Modern Methods in Teaching

A Concrete Consideration of the Teacher's Classroom Problems

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PREFACE

The text is organized into three parts, as may be seen from a glance at the table of contents. Part I presents such aspects of the philosophy of education and such concepts of the modern school and its essentials as are necessary to provide the teacher with the essential background for working understandingly in the socialized school. Part II sets forth the nature of the work in such a school, showing how it may be effectively and adequately motivated. The major types of teaching procedures are defined and the principles governing their use are explained and illustrated, for the purpose of showing the teacher how to organize his class in a way that will secure growth through the normal activities of children working in a natural, educative environment. Part III is concerned with the various phases of teaching procedure which, when thoroughly understood and practiced, produce a school which operates with economy and efficiency in promoting the education and socialization of children.

Our aim has been to answer very concretely by abundant illustrations drawn from the actual classroom experiences of the best teachers those few basic questions which must be answered in keeping with the latest scholarship and the best practices. Such a basis of understanding is essential before any teacher may go about her daily tasks rationally and with justifiable hope of working originally and independently with her pupils toward creative ends.

With the broader training now possessed by teachers,

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they need less guidance concerning routine matters and fewer directions in regard to the details of teaching procedure. Textbooks for guiding teachers must in the future find justification in their ability to help the teacher (1) to keep abreast of the latest scholarship which may bring improved teaching, (2) to see her daily tasks with clearer perspective and in their largest educative aspects, and (3) to proceed with confidence in socializing her work. This text definitely seeks to help the teacher to an enlarged grasp and solution of her daily detailed tasks.

For the point of view presented in this book, and particularly for its tested value, the authors are heavily indebted to hundreds of teachers with whom they have worked in supervisory and instructional relations. Nothing has been presented which was not first subjected to the criticism of many classes of students and teachers in teacher-training classes at the University of California, the Emporia Kansas Teachers College and at other institutions where the authors have taught.

What is presented has also survived the severer test of actual use by well-trained teachers in many of the most progressive classrooms of the United States. The teachers in the public schools of Berkeley, California, especially in the University Elementary School of Berkeley, and in the training school of the Emporia Kansas Teachers College, have aided greatly in testing and improving the procedures advocated and the results achieved through their use.

Our general indebtedness to writers on modern education and in fields tributary thereto is so great that adequate acknowledgment would require the listing of many names here. Where the obligation is specific due credit has been given in the proper place in the text.

THE AUTHORS.

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PART I

THE BACKGROUND OF MODERN CLASSROOM PROCEDURE

CHAPTER I

The Need of a Clear Conception of the School's Work

No one can undertake successfully to do anything until the thing to be done—the result to be accomplished—is clearly and definitely in mind. This is true whether the task be a simple one, such as preparing a meal or making a suit of clothes, or a complex one, such as building a state capitol building, drafting a state constitution, or establishing a sound financial system for the nation.

In order to be certain that the arrangements for a dinner will result satisfactorily, the one in charge must know before planning it how many are to be served and whether the meal is to be a simple family dinner or one at which guests are to be entertained. If guests are present, the intimacy of the guests with the family is important, also, in determining how formal the table appointments and the manner of serving shall be. These and all other details, even the most minor, are determined by the particular purpose of the meal.

Likewise, before one's tailor can advise regarding the cloth to be selected or the style to be used in a suit of clothes, he must know the use his customer expects to make of the suit he is ordering. All of the details of pattern, style, and finish will vary according to whether the suit is to be used for business purposes or for formal social functions.

It is evident that the more complex a task is, and the more permanent the result sought, the more important it is to define clearly just the result to be produced before any permanent work is done. A given amount of stone and other building materials may be so combined as to produce either a palatial residence, a beautiful cathedral, or a well appointed state capitol building. Before the professional knowledge and skill of the architect can be brought into successful play, however, he must determine exactly what he is to build and the purposes the building is to serve. From a detailed knowledge of what the building is to be used for, he can solve all questions of size, arrangement, and appointment. The exact ends to be served are correspondingly important in developing plans for satisfactorily solving problems in the fields of finance and statesmanship.

Although, strictly speaking, a task should not be undertaken until the result to be produced is clearly defined, it is surprising to notice how many persons go about their work with only vague objectives in view. The writer was an intimate witness to the ups and downs attending the efforts of a brilliant young man who patented an article of furniture and immediately opened a plant for its manufacture, before he knew in any thorough way the needs and problems of operating a furniture factory. One important reason why some pupils prepare their lessons so poorly is that they do not define their problems definitely. They do not determine upon beginning work just what is to be done. Instead of analyzing into definite points and problems just what is to be mastered, and reading to find specific and definite help on these problems, they open their books and begin to read in a "browsing" sort of way.

If a clear understanding of the results to be secured is so necessary in doing even the simplest things, how much

more important must it be to conceive clearly the ends to be attained through the elaborate process of education. The problem of defining these ends is rendered complex and difficult by reason of the fact that the process of education extends over many years of the child's life. The problem is further complicated by the growth changes and the changes from other causes which take place in the child during the period of his school training. But because several different teachers will help in the child's education before it is completed, it is very necessary that each have a clear understanding of the results public education should secure, so that every teacher who tries to aid in the child's education may be aiming for the same results.

It is evident, of course, that an institution so extensive and so expensive as the public schools could never have been established, nor could it have continued to exist, except for the fact that the public believes it can accomplish certain necessary results in children better than they could be secured otherwise. For no other reason than that society wants these desirable results secured, is our public school system maintained and supported. Even where the schools are poor and the results less desirable than elsewhere, the people continue to support them because of the service they render. Poor schools can be improved and good ones made still better only by placing in charge of education in each type of system men and women who have a clearer vision of the results to be secured.

What, then, are the results which our educational leaders believe the public schools should produce? In other words, what are the abilities which modern education is expected to develop, or which are expected to be greater than they would be if no formal education were provided? Stated still differently, what are the desirable effects in the lives

of children which successful teaching may be expected to produce? Before anyone attempts to teach school, he should be able to answer in a way that is at least tentatively satisfactory all of these questions. His answers will constitute his statement of what he expects to accomplish through his teaching. In the light of what he expects to do, he can go about planning all the details of organizing his school, directing the various activities of the school, and teaching the various lines of work.

The chapters of this book attempt to give a simple and definite statement of the answer which modern educational thought offers to these questions, and to discuss the ways and means whereby the school may secure the results it is expected to produce.

CHAPTER II

The Objectives of Modern Education

Near the close of the preceding chapter some fundamental questions were raised. This chapter will try to answer those questions so that we may have a basis for treating the problems that follow in the later chapters.

We find at the outset that it is not easy to give a simple, clear, definite answer to these questions. Why can these questions not be easily answered? They are difficult to answer in the first place because leaders in educational thought differ in the terms they use to express the results that education should secure. This variety of statement may be seen by reading two or three chapters from as many different current writers. Such chapters as the following will illustrate the point: Chapter I of Butler's *Meaning of Education*, Chapter I of Charters' *Method of Teaching*, and Chapter I of Strayer's *Teaching Process*.

In the second place certain effects of education appearing in some children and desirable in all are so intangible that it is difficult to find the right words to express them. These intangible results are suggested by such expressions as: "ability to think with fine discrimination"; "appreciation of the subtle meaning and feeling in poetry, music, and art"; "poise and affability in social intercourse"; "mastery of the graces."

It is probable, however, that the desirable results discussed above will not be secured by teachers unless they

state them as definitely as possible, and consciously seek to secure them. Just as surely as a little salt, a little sugar, a little flour, a little water, and a few cherries will not make a delicious cherry pie unless a competent cook puts the right quantities together in the right fashion; just so surely will a little reading, a little writing, and a little arithmetic fail to produce in the lives of the children the desired educational results unless a mind conscious of the desired ends directs the whole process.

Because it will be a mere accident if schools secure the wished-for results if those results are hazily understood, it is necessary to formulate a statement of them. Only to the extent to which one has a clear vision of the desired product is it possible to gather materials and to plan methods for its realization.

Where shall we first look for the answers to the questions raised in the previous chapter? When will the child feel the need of the abilities and qualities of personality which are improved through education? He will feel the need of them when he takes a place in the life and work of the community, and it is in the life and work of the community that we shall seek to find what the aims of education should be. The school in which the pupil spends his early years should not only provide attractive, profitable work, but through this work he should be prepared for the life which follows.

What, then, are the lines of ability with which the school should seek to equip its pupils? That question might be answered in various terms, but the most helpful answer for our purposes classifies the abilities or the phases of efficiency with which one should be equipped as:

1. Good physical development and vigorous health
2. Necessary equipment for one's duties and responsibilities as a citizen

3. Ability to engage successfully in some occupation—to do well some kind of work
4. The qualifications and disposition to use one's leisure time profitably and wholesomely
5. Proper moral ideals and standards

Such an equipment as the foregoing should enable the person possessing it to carry his life duties and responsibilities with satisfactory efficiency. A person who is so equipped may be spoken of as "socially efficient." The five abilities indicated above may be briefly expressed as aspects or phases of the total social efficiency which education seeks to produce as follows:

1. Vital or health efficiency
2. Civic or citizenship efficiency
3. Vocational efficiency
4. Avocational or leisure efficiency
5. Moral efficiency

It will be well at this time to show briefly how essential each of these types of efficiency is to every person.

It seems that it should be accepted without discussion that the preparation necessary for the work of the twentieth century should include a body sound, healthy, fully developed, and in good tone. Until recently, however, schools have given almost no attention or merely incidental attention to the health of their pupils. It was considered sufficient to teach those who remained alive and well enough to attend school; there was no definite provision for securing good health and physical vigor, either among those who attended school or among those who stayed away.

Even before the World War, scientific investigation had revealed the startling fact that seventy-five per cent of the more than twenty million children in the public schools

were handicapped by various physical defects. It revealed further that this unfortunate condition was largely unnecessary, because proper care would remedy it. In the military training camps of 1917 and 1918, intensive attention to the matter of health produced wonderful results. After the authorities had rejected about thirty-five per cent of the men examined under the first selective draft, they found many of those accepted below the standard requisite for their arduous tasks. Then there came to the men in the camps the vaccinations, the visits to the dentist, the hike, the drill, and the setting-up exercises. This carefully directed, persistent effort to eradicate weaknesses and to build up the health, the strength, and the vitality of the men resulted in almost unbelievable gains in physical efficiency.

Educators of the United States now recognize that if boys and girls are to be prepared adequately for the strenuous work of the coming years, they must have good health during the time of preparation and develop vitality and vigor sufficient to withstand the stress and strain of adult life. They recognize, too, that it is the business of the state to make necessary provision for keeping the pupil at his maximum in health and for giving expert attention to the development of his physical powers.

Only in this way will the largest results come from the money expended and from the efforts put forth by instructors. Pupils who are not well are in no condition to do mental work. Discomfort or pain deflects nervous energy to the part affected so that one cannot give his full energy to other work. Want of sleep leaves a tired mind, not alert to all of the factors in a problem. Want of proper food leaves a weakened mind, unable to follow carefully any train of thought. Such conditions in childhood, also, bring

the pupil to the work of the world with depleted vitality and vigor, both mental and physical. As Ruskin long ago said, the people "themselves are the wealth" of a nation, not miles of railway nor innumerable smokestacks. Suppose we do know how to raise more bushels of corn to the acre than our fathers did; of what value is that knowledge if our people are too weakened to reason wisely? Knowing, then, that physical development and good health are necessary to the growth of our nation, to its economic advancement, to its scientific progress, and to its political achievement, we know that adequate provision to secure good health and physical development is essential to the welfare of the nation, to its integrity and to its permanence.

That everyone who would enjoy life must be able to do some kind of work, to pursue some calling, is almost as evident as that he must have good health. The majority of the children of the public schools must earn their living when they become grown. Even those who by some chance are free from this necessity will find life attractive only on condition that they assume some of its burdens. This fact should influence the school in its dealing with the children.

Education for vocational efficiency falls properly into three classes: first, the guidance of each person into the life-work he can do best; second, the equipping of each with the operative skill needed in his chosen work; and third, the development of that body of vocational intelligence required to do his work well. The boy living in the mining camp, for instance, is familiar with that occupation, but may know little or nothing about any other. The boy brought up on the farm knows much about the plowing of the earth, of the sowing of the grain, of the cultivation of the crops, and of the harvesting of the products, but has little knowledge of other occupations than farming. The

boy whose home is in the city, on the other hand, may have some notion of what factory or office work is like, but has no conception of the work carried on in a mining camp, or on a farm. Such a knowledge of occupations is far too narrow to enable a boy to choose wisely his life-work.

At present the schools are attempting to supplement this meagre knowledge of vocational opportunities by giving a few commercial and industrial courses. But the possibilities along this line are much greater than is ordinarily realized. The work of such a course should include such reading, such observation of industries, and such participation in labor as will give the pupils a wide knowledge of occupations. With such preparation, young people will be better able to decide between the mine and the factory, between the office and the farm. Moreover, such a knowledge of industrial conditions tends to create sympathy with laborers in other fields and an appreciation of their work.

