answers for any of them as yet. Choose some of them for individual reports or for classroom discussion *during* the course. The 12 problems are problems in the real sense of the word; they are not intended as exercises calling for clear-cut, immediate answers.

Problem 1: Make a list of the problems in reference to the use of audio-visual materials either in the community or in the classroom which face you as a teacher or administrator. They should be those questions which need to be answered, elaborated upon, discussed, or set up as research problems in this course. On another sheet of paper, amplify and discuss *one* of these problems. Pool your problems with the rest of the class and duplicate the list. Make sure that during your course you get an answer to your questions.

Problem 2: Mr. Blank, superintendent of schools in a city of 150,000, is concerned about the introduction of new tools of instruction into the schools. He is especially interested in the use of audio-visual materials, including teaching films. His observations have led him to believe that the films currently but sporadically used are handled as entertainment. Their use is almost entirely unplanned; accident and circumstance dictate the films that are used, the occasion and method of use. Each building principal handles the problem in his own way. There is no coordination in planning.

Several possible solutions have occurred to Mr. Blank. His immediate staff might work out and inaugurate an administrative plan. He might appoint an interested teacher in each building to form a planning committee for the use of new materials of instruction in the audio-visual field. He might ask each principal to appoint a person. Or he might ask the teachers in each building to elect their own representative to such a planning group.

Discuss each of the possible alternatives open to Mr. Blank (or any actual situations with which you are familiar) in the light of their democratic nature, their practicability, their greatest utility as far as student growth is concerned. Then indicate your choice of these alternatives and discuss the reasons why you would take it.

Problem 3: A speaker on the topic of reading recently made the following remark, "Reading is the process of putting meaning *into* the printed page." Usually we speak of reading as the process of getting meaning *out of* or from the printed page. Are these two statements merely different ways of saying the

same thing, or are they really radically different? If so, with which one, if either, do you agree? Furthermore, if we emphasize reading as a process of putting meaning into the printed page, what relationship does this have to visual materials?

Problem 4: The statement is sometimes made that 87% of our experiences is gained through the eyes. Analyze psychological literature and see if you can find any basis for such a statement. Try to discover, too, where there is any basis for the popular notion that some persons are "eye-minded" and others "ear-minded."

Problem 5: There is considerable discussion of the use of junior or senior high school boys in the projection of motion pictures in the classroom. Outline the arguments pro and con for such procedures, then indicate your own position. Be sure to discuss your position in the light of the educational philosophy which you hold.

Problem 6: The city of Pemberton has a superintendent of schools who is greatly interested in excursions. The school uses thirty buses to transport children to significant industries, museums, governmental agencies within the city and county. In reply to questions about the meager use of motion pictures in the schools, the superintendent indicates that the direct experience of visitation is much superior to a second-hand, vicarious experience gained through a motion picture. Why change from a superior method of instruction to an inferior one, is his argument.

Prepare a statement for this superintendent of schools, either as a defense for his position, or suggesting parallel and unrecognized advantages in the use of silent or sound films or other audio-visual materials.

Problem 7: A lecturer on audio-visual education had stated the principle that it is unwise to emphasize auditorium showing of educational motion pictures but that primary emphasis should be on the use of films in the classroom under normal classroom conditions. One of the audience objected on these grounds:

In view of current conditions, it is impossible to show the film individually in classrooms. Rental conditions usually permit the use of the film for only one day. Therefore, it is better for most of the children in the school to see it, even under somewhat adverse conditions, than for a limited number to view it in a single classroom.

He further stated that auditorium showings might be defended on the principles of progressive education. Why follow stereotyped subject-matter procedures? Why not let all the children view interesting and novel events on the screen in the auditorium? We permit browsing in the school library and do not narrowly restrict reading to what has been assigned in school lessons.

Another member of the audience said that the difficulty lay in the failure



Students who visit reconstructed Williamsburg, Va., are not likely to forget this view of the formal gardens in the Governor's Palace, reproduced above. This picture was taken from "the mount."

to distinguish between two types of films, one which he called the foreground film, the other the background film. The foreground film was immediately and closely related to what was being studied in the classroom. The background film was very much like the feature film at the theater. While it was not immediately relevant to any program of work going forward in any of the classrooms, nevertheless it had a general value. He believed that the problem of auditorium versus classroom showing of films could be more skillfully handled if this clear-cut distinction between films was made.

Here you have some reactions to this typical problem. After reading about the matter and forming your own judgments, write down the principles which might differentiate auditorium and classroom projection of films.

Problem 8: In a discussion over the wisdom of censoring theatrical motion pictures it was argued by one group that since we did not have censorship of newspapers, we should not have censorship of movies. The reply was made that the two media are not comparable—that motion pictures have such great power over the emotions and conduct of people that censorship is needed. Discuss the problem (a) as to the validity of the claim of the effect of movies; (b) as to the wisdom of censorship of theatrical movies on this and other grounds.

Problem 9: The following adverse criticisms are made regarding the use of audio-visual materials, especially movies, in the schools: (a) Because of the relative ease of interpretation they encourage passivity in learning. (b) They encourage an attitude of wanting to be entertained. (c) Since they are non-verbal in greater or less measure, they do not facilitate generalizations and principles which are usually phrased verbally. What reply would you make to these criticisms?

Problem 10: Indicate how an explorer in the north temperate zone would explain to a savage who had always lived at the equator just what snow is. Would it be equally hard to explain to an Eskimo what the climate of the tropics is like? What useful educational principles can you draw from this discussion?

Problem 11: Let's suppose that you are arranging an introductory presentation on fractions to a fifth-grade class. Indicate specifically the various kinds of audio-visual materials which you would use and how you would use them. It is assumed that this presentation may be a joint enterprise of teacher and pupils.

Problem 12: One of the reasons why teachers hesitate to shift to new methods of teaching is that they do not like to jeopardize their present feeling of security with known materials and techniques for a possible insecurity with unknown materials and new techniques. Explain how an in-service program might be set up which would successfully induct teachers into these necessary understandings and skills. Be quite specific as to the number and kinds of meetings, reading materials to be used, demonstrations to be developed, and the like.