In addition to developing bodies of knowledge and skill of different types, the effort should be made to develop in each child aptitudes for particular industries, a disposition to work happily toward the accomplishment of some useful end, and a social attitude which holds an ideal of construction rather than of destruction, and seeks not only to procure rights for the individual but at the same time to protect the rights of all.

It is evident that in addition to doing acceptably and well some sort of work, every citizen should take an active part in the government and in the general affairs which concern his town, his county, his state, and his nation. Not only should he aim to vote intelligently and to obey the laws and the ordinances under which he lives, but as a loyal citizen he also should be active in all ways which he thinks

will make our institutions more democratic and more helpful to our people.

If we are to maintain our democratic institutions, our coming citizens must grow up with the capacity to understand the spirit of our laws and with the desire and the will to obey them. The public schools must teach and train to this end.

At the same time, our schools must put forth every effort to develop in these young citizens independence, initiative, and originality—the qualities essential to leadership. As far as may be, each citizen should be prepared for leadership. He may be destined to become a leader in his home, in his club, in his church, in his community, in his state, or in the nation. Our nation will progress only as in each community there are thinking men and women awake to every opportunity to improve community and national life.

The maintaining of the highest standards of government in a democracy is dependent upon the largest possible development in every citizen of those qualities which are essential to following or to leading intelligently. In a democracy the government may make such decisions or may take such action only as is in harmony with the thought and will of the majority. It is necessary then that its citizens think straight and act wisely. The responsibility for equipping the next generation for efficient, democratic citizenship rests heavily upon the schools. Every educational program, therefore, should make careful provision for fulfilling this duty in the most concrete and detailed fashion.

In order to perform satisfactorily the serious work of life and the duties of a good citizen, one must have some leisure time. We are coming to recognize that the work of the world needs to be done joyfully. In consequence, while the number of working hours is generally decreasing, the number

of leisure hours is increasing. Whether the increased leisure time is to be a curse or a blessing depends upon the manner of its spending. At one time the operators in a certain mining camp found that if they shut down the mine Sunday, they were unable to reach their full output again before Wednesday on account of the drunken carousal of Sunday. In the interests of health, of efficiency, of morality, and even of work, it is highly important that every citizen spend his leisure time wisely.

In order that one may spend his spare time in such a way that the results will be beneficial, a certain mental equipment is necessary. This means that the school should develop in each pupil such standards and prejudices as will lead him to choose only acceptable and wholesome recreation. His ideal must be that of a nobler self, so clean, so fair-minded, and so void of littleness that all that is unclean, or unfair, or mean is repugnant. He should have not only these ideals and feelings which strongly influence him, but also such intellectual interests and physical and social activities, that whether alone or in the presence of others, he may never be without the means of entertaining himself. The ear has only to become accustomed to good music to care for the best and to reject the bad. Usually an eye trained to appreciate color and form is sufficient to make one enjoy all outdoors. Indeed, the field of leisure interests is extensive. It includes activities which are physical, intellectual, social, æsthetic, and ethical.

Professor Bobbitt suggests the following leisure interests:

Conservation, observation of men and things, construction and operation of things, hobbies, sports, games, athletics, reading, travel, music, painting; scientific experimentation prompted by interest in science; the reading of history, economics, philosophy, science, foreign languages, mathematics, and technology, when

prompted by love of the subject and delight in the intellectual experience; religious meditations and philosophic contemplation.

While provision for training the coming citizen in the right use of his leisure time should be adequate, it must not become the excuse for retaining that subject matter and those activities which *are* in our course of study merely because they *have been*. The useless and the obsolete must go. The public schools, however, must make increasingly larger provision for those studies and activities which are only indirectly of commercial value, but which provide recreation and add to the joy and zest of living.

Only men who govern the thoughts and actions of their lives by those truths which form the basis of our civilization can form a constructive program for the upbuilding of a community or the advancement of our nation. The foundation of America rests upon the inalienable rights of its citizens to life, liberty, and the pursuit of happiness. What is this but the second commandment, "Love thy neighbor as thyself"?

The ideals and convictions which underlie all noble effort should become the possession of all pupils. They must learn what the world has come to consider right and wrong. It is well that in their study of literature and history they should judge character unprejudiced by their feelings. It is most desirable that they daily practice righteousness in their dealings with their associates and in the doing of their work. Surely, if they act in this fashion in school, they will form right habits of thought and conduct; and habits are not easily broken. Probably the most potent influence in moral and religious training is the atmosphere of the schoolroom. For this the teacher is chiefly responsible. By her attitude toward her pupils and toward life,

she creates an atmosphere which makes for high-principled right-mindedness. If she is scrupulously fair, if she adheres to the truth, if she has an understanding of the rights of others, there is ample opportunity in her everyday teaching and management of her pupils to cultivate their proper moral growth. These virtues are indispensable to one who is to be an inspiration to others. It is no less necessary that a teacher's thinking be high-minded and pure. The reflex effects of the purity and loftiness of one's thoughts upon his personality, and therefore upon all aspects of his efficiency are, as yet, too little appreciated. Teaching must seek not only to train pupils in accurate thinking, but also in clean, right-minded thinking. In the final analysis, one's ability to think, and the nature of one's thinking, constitute the essence of all the effects of one's education. As one "thinketh in his heart, so is he," is a universal law with many and far-reaching implications.

If we grant that these types of efficiency are essential to the measure of success which all men should strive to attain, then what are the permanent possessions the children should acquire as a result of their school life? Evidently they should have such knowledge, such habits and skills, and such attitudes as will enable them to respond effectively to the demands of health, of occupation, of pleasure, of citizenship, of morality, and of religion.

Knowledge is essential to efficiency in any work. One must know what is essential to good health else he may undo by reason of his ignorance all that heredity and the care of his guardians have done for him. If one is to be successful he must possess accurate information for guidance in his work whether he teaches, practices medicine, operates a laundry, or drives an auto truck. Knowledge likewise increases the perception of one's duties as a citizen,

the pleasure to be derived from leisure moments, and the ability to discern the right or wrong in a course of action. In the discharge of its function the school, either elementary or high, should equip its pupils with large and exact funds of knowledge.

Both experience and scientific studies have shown us that most of our knowledge, fortunately, is used without conscious effort. If our fund of knowledge were used consciously, our thinking would be much slower. Knowledge should, therefore, function unconsciously. As far as possible, we must reduce our fund of knowledge to the plane of habits and skills. To this end the teacher should direct a large part of her effort, particularly in the first six grades. There the teacher seeks to make automatic the fundamental operations in writing, reading, spelling, arithmetic, talking, and composing. The greater the field of activities reduced to subconscious direction, the larger the energy left free to overcome new difficulties, to grasp new problems. According to Professor James, "ninety-nine one-hundredths of any act or thing that one may be doing at any time is performed automatically, by reason of the habits and skills which he has built up out of his past experience."

If one would be efficient in his work, he needs not only adequate knowledge and the corresponding and appropriate body of habits and skills, but even more than these, he needs a wholesome right attitude toward his work. The right attitude toward work requires that one find joy in the work itself, that one's primary interest be in the work rather than in the salary, and that one be persevering and conscientious in carrying it forward. One who is dependable and upstanding, who differentiates as to values, discerns the right and wrong, and considers the welfare of others usually finds that these characteristics bring ample reward.

In the light of the foregoing statement of the results education should produce, it seems clear that these objectives should be constantly before all who have to do with the shaping and the execution of educational programs. These objectives must guide boards of education and their expert advisers in providing the physical equipment of schools, such as grounds and buildings. They must guide the superintendent of schools, the supervisory staff, and the teaching force, in deciding upon the curricula. They must guide all educators in the development of methods of management and of teaching, and in the detailed execution of each type of work in all grades and departments of the schools. How these objectives operate to determine concretely all the details of school plans and procedures and the execution of the same, even to the making of assignments and the conducting of class exercises, will be presented in the following chapters.

CHAPTER III

The Essentials of a Good School

Before any sort of business or enterprise may begin work, those things essential in producing the results desired must be determined and provided. A railway system must have a roadbed, rolling stock, customers to be served, and a corps of expert workmen and officers before it can produce the results for which it exists. A bank must have a suitable building properly equipped, a public needing its services, capital, and expert directing heads if it is to succeed. So, also, must a factory, a farm, or a dairy be provided with the essentials peculiar to the work of each before success is possible.

A school is no exception to the rule just stated. Indeed, it is an excellent illustration of the fact that in any enterprise those things must first be determined which are essential to securing the results for which it is to be responsible, as set forth in the preceding chapter.

Before taking up a detailed discussion of any phase of classroom practice, it will be well to note briefly the various essentials which are employed by the school in its effort to realize the objectives of education. This brief notation will aid us in keeping a well-balanced view of the entire round of the school's educative efforts. It is through the proper coöperation and the right blending of these agencies that the work of the school moves forward with certainty, economy, and efficiency in the promotion of the thorough education of America's children.

The essentials in a school have been variously stated by different writers on education; but for our purposes they consist of **seven,** as follows:

1. The school plant and its permanent fixtures
2. The courses of study and syllabi, which direct what shall be taught and indicate the emphasis desired
3. The textbooks, books of reference, and other supplementary books
4. The instructional supplies and equipment
5. The establishment and maintenance of harmonious, mutual relationships
6. The school's standards of conduct and educational attainment
7. The instructional staff

We shall next consider the relation of each essential to the work of the school. The purpose here does not make it desirable to elaborate each essential in detail. It is only necessary to discuss each sufficiently to show its place in relation to the requirements of the school as a whole.

It is evident, when considered fundamentally, that the school plant, with its grounds, buildings, and equipment, is not merely the place where the school does its work. It is a vital means or agency in the educative process. If properly managed, it contributes greatly to the successful working of the school.

In the first place, the school plant should be properly located. The location chosen should be easily accessible to the community to be served. Other things being equal, a central location is desirable. Obstacles to safe access, such as streams, and railroad and street-car tracks, should be avoided if possible in the location of the school plant. If the school can be reached with ease and safety, problems of attendance are fewer. The school is also more apt to be

used and visited by parents, hence the relationships between the school and the community are increased with great gains to the school's efficiency. The location chosen should be free from distracting noises and objectionable odors. The site should be in a healthy, wholesome environment, and as much attention as possible should be paid to securing a beautiful setting and an inspiring outlook.

In the second place, the school building should be so constructed and appointed that it provides a hygienic place to live and work. Proper provision must, therefore, be made for heating, ventilating and lighting the building. Adequate provision must also be made for the disposal of sewage.

In the third place, the building and its equipment must be definitely adapted to the use to which they are to be put. The kind of school and its correlated community activities must be in the minds of those who plan and equip the building. Indeed, each room in the building must be planned and equipped with reference to its particular use. A science room must be very different from a manual training room. Moreover, the best plan and the best equipment for an elementary school are not suited to the needs of any other kind of school. A room which is well suited for the use of a third grade would not meet the requirements of a good kindergarten room.

It is evident that if the physical details of a school plant are properly worked out, the first essential in operating a school economically and effectively has been provided for. Indeed, it is not too much to say that the school plant supplies the physical basis and background for the mental and spiritual development which the school attempts to bring to its pupils.

The second essential of a school is the curriculum. It would be difficult to over-emphasize the vital importance

of this essential of the school, as it probably determines to a very great extent how the time and energy of both pupils and teachers shall be spent. Let us note briefly here the more important services rendered in a school or school system by the course of study, reserving for detailed treatment in the next chapter the general curriculum problem.

The best type of course of study, such as may be found in use in the leading city, county, and state systems, supplies guidance to the teacher in most, if not all, of the classroom duties which are to be performed. Such a course of study is a real handbook and guide to the teacher. It not only indicates the scope to be covered in each subject from grade to grade, but also suggests good methods of procedure and illustrates the results which should be secured. Ways of measuring the progress each child is making are also indicated.

The difference between a good course of study, such as has just been described, and a poor one, which tells in the briefest way what is to be done, may readily be seen by comparing examples of the two types.

The following quotation, from an arithmetic course of study issued in September, 1918, merely tells the work to be done by the high fourth grade, giving no suggestions or reference to good procedures in teaching:

I. READING AND WRITING NUMBERS.
To 100,000. Roman numerals through C.
Dollars and cents in decimal form.

II. COUNTING.
Continue drills.

III. ADDITION.
Same as 4B with more difficult work.

IV. SUBTRACTION.
Same as 4B with more difficult work.

V. MULTIPLICATION.
Same as 4B. Multipliers with three figures.

VI. DIVISION.
Long division, including dividends with dollars and cents; divisors of two and three places.

VII. MEASUREMENT.
Square inch, square foot. Estimating and measuring rectangular surfaces. Reading thermometer.

VIII. FRACTIONS:
Addition and subtraction of fractions whose least common denominator may be discovered by inspection. Reduction of fractions begun.

IX. BUSINESS FORMS.
Simple personal budget and accounts.
Note: Keep problems within experience of pupils.

The next quotation, from an arithmetic course of study for the high fourth grade which was issued in July, 1921, tells the work to be done and gives helpful suggestions to the teacher:

MULTIPLICATION. Teach the remaining facts concerned with 7's, 8's and 9's.
3 new facts concerned with 7.
7 times 7
8 times 7
9 times 7
2 new facts concerned with 8.
8 times 8
9 times 8
1 new fact concerned with 9.
9 times 9
DIVISION. Division by 7; by 8; by 9.
FRACTIONAL PARTS. $\frac{1}{7}$, $\frac{1}{8}$, $\frac{1}{9}$ of numbers.
UNITED STATES MONEY. Add. Subtract. Multiply by integers. Divide by integers.
Review fundamental processes.

The central topic in geography for this grade, *Transportation*, suggests the activities in which the number study may take its rise, and in which the repetitions for fixing facts and processes will be supplied. Among these are:

Operating a Receiving Depot for Freight.
Operating a Ticket Office.
Conducting a Students' Express Business.

The operation of a Ticket Office would call for the study of mileage rates, and touch upon the method of fixing them. Time tables which have distances also, may be used as basis for computing fares between stations. Tickets may then be sold, and change made.

If a Students' Express Business is conducted, opportunities will be immediately at hand for computation with the 7's, 8's, and 9's assigned to the grade; for example, What will be received for delivering 7 suit cases at $.50 each? 9 trunks at $1.25 each? 8 loads of furniture at $18 a load?

Many other matters connected with the "business" will come up for consideration: the cost of gasoline and the amount used in a day, wages for drivers, rent of office, and the like.

An activity which will furnish experience in the fundamental processes, is *Keeping a General Merchandise Store.* This activity is a broad one, and pupils can watch carefully the prices of common foodstuffs, clothing, tools, and other articles.

Determining the profit or loss in keeping chickens, or rabbits, is another activity of value in this year. The following are typical problems which may arise:

If a sack of corn costs $4.50 per sack, a sack of bran $2.50, and a sack of scratch feed $4.00, what do they all cost?

A boy has twelve laying hens. If they lay seven eggs a day, how many eggs do they lay in a month?

If the family uses four eggs a day, and sells the remainder at $.42 (or the market price at the time the question is being considered), what is the monthly income from the eggs?

If the feed costs $4.00 a month, what is the profit?

Similar marks of difference might be cited between the "skeleton" and the "helpful" course of study in all subjects. The skeleton course usually indicates just the work to be covered, as in the first quotation above. Sometimes it just states the pages of the adopted textbook to be covered from grade to grade, without even listing the topics. The helpful course, however, makes clear what work is to be covered from grade to grade, what results are expected, and what procedures it is best to use.

In a subject such as language, history, or geography, three or four pages are frequently devoted, in the helpful course of study, to providing assistance and guidance for the busy teacher in order that her methods of teaching may be the best known.

The third essential in the work of a school consists of the textbooks, supplementary books, and reference books. The textbook is usually the basic book in use in a given subject. It is used more than any other book. Each pupil of the school should have a copy. Supplementary books may be either other textbooks, similar to the adopted one, or books treating the same matter in a more complete way. Supplementary books of the latter type are usually more interesting than the regular textbook. They usually present more concrete matter and more illustrations, and are generally written in a good literary style. Reference books consist of a dictionary, atlas, encyclopædia, and other similar books.

The vital relation of the book equipment of the school to the success of its work is so evident as scarcely to need elaboration. Emphasis is placed upon it here because the need for supplementary and reference books is so poorly met in many schools. This is especially true in rural and small town schools. Without these aids, the child's book

help is limited to his textbook. This generally results in a narrow view of the subject and less inspiration in his work.

How much greater, richer, and more inspiring the child's opportunity is if he has plenty of other books to use along with his textbook! The critical period in American history (1873-1879) for example, is much better understood by the pupil if he can supplement his textbook by access to two or three other textbooks, and especially by reading such supplementary sources as Fiske's *Critical Period*, Wilson's *George Washington*, and Sparks' *The Men Who Made the Nation*. The child's effort in geography to gain ideas of the varied conditions on the earth is rendered much easier if, in addition to his textbook, he can read interesting volumes on travel, food, clothing, and shelter. Illustrations in the other subjects similar to those cited in history and geography will readily occur to the reader.

The fourth essential of a good school consists of the instructional supplies and equipment from textbooks. Except for purposes of emphasis, the third and fourth essentials might have been presented as a single need of the school.

In the best appointed schools, a great many valuable aids are included in the list of instructional supplies and equipment. There are globes and maps for use in geography. The maps may be political, physical, relief, or picture relief. The outline map is much used also. History requires for its thorough teaching a corresponding equipment of maps and globes, and, in addition, it requires a series of historical maps portraying the political changes in the country or countries studied. Both geography and history require also a great variety of objective and other visual aids in addition to those noted, as pictures, models, and stereographs. Some valuable films are now available for use also. In sim-

ilar fashion, the equipment essential to teaching thoroughly each subject might be indicated.

The great attention now paid to constructive work in all subjects, particularly with the recent emphasis on project teaching, makes necessary more laboratory, shop, and workroom facilities than formerly. From the kindergarten up through the grades, the children must have access to materials such as sand, clay, wood, cement, and to necessary tools, if the appropriate activities in which they are engaged are to be truly helpful in clarifying the ideas gained through reading and conversation.

The modern, properly equipped school presents quite a contrast to the older type of school. Whereas the modern school is fully supplied with such materials as are indicated above, a school which has not kept pace with the progress of the times is almost barren of such aids. Some boards of education still believe that a school needs no teaching aids, so they provide in addition to a bare room and desks merely a dictionary, a map of the world, a globe, and, perhaps, a primary reading chart.

The school which is not adequately equipped for the various types of work the children are to do is as seriously handicapped as a factory or store would be without proper equipment. The best work is not possible nor is as much work possible without proper equipment.[1]

The fifth essential of a good school consists in harmonious, helpful relationships within the school, and between the school and the community it serves. This is not usually listed among the essentials of a successful school. Yet every teacher knows it is a very important requisite.

[1] Strayer and Englehardt's *School Inventory Book* provides excellent help in making up lists of equipment essential in all sorts of work in modern schools. See also chapter 14 on "The School Plant and Its Equipment," in *The Classroom Teacher*, a textbook by the same authors.

What a great asset it is, does not ordinarily become evident until something happens to disturb the fine working relations within the school or between the school and the community. Sometimes the faculty harmony or the school and community relations become strained over the location of a new school building or over the school's effort to raise money by giving a play, having a fair, or doing some other similar thing. Every teacher has noted the deleterious effects upon her school of such a "flurry."

Just as a business enterprise thrives and flourishes, if there is mutual understanding and confidence between the directors and workers in the business and between them and the public served, so the work of a school moves forward more satisfactorily and with larger results if there is mutual acquaintance and understanding between the school and the community served. Only when these conditions exist is there desirable confidence and coöperation between the school officials and the patrons. If these groups are working harmoniously, the attitude of the pupils toward the school and its work is helpful, disciplinary problems are fewer, and the total progress of the school is more satisfactory.

There are many helpful ways of establishing and maintaining desirable relationships between a school and the community it serves. Mothers' clubs and parent-teacher organizations have done much good in promoting acquaintance and coöperation between home and school. Visiting days and school exhibits enable the school to show the good work it is doing with the result that the community's faith in the school increases. Social occasions of any sort which promote the mingling of patrons and teachers make for the establishment of the desired relationships. After all, however, nothing contributes quite so much toward

good school and home relationships as genuine good work in the schools, with resulting fine progress and growth physically, mentally, and morally on the part of all the pupils. Such work in the school, and a cordial, hospitable attitude on the part of teachers toward parents is almost certain to create and maintain fine relationships between the school and the community.

Satisfactory school standards constitute the sixth essential of a modern progressive school. It is evident at once that unless proper standards are maintained from grade to grade in the various lines of work, the total attainment essential to the successful realization of the objectives of the school will be impossible.

The fundamental importance of right standards from one stage of progress to the next, until a satisfactory completed product is realized in the last stage of production, is more evident, perhaps, in industry than in education. In industry, the customer orders from the manufacturer a certain product which must conform to certain definite, standard specifications. If steel rails for a railroad are ordered, every detail of measurement and weight per foot and chemical composition is specified. Then the manufacturer determines exactly the degree of progress toward the finished result which must be achieved at each stage of the manufacture of the steel rails. Having determined his ultimate goal, and the standard of achievement for each stage, he holds every workman rigorously to doing his work so that the finished product may meet exactly the standard specifications.

For present purposes, two types of standards will be discussed. One has to do with the conduct of pupils and will be referred to as the disciplinary standard of the school. The other has to do with the attainments of the pupils

from grade to grade in the various subjects of study and will be referred to as the subject matter achievement standard. The importance of reasonably high standards of both types to the success of any school is clearly evident.

The disciplinary standard of any school aims to secure such conduct on the part of the pupils as will promote their working together in helpful, harmonious relations. This standard must be expressed in general, descriptive terms. Because it cannot be indicated in terms of definite units of measure, we call such a standard qualitative.

In carrying out the school's disciplinary standard, it is usually necessary to decide what things may be done, what may not usually be done with good effect, and what things may be done sometimes or under certain circumstances. In so far as possible, these decisions should be the result of talks between teacher and students in reference to how all should conduct themselves in the interest of the greatest good to all. When the conduct standards of the school are thus worked out with the students, they understand the reason for each regulation. Consequently, every fair-minded pupil tries earnestly to help maintain the standard. His conduct becomes a matter of fair play and of doing what is necessary to successful, harmonious living rather than a matter of obeying the arbitrary orders of the teacher in authority.

Subject matter achievement standards, indicating definitely the progress which is necessary in each subject from grade to grade, are just as indispensable in education as they were shown above to be in industry. Just as a purchaser does not say to the manufacturer, "I want pretty good rails for my railway," but says, "I want rails which are exactly according to the specifications I have given you," so those responsible for the results the schools should pro-

duce must not rely upon saying to the teachers of various grades and subjects, "You are expected to produce 'pretty good' results." Rather, the results which are necessary from grade to grade must be specified as definitely as possible.

In some subjects of the curriculum, it is now possible to indicate in quantitative terms just what standard of achievement should be attained from grade to grade.[1] The meaning of this statement will be illustrated from the subjects of handwriting and arithmetic.

The objective standards for handwriting are shown in the following table, which indicates the speed and quality that has been set for each school grade in light of experience:

AYRES HANDWRITING SCALE
(Gettysburg Edition)[2]

Grade	III	IV	V	VI	VII	VIII
Speed in letters per minute	44	55	64	70	76	79
Quality	42	46	50	54	58	62

By counting the letters each pupil writes per minute, the teacher can tell at once whether the pupil's speed of writing is up to standard. By comparing the writing of each pupil with the standard samples of handwriting appearing in the scale, the teacher can readily determine whether a pupil's writing is up to standard in quality.

The objective standards which have been established in

[1]A complete discussion of quantitative standards in subject matter attainment would not be in place here. A large list of standardized tests for use in measuring the efficiency of pupils may be found at the close of chapter 9 of *The Classroom Teacher*, by Strayer and Englehardt. A feature of each test is a statement of the achievement pupils should show from grade to grade.

[2]L. P. Ayres, *Measuring Scale for Handwriting* (Gettysburg edition), Russell Sage Foundation, New York City.

arithmetic require the correct solution of a certain number of problems in a definitely fixed time. An example of this type of standard test is as follows:

WOODY-McCALL MIXED FUNDAMENTALS—FORM I

NAME.....AGE.....GRADE.....

Get the right answer to as many examples as you can in twenty minutes. Do all work on the front or back of this sheet.

(1)	(2)	(3)	(4)	(5)
Add			*Subtract*	*Multiply*
2	$2\times3=$	$3\overline{)6}$	2	23
3			1	3

(6)	(7)	(8)	(9)	(10)
Subtract	*Add*		*Subtract*	*Multiply*
13	17	$3+1=$	16	254
8	2		9	6

(11)	(12)	(13)	(14)	(15)
	Add	*Subtract*		*Add*
$4\div2=$	23	393	$2\overline{)13}$	9
	25	178		24
	16			12
				15
				19

(16)	(17)	(18)
Multiply		*Add*
5096	$2-1=$	$12.50
6		16.75
		15.75

The above eighteen examples constitute the first part of Form I. By actually giving this test to a large number of

pupils in various grades the authors established the following standards:

STANDARD JUNE MEDIANS

	III	IV	V	VI	VII	VIII
Form I or II	13	18.5	24	28.5	31	33

Also, by testing a large number of children whose ages had been recorded, Professor Franzen established the age norms included in the next table.

AGE NORMS

Age (years and months)	8–0	9–0	10–0	11–0	12–0	13–0
Form I or II	12.00	15.16	18.33	21.50	24.67	27.83

Finally, another type of score has been developed for the same test. This is based upon the value of the score made by a pupil as compared with those of others in a group sufficiently large to produce a normal distribution of scores of pupils of the same age. These scores are to be found in the tables by Franzen,[1] Hamilton, and McNair.

These various scientifically determined scores may be changed slightly when larger numbers of children have been tested. For diagnosing causes of error the following table for the four fundamentals has been computed from the results obtained in the tests:

STANDARDS FOR THE FOUR FUNDAMENTAL OPERATIONS

(FORMS I AND II COMBINED)

	III	IV	V	VI	VII	VIII
Addition	10.5	13.	15.5	17.5	18.4	19.
Subtraction	7.5	9.5	11.5	13.	14.	15.
Multiplication	6.	10.	14.	16.5	18.	18.5
Division	4.5	6.5	9.	12.	14.	14.5

[1] Franzen, R. H., and Hanlon, W. H., *The Program of Measurement in Contra Costa County, California*, chap. 2.

The above illustrations indicate how we can measure scientifically the progress and achievements of children in certain subjects. The subject of testing will be dealt with at greater length in a later chapter.

In other subjects such as nature study and literature we are compelled to rely upon general descriptive terms to indicate the achievement which pupils should make from grade to grade and at the conclusion of their study of the subject. Scientific experts in the field of educational research are attempting to devise tests, scales, and standards which will apply as accurately to these subjects as the tests and scales now in use apply to certain other subjects.

The seventh essential of a good school is a carefully selected staff of adequately trained, professionally minded teachers and workers in other capacities. Just as a successful industrial plant must have skilled workmen each of whom can do accurately his particular kind of work in the plant, so a successful school must have trained teachers and workers, each possessed of all of the essential abilities and qualities to secure the results expected of him.

It is evident, of course, that the staff of teachers and other workers is the most important factor in making a school or school system successful. Whether each other essential of the school accomplishes what it should in the education of pupils depends upon the staff of workers. If they are skilled and capable in achieving requisite standards and in using the other essentials of the school to that end, satisfactory results are achieved.

The blending of the foregoing factors under the skillful guidance of the teacher in the work of the school will be constantly evident in the chapters which follow. Every teacher should frequently "check up" his school with reference to the satisfactory operation of these essentials.

CHAPTER IV

The Curriculum of the Modern School

In the preceding chapter, the curriculum of work as set forth in the course of study was designated as the second essential of a good school. In that discussion, the need and importance of a good course of study were emphasized and illustrated. The more thorough and detailed treatment of the curriculum in its relations to good schoolroom practice was reserved for this chapter.

The determination of the curriculum for a school system is essentially an administrative responsibility. But, because the curriculum affects so vitally the work and the procedures of every teacher, the authors believe that certain basic aspects of the curriculum problem should be studied by teachers in their consideration of methods and other matters affecting teaching procedures and results. Accordingly, those matters of interest and value to the teacher will be considered here. An insight into these matters will enable teachers to know the work of a good curriculum, to appreciate the weaknesses and the reasons therefor in an unsatisfactory curriculum, and to take their due measure of responsibility in the proper modification and constant improvement of the curriculum of the school system in which they teach.

With the above ends in view, certain questions pertaining to phases of the curriculum problem will be answered briefly but concretely in this chapter. These questions are:

(1) What is a school curriculum? (2) What factors determine it when it is rationally developed? (3) What should it do for the school it serves? (4) What progress has been made in curriculum development in recent years and what remains to be done? (5) What is the teacher's relation to the improvement and success of the curriculum?

If the teacher has an independent working point of view in reference to each of these questions, he will be duly discriminating and cautious in judging and using the curriculum in their school system where he teaches.

(1) *What is a school curriculum and what should it do for the schools it serves?* Webster defines it as "a specified course of study." Charles Hughes Johnston says it is "any systematic and schematic arrangement of courses which extends through a number of years and which is planned for any clearly differentiated group of pupils."

The foregoing definitions, while serving certain purposes, certainly do not, standing alone, define the curriculum, or course of study, of a school system in such way as to indicate its great central place of importance and control. This may best be done, it seems to us, by turning to the second part of the question we are seeking to answer in this section.

An indication of what the course of study should do for the system it serves will answer in a more concrete, direct, and thorough fashion what it is. Knowing what a course of study is in terms of the service it should render, will enable the teacher to judge it critically for the purpose of seeing how it should be supplemented and certain phases of its requirements surpassed, and at the same time cause him to be concerned that his own efforts shall always contribute to its improvement.

The first thing the course of study in any subject should do is to point out how that subject may help pupils to be-

come equipped for the duties of life. The value of a subject in training for vocation, citizenship, leisure, good health, and morality should be briefly stated in concrete, illustrative fashion for the guidance of the teacher. A definite set of objectives for realization is the first step in good teaching. The modern course of study should definitely remind the teacher of the goals to be sought through the teaching of each subject. A right start in this matter possesses inspirational values for the teacher and aids in rationalizing every succeeding phase of the teacher's procedure.

Brief quotations from courses of study which give adequate attention to this matter will illustrate the particular quality of a good course of study which we are stressing here. Quotations from courses in home economics, penmanship, geography and nature study will be sufficient for this purpose. In each course, the contribution of the subject to all of the objectives to which it ministers is fully set forth; but the purpose here is fully served by quoting from each course the views it presents with reference to the relation of the subject to the achievement of one or two of the social aims of the school. It seems unnecessary to quote from each course the contribution of the subject to each of the objectives of education.

The home economics course says:

> Seeking, then, to aid the development of the child for social efficiency, the following objectives hold in teaching home economics:
>
> *Health Efficiency:* By teaching the relation of food and clothing to health; the best care of the human machine; the needs of the body and how those needs may best be met through the proper choice and preparation of food; the ill effects of improper choice of food and clothing and of improper preparation of food; personal hygiene; household and municipal sanitation.

This quotation is from a penmanship course of study:

Penmanship contributes to the equipment of the individual for efficient social service through providing him with the ability to write legibly and rapidly with ease and endurance. The ability to write is essential to every individual, that he may record his experiences or communicate his ideas and experiences to others who are absent. It is evident that its contribution is mainly to vocational, avocational, civic and physical efficiency.

The ability to write is almost indispensable in every occupation. In the course of one's daily work, records need to be made, memoranda need to be dispatched, and written communications need to be interpreted. A prerequisite to securing and holding almost any sort of a position is the ability to write and to read the writing of others.

The ability to write equips one with a valuable ability which is much needed during leisure. All social correspondence, by means of which one keeps in contact with his absent friends, is essentially an avocational pursuit. It can hardly be indulged in by those who do not possess the ability to write. As one goes about his reading for pleasure, he constantly finds need for the ability to make notations and to record thoughts and inspirations which arise in the course of reading. As one travels and indulges himself in those common means of pleasure and recreation, he finds constant need for the ability to write.

The following quotation from a geography course exemplifies the avocational value of the subject:

The objectives of good geography teaching relate themselves to the general objectives of education specifically as follows:

Dealing as it does with the relations of mutual interdependence between the earth and man and man's institutions, geography contributes in large ways to the equipment of the individual for efficient social service. While it contributes somewhat to all phases of social efficiency, its main contribution is to the avocational, vocational, and civic aspects of social efficiency.

The contribution of geography to avocational efficiency is large. It provides equipment enabling one to read the newspapers and current magazines with intelligence and pleasure; it enables one to contemplate travel and do it with intelligence; and it also provides one with a body of interests and ambitions which lead to the exploration and appreciation of far-distant countries through reading.

The quotations from the nature study course illustrates the moral and civic phases of its value:

The Moral Aim:

Through a knowledge of the life of animals and plants, through a knowledge of the powers and forces that control our earth, the sun, moon, and stars, the child is placed in an understanding relation with the natural world about. When the nasturtiums or the beans are not watered during a dry spell and are found withered the following day, when the pet canary or the guinea pig or rabbit has not been fed and watered for a day or two and it is found listless and unhappy, the child will realize that diligence and care and doing the right thing in time are necessary to health and happiness and that carelessness and shiftlessness are wrong and result in unhappiness and sometimes death. The consequences of neglect or wrongdoing will be shown concretely. There will be more sympathy and love for animals and plants.

There is nothing that shows a child heedlessness better than the careless planting of seeds. If radish seeds are scattered unevenly in the furrow or a few are dropped in the space between the rows the seeds will sprout exactly where dropped. Thus the child comes to realize that it is easier to prevent mistakes than to rectify them.

Through the possession of a private garden patch, or pen of rabbits or pigeons, the child's sense of ownership is aroused. If some other child should trample the lettuce or pull out half-a-dozen tender radishes or onions, in the surprise and disappointment there will come realization of the respect that each one

owes to the property of others. As a result, another child's garden patch will not be so easily destroyed.

In employing leisure hours between school dismissal and dinner time, to work among plants or pets, the child will be kept off the streets and will avoid getting into mischief in the neighborhood, and will be learning lessons in patience, diligence, steadfastness, and thrift.

> "Through a knowledge of the wonderful things of the world, of their mysterious forces, of the why and wherefore of it all, leading one to believe in an all-planning and all-guiding influence, religious sentiments are aroused."—Holtz.

The Civic Aim:

In the furthering of food production by school children on plots of ground considered their own, in the raising of their own chickens and rabbits, is aroused a sense of ownership and a knowledge and love for the cultivation of the soil. In the pride that comes for one's very own garden, for one's very own animals, comes a pride in one's own home surroundings, in neighborhood homes, gardens, and animals. This leads in time to improvement of a whole community and to better civic conditions.

> "Where agricultural education has been made compulsory in the schools of France and Belgium and in certain districts of Illinois and Iowa, the young people are very proud of their homes and their farms, and the movement of population has been from the cities to the country."—James Ralph Jewell, in *Agricultural Nature Study and School Gardens*, Bulletin No. 2, 1907.

Through the effort required in cultivating and gathering crops and through the knowledge gained of the values of their products there will be engendered ideals of thrift and conservation.

The study of the protection of the natural and native wild life of our state public parks, and the study of the sources of our water supply and their protection, lead to the realization of civic responsibility.

The second service of the course of study is to indicate the total scope of the field to be covered in each subject by the grades concerned, and to assign definite portions of the total field to each grade. This must be done to enable each teacher to understand his definite responsibilities in the total undertaking. In performing this function, it will add greatly to the teacher's confidence in the course of study if it bears evidence that its directions are made in the light of the latest pertinent scientific investigations and of the best practices in other leading school systems.

Any course of study worthy of the name doubtless discharges this duty in some fashion or other. The most modern courses, however, render this service in a very helpful way while others merely assign the duties in a few brief sentences.

How the best type of course of study performs this duty will be noted briefly. In the first place, in the assignment of work for each grade which is expected to study a given subject, the most helpful type of curriculum suggests the relative importance of the different topics or phases of the subject, and about the amount of time which should be devoted to each. Such suggestions are made in view of the relative importance in social life and in the achievement of the purposes of the school which each topic or phase of this subject is judged to possess. For example, a good course of study in history, now before the writer, says that four to six weeks should be devoted to the constitutional convention and the adoption of the constitution, while it suggests that from one to two weeks should be devoted to "The Development of the Northwest Territory."

In the second place, the good course of study suggests the relationships between topics and phases of the same subject, and how to make the transition from one of these

to another with best results. A course before the writer explains the connection which should be maintained in teaching the Declaration of Independence, the Articles of Confederation, and the Constitution of the United States. A sixth grade geography course says:

> The teacher may introduce the study of Africa by accounts of the experiences of Roosevelt, Stanley and Livingston on this continent. This will interest the children in the difficulty of travel, the ignorance of the natives, health conditions, and vegetation. The following activities are suggested: a series of pantomimes or charades calculated to represent the experiences of one traveling in Africa. These might pass across the screen—an elephant hunt, finding of a diamond mine, the desert caravans, lives of the pygmies, etc.

In the third place, a good course of study, in performing the second service for which it is responsible, suggests helpful correlations. Bonser[1] quotes from the experience of Blanche E. Campbell to show how literature, language, industrial arts, and music make contributions to the fifth and sixth grade history assignment. The good course of study points out in this way how different subjects may be made to supplement each other.

In the fourth place, in completing the assignment of work to be done, the good course of study provides, usually in the last year of the course, a logical or scientific outline of the subject. This helps to keep before the teacher the relation of the various parts or phases of the subject to each other. It will probably add also to the thoroughness of the pupil's understanding of the subject if he reviews the whole field by such a logical outline, provided it is not made obscure by the inclusion of too many details.

[1] Bonser; *Elementary School Curriculum*, p. 114 ff.

The third service the course of study should render consists in setting forth in each subject what results are expected at the close of the work in each grade. What is possible and desirable in this connection was rather fully set forth in discussing the sixth essential of a good school in the preceding chapter.

Too much attention can hardly be given by the course of study to setting forth very fully and concretely the results which are desirable and possible from grade to grade. Space devoted to this brings definite, inspirational guidance to the teacher. Many of the latest, best courses quote extensively from the work of pupils or from teachers' reports in setting forth evidences of the actual results achieved under classroom conditions. These courses quote, among others, papers written by pupils in English classes, summaries prepared by pupils in science and nature study classes, and outlines developed in the study of history or geography.

The fourth thing the course of study should do is to indicate the procedures in teaching the various phases of each subject which may be expected to prove valuable and economic. A good course of study provides a large amount of helpful guidance to the teacher in planning her daily work.

Most courses of study state in a paragraph or two the work each grade is to do in such subjects as history, geography, and nature study. Then, the procedure to be followed in doing the work assigned is suggested. These suggestions usually occupy several paragraphs or even pages.

In the best courses, the procedures indicate dealing with large units of work rather than with small topics and detailed facts. The major problems to be solved, the important projects to be executed, and matters to be studied

merely from the appreciation standpoint, are all definitely indicated.

The following extract from a fourth grade course of study in geography illustrates the help a good course provides the teacher as to how to go about her work:

The plan of this grade is to teach world geography through a study of things commonly used. This is done by tracing certain necessities and luxuries of life to their sources and, wherever the opportunity offers, using terms of world geography so that they become familiar.

The things taken up in this grade are the chief things that we get outside of the United States. Through the study of the diverse products of our state, the children have become informed of the conditions under which many of these grow, and are led out into the farther regions of the earth. These will not be entirely strange to them because of the previous study of the lives of little people, in the third grade.

The emphasis in the work of the grade will be more largely on the map study and distribution of products. The project should start in a natural setting, the children be interested in the problem of tracing various articles on the breakfast table or garments worn by the children, to their original sources. Avoid a stereotyped method of procedure which develops into a routine very similar for all the articles taken up. Articles in common use which may take the children to all parts of the world in their study are coffee, cocoanut, dates, sugar, spices, rice, tropical fruits, silk, pottery, rubber, and hemp.

Make a collection of various articles from the home about which the children would like to learn. This may be developed in various ways. Groups of children might set the breakfast table, the dinner, and the supper tables with various appropriate articles and then, seated about the table, discuss the sources of supplies.

Make a collection of articles, the sources of which the children would like to know.

Each child may, with the help of the teacher, find out the desired information and report to the remainder of the class. This may be turned into a game in which, after several repetitions, each child may try to give information about all the articles brought by his playmates. In telling about coffee, for example, children should be encouraged to enrich their recitation by talking of raising of crops and preparation for market. They may be made responsible for such questions as "Why we do not raise coffee near home?" They may trace the course of the ship that brought the coffee to San Francisco back to Mexico, the West Indies, Central America, through the Panama Canal to Brazil, to islands of the Pacific, and to Java. In this, the Pacific Ocean, Panama Canal, Gulf of Mexico, Atlantic Ocean, equator and tropics, hot belt, shape of the earth as ship recedes from view, oceans and islands are touched.

Other projects related to coffee industry are as follows:

Collect pictures of coffee-growing and prepare a scrapbook. Write letters to coffee merchants for information, and better still, visit the coffee plantation by means of the baloptican or moving picture. The children should feel free to ask questions to be answered by an individual or group who appoint themselves to be responsible for general information.

Making a moving picture showing the cocoanut from the time it grows in the warm countries to the time we break it for the table affords an interesting project.

This could include various scenes: the tree, picking the fruit, life on the plantation, uses of the cocoanut for food, houses, roofs of houses, dishes, bottles, baskets, curtains, twine, fuel and light, soap, sap of vinegar and liquor obtained from cocoanut. It would include the steamer on the Pacific Ocean, crossing the equator to Samoa, with the long, slender trees along the shores. Such problems might come up as "Why the Samoan Islander has only one type of house," leading to finding available materials, etc.

For appreciation, R. L. Stevenson's *In Foreign Lands* and selections from his Samoan experiences may be read. This subject makes an attractive problem in sandtable construction.

Learning about the home of the date palm. Boxes of California dates and foreign dates may be compared, and different routes by which each came to our city traced on the map. The ship going after the foreign date journeys from San Francisco across the Pacific Ocean into the Mediterranean Sea, to the Nile River, up the Nile River and by caravan into the desert. A study of the life on the Sahara Desert will review the oasis, great sandstorms, reason for great heat, length of day and night. Other great deserts such as Arabia, Gobi, Great American Desert, may be pointed out. *Dick in the Desert*, by Otis, may be read and enjoyed at this time. Chapter from H. H. Hudson, *The Little Boy Lost*.

A Pageant of Articles

Groups of children may represent various articles over the world and work out some appropriate conversations suggesting from where they come and across what waters, leaving the audience to guess what they are.

Transportation Project

This is one of the most attractive projects for children of this age. The way in which it is worked out can be varied according to the interest of the children and desired outcomes. Booklets may be made in which are collected the various vehicles of transportation, with a statement below of some of the routes and the cargoes which they carry. World maps may be drawn, in which the children draw or place the vehicles of transportation loaded with articles appropriate to the routes they are following.

What can we send to our Foreign Cousins? Review of resources of our state. We have a surplus of some things. What are they? Who needs them? Why cannot our cousins raise these themselves? Need and dependence of one country upon another.

Pageant of Countries

Each child may be dressed to represent a country, or some article of apparel which is associated with a particular country.

Each country has something to offer Miss California. In turn Miss California tells about her products and why she can give them. Here is opportunity for oral language.

Following are some of the articles which may take the children to all parts of the world:

Cutlery	England	Macaroni	Italy
Fish	Norway and Holland	Ivory	Central Africa
		Diamonds	Kimberley Region
Flower Bulbs	Holland	Pearls	Ceylon
Cheese	Holland	Tea	China, Japan and Ceylon
Toys	Germany		
Silk	France	Firecrackers	China
Porcelain	France	Porcelain	China, Japan
Timepieces	Switzerland	Pineapples, Bananas	Hawaiian Islands
Manila Hemp	Philippines		

This course devotes over five additional pages to suggesting how the work of this grade may be done. The discussion throughout is concrete, reporting what has been successfully done by some teacher or what may profitably be attempted. The section on procedures is followed by a bibliography of thirty-one references, helpful in the work of the grade, and by an equipment list. Seven definite magazine references occur in the bibliography. The equipment list is as follows:

Sandtable, modeline, crayola, drawing paper, paste, construction paper, scissors, poster paper for mounting pictures, file, twelve-inch globe, map of the world (divisions through oceans rather than through continents), *National Geographic* pictures (the land, the water, the air), baloptican and slides, stereoscope and stereographs.

From a fourth grade course in nature study, the following is quoted to illustrate the help provided for the teacher's guidance:

Making an Ant's Nest

Fill a quart jar or some larger glass receptacle nearly full, with the loose soil, ants, and pupæ of an ant hill found in the garden. If possible, procure a queen ant, which is larger than the other ants. Scatter on top of the soil a little sugar, crumbs of bread and bits of meat, and small seeds like wheat. Hang to the inside of the jar a wad of cotton or cloth or bit of sponge kept moistened with water. Cover with a thickly-woven cloth, or screw on the cover half way. To prevent the ants from escaping to other parts of the room, set the jar on a stone or block of wood, in a bowl or deep saucer of water. Cover the sides of the jar with a dark cloth to encourage ants to tunnel through the soil. To observe, remove this cloth for a short while. Note their movements, the use of their feelers, jaws and legs, the pupæ and how they are carried, the work of tunneling, the community life in the nest, their food and what they do with it. Discuss the harm done by ants in the home and in the gardens, and how best to get rid of them. If they have entered the schoolroom or are in the children's garden, experiment in using the pastes and powders to get rid of them. Boiling water or kerosene poured into the nest will kill the ants.

References: A. B. Comstock's *Handbook of Nature Study*, pages 419-428, and the *Ways of the Six-Footed;* H. Comstock's *Insect Life*, page 276; Hodge's *Nature Study and Life*, pages 86-88 and 415-419; J. H. Fabre's *Insect Adventures*.

Read poem, "The Ant an Engineer," in *Nature in Verse*, by M. L. Lovejoy.

At the close of the outline of the work in nature study for all the grades is a two-page equipment list consisting of sixty-three items to which reference is made in the grade outlines. This list is followed by a nine-page bibliography to which reference is constantly made in the grade outlines.

Such illustrations as are used in discussing the various lesson types in Part II, may very properly be included in

courses of study that wish to suggest good teaching procedures. These lesson types should be gathered from the best work in the school system by those who are planning a course of study in any subject.

In the light of the foregoing, the curriculum may easily be defined in terms of what it should do as: That administrative and supervisory device which sets forth (*a*) the value of each subject in realizing the objectives of education, (*b*) the total field to be covered by the subject and the work assigned to each grade, (*c*) the results, both quantitatively and qualitatively expressed, which should be secured from grade to grade in teaching each subject, and (*d*) the procedures suggested and recommended for use, grade by grade, in teaching the various phases of each subject. This phase of a course of study is thus seen to occupy a very controlling relation to the school. It probably exercises more far-reaching effects in determining what the pupils and teachers do, day by day, and with what results, than all other influences combined.

(2) *What factors determine a curriculum when it is rationally developed?* Modern educational thought agrees that there are two: (*a*) the wishes and purposes of society, (*b*) the nature and ability of the child for whose benefit schools are established and maintained. We shall discuss briefly the relation of each of these two factors to the determination of the effective curriculum.

In Chapter II, we saw that society's conception of what it wishes accomplished determines the objectives of our public schools. These objectives have not always been the same as they are today. They vary and change as society's conception of its problems and needs change, and as society's ideals and purposes become clarified and extended.

The wishes and purposes of society as expressed in the

objectives of public education determine two things of great importance in curriculum making: first, what shall be taught (giving us the principle of *selection* in curriculum making); second, the relative value which shall be assigned to the things taught (giving us the principle of *emphasis* in curriculum construction). The effect of each of these principles, derived from an interpretation of society's wishes and purposes, on the curriculum problem, will now be presented.

The first of the two major factors which determine the curricula of schools dictates, then, the selection of the materials to be taught and the relative importance of the various materials included in accomplishing society's purpose in maintaining public schools. What shall be selected out of the total experience of the race for use by schools in the education of children in preparation for the duties and responsibilities of life is a problem as old as education itself. The answer to this problem has varied with each nation and with the different periods in the history of each nation. The solution of the problem determines for each nation and for each period in that nation's history both what subjects shall be taught and what shall be the content of each subject included in the school's course of study.

How the answer to this problem has changed in American educational history will illustrate the point under consideration. A few "high spots" in the many changes which have occurred will be sufficient. In the first New England schools, the needs of society which were dependent upon schools for their satisfaction were met through the teaching of reading and writing. The people wanted all to be taught to read so that each could read and interpret the Bible. In addition, it was thought necessary that each child should learn to write, in order that he might be able to keep simple

records and write his own letters. Later this New England school added music to its curriculum, in order to secure better church singing. As time went on, and the area of the United States increased until it finally extended from the Atlantic to the Pacific, the need increased for teaching geography, with the result that it was also added to the subjects taught in the schools. The extensive attention now given to the teaching of history began at the close of the Civil War and was due largely to the desire of the veterans of the war to have the memory of their deeds live with their children and future generations. Physiology was added most generally after it was combined with scientific temperance and its teaching demanded by the Womens' Christian Temperance Union. During the last half century, the subjects taught have been rather definitely prescribed by state legislatures, by means of which the people carry into effect their wishes regarding what the public schools shall or shall not teach.

A few years ago, it became apparent that the course of study had become overcrowded by the addition of many new subjects. As a result, the problem of the curriculum assumed a new aspect and became one of selecting with greater care than had been exercised previously those aspects of each subject which if taught would probably contribute most to fitting each child for the duties of life. Since it is impossible to know everything, the problem became one of deciding *just what* things out of all that might be taught in each subject should be included because of the intrinsic value of each in furthering the child's equipment for "social efficiency."

While this new aspect of the problem has been quite largely the task of the professional educator rather than of the people and their legislators, yet the impetus to work

upon the problem came from the dissatisfaction of the people with the results the schools were producing. The educators attacked the problem by attempting to determine what changes should be made in curricula in order to improve these unsatisfactory results. This action began as a measure of self-defense in order that the schools might not lose public support and by so doing retrograde. The progress made on the problem from this standpoint will be sketched when we take up the next question in this chapter.

The second thing pertaining to curricula which is determined by the wishes and purposes of society is the relative importance of the things taught in each subject. The greater the importance assigned to a subject or a topic by society, the greater is the time which schools will tend to assign for teaching it, and the greater is the space which textbooks will tend to devote to it.

Both of these tendencies will be carried into effect unless more economic ways of meeting the wishes of the people are found. What the people always want is a satisfactory functional result. They leave it to educational experts to determine in school terms the statement of the results asked. If educational procedure can discover ways of providing the desired results in the same or less time, and without increasing the space used in textbooks, the people will be satisfied and will also be glad of the savings accomplished.

This is just what improved procedures in the modern school have found ways of doing in such subjects, for example, as handwriting, spelling and arithmetic. The people are just as insistent as in the past upon satisfactory results in these subjects. It is undeniably true, moreover, that the results secured by current educational methods are far superior to those formerly secured; yet the time devoted

to teaching them is relatively much less. These better results are secured by reason of two things which characterize the modern school; first, it determines with much greater accuracy than schools formerly did just what should be taught in order to secure the results society wants; second, the methods used in teaching have been scientifically worked out so that they produce, with greater certainty and economy than older methods did, the results that are demanded.

The principle of emphasis may add a topic or subject to the curriculum or diminish the attention given to a topic or subject. The principles of selection and emphasis are closely related in their operation. The fact that the people want more attention paid to something may lead to its selection for *entirely new* attention or for just *more* attention. For illustration, the World War caused us to study the advantages of democratic governments as compared with autocratic governments. The increased appreciation of our own democracy which resulted has brought an increased emphasis to the teaching of the essentials of our American democracy and their priceless value. In some states, prospective teachers must now take a course in civic education before certification can be secured. Many new textbooks are giving more space than ever before to discussing the duties of an American citizen and stressing the qualities essential to good citizenship. Similarly, as the United States has engaged more and more in foreign trade, the teaching of geography has responded to the need of teaching more about America's exchange relations.

It is also true that a change in the thinking of the people on some matter may result in reducing the attention the schools have been giving to a particular subject. For example, the teaching of German was eliminated from the

public schools of some states during the World War. Also, owing to the growth of certain points of view regarding disease and its cure, much less attention is given by schools in general to such teaching. The emphasis is now from the positive side of stressing good health and the conditions that produce and maintain it.

Many other illustrations of changes in emphasis which have come about in every subject of study will occur to the reader. Just as the principle of selection is necessary to guide in the choice of right subjects and of the proper content in each, so the principle of emphasis is needed to insure the proper proportion of attention not only to the teaching of each subject but also to the various phases of its content.

At the opening of this section of the chapter, we noted that the second factor which determines any curriculum is the nature of the child. This factor determines three important elements in formulating the course of study in any subject: first, the general order of teaching the subject; second, the grade placement of the content to be taught in the subject; third, the necessity of varying the content to be taught in a subject to suit the mental differences in pupil groups.

In planning a course of study, we shall note briefly the importance of each of these elements as controlled by the nature of the child.

First, the general order of developing a subject to be taught is determined by the mental nature of the learner. For example, if it were not for the fact that the child cannot master and understand the logical organization of the subject of geography, we should teach it so, starting with the nebular hypothesis and the relation of the earth to our solar system. Next in order, we would teach mathematical,

physical, and social and commercial geography. We find it impossible, however, to teach geography in any such order, owing to the child's lack of capacity to think in any such fashion, due, of course, to his lack of appropriate experience and from lack of any need for it in his childish efforts. The one who teaches and plans a course of study in geography is forced, therefore, to discover the order in which the subject of geography can be learned with economy by beginners in that subject. This order of teaching a subject, as dictated by the learner's needs, is called the psychological order of the subject. To continue the geography illustration, we find the psychological order for the learner begins at practically the closing point of the logical order; that is, it begins with the child's social and economic experiences at home, whereas the last thing the child learns, if it is included at all in his course, is the first thing in the logical development of the subject of geography—the theory of the origin of our solar system.

Without further illustration, it may safely be said that makers of curricula need to organize the subject matter of each course in such a way that the child's experiences and abilities will enable him to learn it with greatest ease and economy. The course of study must follow the psychological order rather than the logical, in planning the teaching of a subject.

Second, the grade in which a particular part or phase of each subject may best be taught is determined by the child's way and order of learning. In arithmetic, for example, it is impossible to solve problems, even in simple mensuration, until the fundamental processes as applied to integers, fractions, and decimals have been mastered. Time must be allowed, therefore, in the early grades, to enable the child to become proficient in those things which

are basic to any topic before assigning it to a particular grade for mastery. The grade placement of what is selected for mastery in each subject is finally determined, therefore, by the order in which the learner must master the subject and by the time occupied in taking the various steps in the psychological order.

Third, the nature of the child, as it expresses itself in varying degrees of ability in the children who attend the public schools, requires planning the course of study so that it is sufficiently varied in content and difficulty to adapt it to the learning ability of each group. Dickson[1] covers this problem of curriculum-making well as follows:

> There is only one way in which the public school can adequately meet the problem growing out of ability differences in groups, and that is through a differentiation of courses of study and standards of attainment. The person who has lost self-confidence has lost the power to use effectively even that ability which he has. Let us, then, give the encouragement that comes from success in doing tasks commensurate with ability. Instead of thinking so much about fitting a child into an established curriculum, we must begin to think more about modifying the curriculum to fit the needs of the child. Such a policy leads inevitably to methods of classification which will meet the varying capacities of children. Whether for the city, or the town, or the rural school, the principle of adjustment remains the same; every school, wherever situated, faces the same problem and must employ the same general method of solution.

The general opinion of educators has been that the work of the elementary school for at least six grades, and possibly for eight, is fundamental and should be required of all pupils alike. It is our belief that this conception must change. As a result of the compulsory attendance laws, we must now teach many children of a type not formerly held in school. As our immi-

[1] Dickson, *Mental Tests and the Classroom Teacher*, pp. 131 ff.

gration has increased, our school problems have been multiplied by difficulties due to language, customs, ideals, and environmental influences. We face the fact that our curriculum and our time allotments, which were originally formed for a select group, are not suited, even in the elementary schools, either to the needs or to the abilities of a large proportion of children.

Fully 20 per cent of the children who enter the first grade cannot even under most favorable school conditions be carried through the first seven grades of the standard curriculum before the age of sixteen years. Our laws require these children to stay in school. Most of them carry the red flag of rebellion and discontent either openly displayed or furled up inside of a life chafing at requirements and longing for that birthday which will give them freedom or (in states with part-time laws) partial freedom from the bondage of school.

Are the standard curriculum requirements of the first six or seven grades the ones best suited to the educational needs of these children for the eight or ten years they are required to attend school? This question has not been answered conclusively. We believe the answer must come, and that it will lead us to accept the mastery of a few of the essential features of the curriculum in the elementary grades as sufficient to justify us in allowing certain children to pass on to the upper grammar grades, to the junior high school, and even to the senior high school for whatever types of work they can do effectively.

The above question relates mainly to the adjustment of the curriculum from the standpoint of the child whose ability does not enable him to keep pace with the regular course. The problem of the adjustment of the curriculum is just as great for talented, or gifted, pupils. What is done to meet their needs adequately is probably of greater significance from the standpoint of the total welfare of society.

Curricula must, therefore, be developed with the needs and welfare of talented children in view, also. From some

standpoints, they are more neglected than any other type of child in the school system when we consider their actual needs in the interest of growth in keeping with their abilities.[1]

(3). *What progress has been made in the scientific determination of curriculum content in recent years and what remains to be done?* The need in this connection is not to present the progress achieved and the work remaining to be done in detail; but rather to set forth its essential features. The illustrations will be limited to the elementary school subjects. A complete compilation of the work done and remaining to be done, even in the elementary school subjects, would require an entire book exceeding this one in size.

The first progressive step in the careful determination of curriculum content according to present standards consisted in the gradual acceptance of the principle that no content should be given a place in any subject of study which careful investigation failed to show was of real use in some important life situation. Stated positively, this principle holds that only those things may properly be included in the various subjects of the course of study which are found in use by people who are reasonably successful in their occupational duties and their life-relationships.

In determining the content of the elementary school subjects, therefore, only those materials should be included, out of all which are found to be socially valuable, which investigations show are generally used by the rank and file

[1] Quite as important as developing differentiated curricula adapted to different ability levels is the use of accurate measures for determining whether each pupil is living up to his growth possibilities or not, in view of the opportunities which the school provides him. See A. J. Hamilton, "Achievement Testing in the Elementary School," *Second Yearbook, Department of Elementary School Principals*, p. 182 ff.; also see Franzen and Hanlon.

of people living and working under varied conditions. In other words, it is generally agreed that the elementary school subjects should provide those socially valuable materials for learning which will be needed for use by approximately all of the people.

This point of view was definitely expressed by the Department of Superintendence Committee on Economy of Time in their first report of 1915,[1] as follows:

> The significant problem then is, what can be done in the elementary schools of our democracy to secure that degree of accomplishment in knowledge, character, and skill essential to equip those who finish the elementary schools with an intense desire and the training necessary to make the greatest possible additional personal growth, and with the disposition and ability to contribute to the welfare of society. Society is still depending primarily upon the elementary schools to furnish not only the tools of knowledge but also those facts, concepts, and principles essential in a democracy to common discussion and to the collective consideration of common problems. The training of the elementary schools must supply the requisite basis for "mutual intercourse, mutual understanding, and mutual sympathy," which are absolutely essential to a successful democracy. It is from the point of view of insuring that the schools supply this common basis for conference and intercourse that the determination of the indispensable content for each subject of study is of paramount significance. We must determine what the absolute essentials are in the equipment of our citizenship, that they may discuss and confer on a sufficiently high level to insure the progressive evolution of our democratic society. By concentrating our teaching efforts upon these essentials, their thorough teaching and permanent fixation will be insured in the minimum time.

[1] See "Minimum Essentials in Elementary School Subjects," pp. 12 and 15, *Fourteenth Year Book of the National Society for the Study of Education*, Part I.

Apparently our leaders in education agree that the function of the elementary school is to provide those educational opportunities necessary to insure, with the assistance of the other institutions of society, the acquisition on the part of the elementary school children of such habits, skills, knowledge, ideals, and prejudices as must be made the common property of all, that each may be an efficient member of a progressive democratic society, possessing the power of self-respect and self-direction, the capacity and disposition for coöperative effort, and, if possible, the ability to direct others in positions of responsibility requiring administrative capacity.

The acceptance of this principle was a very important step, because it supplied the necessary basis for scientific studies. The problem of what to teach in the elementary school subjects has become one of finding what knowledge, skills, and attitudes are being used sufficiently by people generally in meeting successfully the duties, responsibilities, and opportunities surrounding them in life. Once these knowledges, skills, and attitudes are determined, the schools are warranted in requiring their acquisition as far as possible by all children in the elementary schools.

The second step in the careful determination of the content to be taught in the various elementary school subjects is still in process of being taken. It consists of scientific studies, each of which seeks to answer for a given subject some phase of the question, "What should be taught in this subject?" A satisfactory answer to this question must show (*a*) the knowledge, skills, ideals, standards, appreciations which the study of the subject should impart to children, in order to train them efficiently for life's duties and responsibilities. It must also show (*b*) the materials pupils should master to acquire the psychological outcome desirable under (*a*).

The technique of conducting these studies need not concern us here. This varies greatly, of course, as does the value of the findings of the studies. Those interested in the procedures used will wish to consult the various studies[1] which are available.

The progress which has been made to date in certain elementary school subjects through scientific studies will be briefly summarized here in general terms. Teachers and others who are working on improving courses of study should go directly to these studies or to extended accounts thereof[2] for detailed guidance.

Very satisfactory progress has been made by Ayres, Jones, Cook, O'Shea, Starch, Horn and others in determining the content of the word-list in spelling which elementary school pupils should master. Studies to extend and improve this word-list are still under way; but the results to date constitute a safe guide in planning a spelling course for the elementary schools.

The results from studies of what should be required in penmanship in the elementary schools are quite satisfactory, also. Freeman, Koos and others have pointed out the quality and speed in penmanship which are desirable in fitting children to write satisfactorily for social and commercial purposes.

What should be taught in arithmetic to equip the rank and file of people for their needs in life has been very satisfactorily determined by Wilson, Woody, and others. Courses and texts revised in accordance with these studies are certain to equip children with more accurate knowledge and better skills in the use of arithmetic than was possible

[1] See Part I of 14, 16, 17, and Part II of 22 *Yearbooks of National Society for the Study of Education.*

[2] See Charters, *Curriculum Construction.*

when the desirable and necessary topics and processes were "scrambled" with many others which possessed little if any life-use value.

Many studies have been conducted to determine what should be taught in order to equip people to speak and write with necessary accuracy and reasonable fluency. The results to date are fairly satisfactory although not quite so conclusive as are the results in spelling, writing and arithmetic. Sufficient guidance is provided in these studies, however, to facilitate the remaking of the elementary courses in language, grammar, and composition along lines eliminating many topics and exercises which heretofore have consumed considerable time without making the pupils much, if any, more proficient in speaking and writing. Indeed, such topics and exercises, in the main, tend to interfere with results rather than to improve them.

It will be observed that the subjects of spelling, writing, arithmetic, and English are concerned almost wholly in the elementary schools with developing simple habits and skills needed in life situations. It is possible, therefore, to determine rather definitely just what must be taught to produce these habits and skills.

The other elementary school subjects are not concerned with producing merely these simple habits and skills which all must possess in order to live successfully. The problem of determining just what they should equip pupils with is, therefore, much more difficult. It is possible to live successfully, although not so richly, without any certain, definite equipment of knowledge and skills which may be acquired from the study, for example, of music, art, and literature. Just exactly what the subjects of history, geography, and nature study provide which is necessary to successful living, it has thus far been impossible to determine definitely.

With reference to just what should be taught in the elementary school subjects other than the four already discussed, only very general progress has been reported. No results which are even tentatively final have been determined.

In the field of social science, history, geography, and civics, some valuable guidance is provided in the results secured by Bagley, Horn, Rugg, Bassett, and their associates in these investigations. In none of these subjects, however, is it possible to say just what material should be included to the exclusion of other material. In these subjects, knowledge and attitudes are much more important outcomes than skills. Just what experiences and related subject matter are required to produce the necessary outcomes to meet life-needs will require much additional research and extended testing of the results secured.

The guidance which careful scientific studies of curriculum materials would afford is seriously needed in all subjects in which the content has not been fundamentally determined. Some work has been done in reading[1] and literature. The field has been touched in nature study, physical education, home economics, and manual training, but nothing adequate or conclusive has been accomplished in these subjects. Music and art are in great need of fundamental work upon the problem of their curriculum content.

Three types of curriculum change have taken place in those subjects in which scientific studies have led to positive conclusions in reference to curriculum content. In the first place, those materials and processes which studies show were not necessary, have been eliminated. Long lists of words have disappeared from spelling curricula, useless topics and problems have been dropped from arithmetic,

[1] Uhl, W L., *Scientific Determination of the Content of the Elementary School Course in Reading.*

and much non-essential technical matter is no longer taught in English courses.

In the second place, important shifts in emphasis have taken place owing to our more correct information today in reference to the true value of subject matter in training for social service. This is seen in spelling, for example. In spelling not only were certain words dropped, but an effort was made to find with accuracy what the useful and needed words are, and how to teach them with definite precision. In arithmetic, also, decimals are taught in connection with United States money where their most common and practical use occurs. Further, history and civics may well be cited in this connection. In these subjects, much more time is now given to the study of the problems and issues of modern life, while military and political matters, to which a great deal of time was formerly devoted, are now definitely minimized.

In the third place, some materials not formerly included in curricula have been added because investigations have shown that this knowledge is needed in meeting the duties and problems of life. For example, ways of saving and investing money receive much more attention now than formerly in arithmetic courses. More time is given in English than previously to good usage in writing and talking. Many additional illustrations of new materials added to the content of various subjects in recent years could easily be given. The provisions now made for teaching fire-prevention, safety, thrift, health and the like are relatively new and resulted, in part, at least, from the recent efforts to improve curricula.

Attention to curriculum needs, that pupils may be fitted for life's duties, has thus brought many new types of emphasis.

While much remains to be done to render the content of the various subjects as useful and valuable in the work of the school as it should be, yet good progress has been made during the past decade. It is very important, of course, that rapid strides should continue to be made in as many fields as possible, to the end that all curricula shall be recast until they suggest the teaching only of materials and processes of intrinsic social value and use. Only thus can it be brought about that the time and energy of pupils will be spent upon subjects of undoubted educative value. Not only is such a curriculum content productive of larger educational results ultimately but it is easier to attract pupils to it when they become interested and absorbed in its mastery. That which possesses intrinsic value has constant immediate values for the pupils as they work with it and so is much easier to motivate throughout the learning process.

(4) *What is the teacher's proper relation to the improvement and success of the curriculum?* We shall consider the teacher's relation to the improvement of the curriculum first. We shall then be able to see more clearly how the teacher's success in executing the curriculum is dependent in a large way upon his responsibility for promoting its gradual growth and improvement.

Current practice varies widely in amount of help sought from classroom teachers in improving the curriculum. It will be helpful in discussing this practice to note the two extremes in use. One practice, the older and most frequently used, takes the view that the teacher should have little or no responsibility for helping to make or to improve the course of study. Those following this practice consider that the course of study should be made by the superintendent of schools and his immediate associates. Another practice which has grown in favor, especially during the

last decade, takes the view that the rank and file of the teaching staff should sustain a very vital and responsible relation to the work of maintaining a modern course of study. The school systems which follow this practice endeavor to consult as many of their teachers as possible on the ever-present problem of improving the curriculum.

The gains to the course of study which may be expected to follow from teacher participation in its remaking become apparent when we evaluate the teacher's varied relations to it. The teacher's constant effort to execute the course compels him to test and judge it in actual classroom situations. Its weaknesses are, therefore, constantly forced upon his attention. What he has to do by way of supplementing and improving it, in order to adapt it to his various classes with a view to securing satisfactory results is always a problem with him. He thus comes to know what will work satisfactorily in actual situations, and sees the results which are possible of attainment with varying groups of pupils. He becomes familiar also with those procedures which will secure good results without undue expenditure of time and effort.

It seems evident that if the teacher, who is having the everyday experiences just mentioned, feels his responsibility for helping to improve the course of study, he will be in a position to offer an abundance of helpful suggestions. It is impossible for a group of supervising experts, who may visit him and observe his work, to grasp his wealth of experience and focus it upon the problem of improving the course of study. No, the teacher must function as one of the group responsible for the solution of this problem, in order that his teaching experience may exercise the influence it should.

Further, the teacher should know while he is having his

experiences that he is expected to remember them and bring them to bear in improving the curriculum. Under the stimulus of such a responsibility, he will interpret his experiences with greater care and breadth of vision than could be expected if he were casually invited later to review his experiences and suggest ways of improving the course of study. Teaching from day to day under the responsibility of judging the value of the program that he is helping to execute renders him increasingly thoughtful, and arouses his professional pride in his work.

There can be no doubt that a proper use of the experiences of the teaching staff in improving the course of study produces certain very important results which cannot be secured in any other way, so far as our present experience reveals. Three results will be noted here. In the first place, a better course of study is produced. It is inevitable that a plan of making the course of study which supplements the experience and ability of the supervisory and administrative force with the tested experiences of the teaching staff, should secure a better course of study than can be produced by the supervisory and administrative group working alone. The latter group is rendered no less capable by using the help of the teaching staff. On the other hand, it is both stimulated and supplemented by the tested experience of the teaching staff. In consequence, a course of study thus made coöperatively will be certain to bear more of the marks of a good course.

In the second place, the carrying of part of the responsibility for the course of study develops the teacher, rendering him in turn more capable in his work. In order to do such work with credit to himself, he must continually read and study. He must also consider carefully the relation of curricular materials and teaching procedures to the objectives

of education and the results which must be secured to satisfy these objectives.

In the third place, the teacher who has experienced the growth incident upon helping to develop the curriculum, is more certain to do his share in executing it well, thus insuring its successful operation. The fact that the teacher has helped to prepare the course of study gives him faith in it. He realizes it is the best practical result which could be produced with present knowledge. Teachers who have worked to produce a curriculum know it and understand its provisions better, of course. They are, therefore, ready at once to put it into effect, so that it is unnecessary for the administrative staff to hold a series of explanatory meetings before its intelligent use can begin. In fact, when the teachers have had large responsibilities in producing a course of study, they are proud of it and are anxious to demonstrate its excellence. Everybody, therefore, feels responsible for its success and goes to work with a will to insure its success.

PART II

THE NATURE OF MODERN CLASSROOM PROCEDURE

CHAPTER V

Socializing School Work

In Part I, we have set forth the scope and ends of education. The modern conception of the essential factors which must be put into practice in realizing the objectives of education has also been discussed.

Our attention now turns to the classroom where we must expect the major results of systematic education to be achieved. It matters not how perfectly the desired results of education may be conceived nor how carefully the agencies for achieving them may be worked out in theory, the public schools will accomplish little of value unless what takes place in the classrooms of the United States operates with directness and economy to accomplish those results. It is in the classroom that socially serviceable learning occurs, with the result that pupils acquire valuable and useful knowledge, functional habits, and desirable attitudes.

Thoughtful efforts extending over many years have resulted in establishing certain effective methods of working with pupils in groups or classes. Part II is concerned with presenting concretely the most acceptable classroom procedures. The aim will be to make clear the principles to be observed in using each type of procedure and to indicate the conditions under which it should be used.

The modern progressive classroom presents many features which stand in marked contrast to those which prevailed universally but a decade ago. Features which dis-

tinguish the new improved classroom from the older type are: (1) more definite objectives, (2) better subject matter, (3) improved methods of working and learning, and (4) a more desirable spirit. Modifying the efforts of the classroom from the older type to the newer results in socializing the school's work. In order to clarify what is meant by socializing the school's efforts, the outstanding contrasts between the earlier type of classroom and the socialized classroom will be briefly set forth in concrete fashion.

In the first place, the socialized classroom works with directness and with all possible economy toward fitting each child to do worthily and with dispatch all of those things in life which it may reasonably become his duty to do. In the second chapter, it was pointed out that each must engage in some necessary occupation, perform his duties as a citizen, use his leisure profitably and wholesomely, and so on. The socialized school, guided by definite knowledge of the activities in which one must engage to live efficiently, tries to train each child so that he may perform these activities as acceptably as possible.

The type of school which is being superseded by the socialized school conceived its responsibilities in more general terms and worked with less definiteness. It assumed that a general knowledge of the past and of the earlier achievements of the race was sufficient and that one thus generally equipped was ready for life's duties.

In the second place, the earlier type of school determined with less care and accuracy the content to be taught in the various subjects of study. Concern was not shown to select just the content in each subject which if taught would probably be most serviceable to the learner in performing life's activities. Almost any information which was considered true might be taught in the proper subject even though

the learner would seldom, if ever, use it. This point of view resulted in the teaching of much which had little value as we saw in Chapter IV. Many topics of no use to most people were taught in arithmetic. Equally useless things were taught in grammar. Efforts were made to teach the spelling of hundreds of words which the learners would in all probability never write. Many additional illustrations will readily occur to the reader.

The socialized school, however, tries to select the content to be mastered in each subject so that only that information and those processes are included which the learners should acquire to perform satisfactorily the activities which will be involved in meeting and discharging life's duties and responsibilities. Since the pupils in meeting the needs of their school experiences find it necessary merely to solve simple problems containing small numbers, integers, and fractions, and since a study of the life-needs of mature people shows that they also find it necessary to solve only simple problems, the socialized classroom feels responsibility only for training its pupils to solve simple problems with proper speed and accuracy. The common words which the pupils need to be able to spell accurately to express their needs in writing determine the list of spelling words which they try to master. It has been found by scientific investigation that a spelling list so determined will easily include all of the words which mature people outside of the school use. In the matter of grammar, since the great need of pupils in school and of people outside of school is ability to express themselves orally and in writing with accuracy, and also, if possible, with interest, the socialized school places its emphasis on these matters rather than on technical definitions and fine distinctions.

In the third place, when school work is truly socialized,

not only is the content socially valuable, as was illustrated above, but this content is mastered in natural, effective learning situations. This is quite in contrast with the earlier method of securing learning. By the earlier procedure, what was to be learned was assigned from a textbook. What was learned from day to day depended upon what occurred next and next in the text in use. After page 37 was mastered, 38 was assigned, then 39, and so on.

The method of assigning work by pages varies as to its details, of course. Sometimes it takes the form illustrated by the following assignment of a sixth grade geography class:

> I want you to read very carefully pages 12 to 14 in your book, which deal with the products of Texas. You will notice that considerable cotton is grown in Texas. Why? You will also notice that practically no cotton is manufactured into cloth in Texas. Why? Where is the cotton, which is grown in Texas, manufactured? Why?

Such an assignment is very formal and interferes with the pupil's making a natural and unhampered attack. It requires the pupils to look up the answers to a few questions proposed by the teacher. Of course, such an assignment is somewhat better than telling the pupils that they are to study pages 12 to 14 and learn all about the products of Texas. Either assignment is definite; but it dictates the tasks in detail, supplies but small motive for the work of the pupils, and limits their opportunities for thinking.

The socialized procedure unfolds very differently. The work of a class is so developed that the pupils are constantly confronted with definite, interesting problems and with real needs for information and skills which they do not possess. What they try to master from lesson to lesson is determined by their successive needs.

This point of view may be illustrated concretely by quoting from the diary of the geography teacher whose assignment on the products of Texas has just been cited. This diary entry, which follows, was made a year later than the one first quoted. It shows well the teacher's development. Her notes recording her experience in teaching the same topic in the geography of Texas to another sixth grade class read as follows:

My first effort was to launch the attack, so I said, "We have been studying the products of New England and we have seen how many things were manufactured there which were grown or found in the earth somewhere else. Let us see what we can discover about the products of Texas?" The pupils readily suggested several sources to examine, including their geography textbook. After a little preliminary reading one pupil said, "I find that cotton is grown in large quantities in Texas, but I haven't found out what is done with it." Another pupil presently volunteered the information that cotton is not manufactured into cloth in Texas. Another suggested that it is shipped to the Eastern states to be manufactured; others verified this statement by finding similar information in the geography textbook, encyclopedia, and other sources of information. Finally a pupil said, "I don't see why Texas should not have her own cotton mills and manufacture her own cotton." This question set the problem for study, and all of the pupils of the class went to work to find its solution.

The teacher's diary quotes the summary made by the class of the results of their work on the problem as follows:

The reason there are no cotton mills in Texas is because they do not have power to operate their mills. There are very few rivers. The rivers they do have do not carry a steady volume of water. Sometimes there is not enough water to run the mills, and at other times there are floods.

They could use coal for power, but there are very few coal mines in Texas. The coal would be more expensive to ship than the cotton.

Texas is a very good place to raise cattle, and people ought to raise cattle instead of putting in cotton mills.

It takes very many people to work in cotton mills, and being a farming state, Texas isn't very densely populated.

The machinery would have to be sent a long way to be put into the mills, because there are very few, if any, iron mines in Texas.

There are a few cotton mills in the South, but the East still ranks ahead.

The ready-to-wear garments are made in the North and the East rather than in the South. For this reason, it is easier to have mills in the East than in the South. There are more people in the East than in the South to buy the garments.

It is best to have our cotton mills in the Eastern states and have Texas do what she can best do, that is, raise cattle, mules, cotton, and farm products.

In the course of the solution of the problem reported above, the members of the class worked very freely and were constantly aggressively active. They consulted the maps in their texts as well as the larger wall maps. They used the various sources of help which were available, such as encyclopedias, stereographs, the *National Geographic Magazine* and the like. Many questions were asked by the pupils, and various suggestions were made by other pupils, in reference to things they should do in solving their problems.

The teacher worked as one of the group throughout their study. For example, one pupil, while working on the general problem during the supervised study period, told the teacher that he didn't see why Texas shouldn't manufacture cotton into cloth, since it would surely cost more

to ship the raw cotton away than to manufacture it. "But," questioned the teacher, "how would the power to run the mills be procured?" Thereupon the pupil looked for rivers and coal as sources of power, but was forced to conclude that such sources of power were wanting or not available to a practical extent. This is typical of the sort of thing the wise teacher does in most helpfully taking her part in aiding her pupils to learn.

How the teacher relates herself to the pupils when they are engaged in study trying to solve an important problem is of fundamental consequence in its effect upon the total values the pupils should derive from the process. Having successfully launched her pupils upon the study of a significant problem in the geography of Texas, the teacher related herself to what was going on, with the definite purpose of deepening interest, extending the study in all profitable ways and insuring fundamental mastery. Her part was to ask such questions, make such suggestions, and give such guidance as would stimulate each child to do his best work on the interesting problem under study.

How the socialized procedure operates in its details in working with varying materials and in different types of lessons will be set forth concretely in the chapters which follow in Part II. The aim in this chapter, introducing Part II, is merely to set forth, in broad outline, the characteristic features of socialized classroom procedure, leaving the details peculiar to each type of lesson for treatment in the appropriate chapter.

The illustration from geography shows the socialized procedure in securing the results desired when the work originates in and is concerned throughout with mastering the content of a particular subject. It will be shown in the later chapters of this part that the problem under study,

or the project in process of execution, is not always confined to a single school subject. The problem or project may originate in a general school need, such as the need of celebrating appropriately Columbus Day or Independence Day. Meeting such a general need will cause materials to be drawn from history, music and the like, and will call for dramatization, good compositions and so on. It will thus bring rich motive to the pupils for all the work which is drawn from each school subject. Or, the problem or project may arise out of a social situation in the community in which the school may profitably take a part, as the need for beautifying the part of the city from which the pupils come by cleaning up unsightly places and doing planting for decorative effects. In the successful doing of such a task, many subjects would contribute, and all the work done in each which was related to the task would be richly motivated. It will be clearly set forth that such undertakings not only possess large educative values, but that they produce the largest results when the socialized rather than the formal procedure is employed.

In the fourth place, working toward definite objectives through engaging in socially valuable experiences, in the course of which useful subject matter is mastered in natural learning situations, results in a spirit pervading the school and in influences determining the conduct of the pupils which are quite different from those present in the older and more formal type of classroom. This characteristic is a definite result of the features we have just been discussing in this chapter. But brief comment is necessary in setting forth this fourth distinctive characteristic of the socialized classroom.

The older classroom procedure resulted in a spirit of submission to orders and an attitude of conformity in obedi-

ence to the teacher's directions on the part of pupils. What they did and when they did it depended on outside influences, usually exerted in the form of disciplinary pressure from the teacher. The exact topics to be studied, and the precise points to be noted, were dictated by the teacher. The pupils worked approximately in concert fashion in response to uniform directions or questions. Individual initiative was not encouraged, as it upset the appearance of orderliness. When the teacher was absent, or not asserting herself, the pupils ceased all attention to their school work, for they were not expected to have interesting problems on which each pupil was anxious to work with independent initiative. Most of the class meeting time was consumed by the teacher in asking questions to test what the pupils had learned from their rather indifferent and meaningless efforts to study as directed by the teacher's dictated assignments. During school hours, the pupils sat rather primly in straight rows. In fact, sitting quietly, looking straight ahead, and listening, or appearing to listen, were among the primary results sought.

The procedure in the socialized classroom presents a marked contrast to the ways of working which were described in the preceding paragraph. In a socialized situation, the first concern is to have work, or undertakings, of interest and consequence to each child going on. What each child does is not assigned in the sense that it is dictated. Rather, under the leadership of the teacher, the pupils confer on what should be undertaken next, and how. As a result of this conference, the next work to be done is launched in such a way that each child becomes responsible for doing something of interest to him and of value to the entire group because of its relation to their total undertakings. In the geography lesson above, while the problem

before the class for solution was to discover why Texas did not have her own cotton mills, there was no set list of questions which each pupil must find the answer to in the order of their occurrence. In fact, the pupils in the class went about the solution of the problem very much as capable mature people might have worked on the same problem. Various sources of reference were in use at the same time. Some were finding out where Texas got her coal, others about the limited and varying water-power, others were learning what the people of Texas did instead of manufacturing and why, and so on.

When pupils are working with a variety of materials, each in his own way, they cannot remain in their working places in straight rows. A child may be using several sources of help at once, such as his geography, some stereographs, or a magazine. He arranges these so he can look from one to the others, using them in conjunction on his problem. If the map in his text is insufficient, he may need to leave his seat and go to the atlas or to the large wall map. If his sources are inadequate, he may go to the encyclopedias for information. Indeed, it will often happen that a child, while at work, will recall something he needs on his problem that he has used in an earlier grade, or seen in the library, and he very properly goes to get it. As the pupils work, they ask questions of the teacher or confer with her for guidance. After they have been at work for a brief time, it frequently happens that a group of three or four who are working along similar lines naturally begin to work together, sharing their sources and ideas. Often the entire group will give their attention to discussing some question that has arisen, in order that further study may go forward with greater economy and efficiency.

During the class meeting period, the pupils bring together the various results of the work done by individuals and groups, to share them with each other under the general oversight of the teacher. They proceed very much as a similar group of mature people would help each other. As the reports of work done on the general problem are presented, questions are asked by both pupils and teacher to bring out the relation of the various contributions to the solution of the problem. The teacher guides the work by suggestions and questions to insure thorough, fundamental mastery. Notes are made of matters in doubt or of conclusions which are not well supported. At the appropriate time, a summary outline bringing together the various points worked out is developed upon the blackboard. From this outline and the items noted which need further study, the assignment of whatever needs further study is agreed upon. Additional study and class meetings continue until the undertaking is finished.

Under such a procedure, the doing of useless, formal things is absent. All are busy on matters of significance and concern to each pupil. Questions are not asked just to test whether some one knows the answer to each. When a question is asked, it is because some one needs the information sought. Nor is there any insistence upon the formal seating of the class, so long as each gives his attention in thoughtful, helpful ways to what is being done. The children are free to speak, asking questions or presenting statements or illustrations, without the formal direction or consent of the teacher, so long as the general principle prevails that it is neither good manners nor economy for more than one person to talk at any given time.

Problems of discipline scarcely arise when pupils are thus engaged in work. Conduct is considered satisfactory if the

pupils work courteously, without confusion and without wasting their time.

The foregoing discussion has considered the four fundamental characteristics of the socialized classroom which were noted at the opening of this chapter, and has emphasized the advantages of them over certain characteristics which obtain when more formal procedures are established. They are as foilows: (1) The general and specific objectives sought are concrete and definite in the minds of both pupils and teachers. (2) Useful, socially valuable subject matter only is provided for study and mastery. (3) The pupils undertake to do only meaningful tasks and to acquire only such knowledge and skills as are needed in solving the problems under study and in executing the projects under way. They thus work under those conditions which are most favorable to economic, fundamental mastery. (4) The spirit and the discipline among the pupils are similar to the spirit and the discipline found in any group where proper courtesy and good manners prevail.

In setting forth the foregoing large, fundamental characteristics of the socialized classroom, many details of great importance in the education and socialization of children have been presented in their proper subordinate relation. It seems advisable now to bring these into a little greater prominence for the convenience of the teacher in checking up the extent to which she has succeeded in socializing the work of her school. To that end, the following detailed tabulation is introduced, throwing into prominence the contrasts between socialized and more formal school work. Because of gains which follow from analyzing these contrasts in different ways, the outline provides the means of evaluating the two types of procedure from the standpoints of pupil, teacher, and the learning process.

CONTRAST BETWEEN SOCIALIZED SCHOOL WORK AND FORMAL SCHOOL WORK

Socialized School Work	Formal School Work
The Pupil	
Natural interests	Artificial interests
Natural activities	Unmotivated tasks
Critical attitude	Passive attitude
Social conduct	Non-social conduct
Effort	Strain
Thinking	Memorizing
Expressing thoughts	Reciting information
Independence	Dependence
Self-control	Imposed control
Cognizance of values	Ignorance of values
The Teacher	
Creating natural environment	Making artificial setting
Utilizing child purposes	Imposing teacher purposes
Guiding natural activities	Dictating artificial tasks
Student with the pupils	Fountainhead of all knowledge
Interest primarily in children	Interest primarily in subject matter
Attention on desirable ends	Attention on subject matter
The Educative Process	
Aim of social efficiency	Aim of unknown future readiness
Taking into account present needs	Consideration of possible future needs
Natural, children's environment	Formalized schoolroom environment
Normal readjustment	Formal learning
Real life experiences	Artificial exposures
Normal natural activities	Abnormal lifeless tasks
Reference books	Textbooks
Subject matter as means	Subject matter as ends
Including concomitant learning	Emphasizing primary learning
Discussions	Recitations
Unification of effort	Division of effort
Psychological order	Logical order
Attitudes, skills, habits, knowledge	Subject matter, information, skills

CHAPTER VI

Motivating School Work

As pointed out in the preceding chapter, an important characteristic of the socialized work of the school is the appeal it made to the pupils. They attack their work with zest. They are aggressively self-active. This fact is manifested by their fundamental questions, the various sources of information which they use, and the many types of investigations which they employ. But why does truly socialized (socially valuable) work make such an arousing appeal to pupils? Why does any worth-while piece of work, or undertaking, appeal strongly to the person who does it with eagerness? The answer is—"Because it is definitely worth-while *to the doer;* because what he is attempting to do promises to yield a result which he personally realizes that he needs." Any school work which is interesting, attractive, and appealing to those who do it is commonly referred to, especially within the last decade, as "motivated work." The socialized work discussed in the previous chapter was definitely motivated work. Indeed, all school work cited for illustrative purposes in this book is motivated work, except where brief illustrations of other types of work are introduced for the purpose of contrast. So vital is the adequate motivation of the work of pupils to economy and efficiency in securing desirable educational results that it seems advisable to devote an entire chapter to this essential of good teaching. Accordingly, we shall set forth below: (1) the

meaning of "motivation" as applied especially to school work, (2) the importance of motivation, and (3) how the motivation of school work may be accomplished.

In the first place, then, what is meant by motivating school work?[1] Motivating school work consists merely in launching and guiding the pupil in his tasks so that he has a strong reason throughout his efforts for doing them—a reason so strong that it arouses in him a deep desire—yes, often, a longing, an anxiety, an eagerness—to do what he does. To motivate a pupil's work—anybody's work—requires merely that he shall see clearly and feel deeply that he should do it in order to acquire something he needs and should have.

The simplest experiences of life reveal the requisite conditions which give rise to motives for effort. A concrete illustration will demonstrate our point. When a child first gets the idea that he may receive a toy he is anxious to have if he writes a good letter to Santa Claus just before Christmas, he immediately becomes very anxious to know how to write the letter. The moment he "becomes very anxious," he has an adequate motive for learning how to write the letter. He feels an inner "urge" to try to learn what he does not know. He will be certain to complete the task if he is reasonably capable of it, provided the necessary motivating influences supply sufficient urge until it is finished. Motives for the necessary effort must supply stimuli until the undertaking is completed.

If a task is a long and difficult one, it may be necessary to break it up into many several smaller undertakings for the doing of each of which there is an adequate motive. For example, a high school student body, for reasons satisfactory to them, set up the goal of earning the necessary

[1] *See* Wilson and Wilson, *The Motivation of School Work*, chap. 2.

money to pay for the building of a swimming-pool as a part of the new gymnasium. It required many months of work, and a great variety of efforts, to reach their goal. While the original motive supplied stimulus for effort throughout, they found it easier to keep up their enthusiasm by reason of the fact that to attain their final objective they did many contributing things for each of which there were strong motives aside from the initial motive. These minor undertakings consisted of such things as a vaudeville evening in which a large part of the student body took part, a school play presented by the senior class, an evening of music by the various music classes and musical organizations of the school, and the like.

Similarly, in the education of pupils, large general goals requiring considerable time and effort to attain should be broken up into smaller intermediate contributing ends, for the attainment of each of which there is strong motive. For example, the director of a school orchestra arouses in each of his pupils the motive to become proficient in playing some instrument, and in all of them the motive to become, let us assume, the best orchestra the school ever had. Then he interposes many intermediate goals of value and interest in aiding the achievement of the ultimate goal, such as developing programs for special occasions, at which the pupils would be pleased to appear and do well. These may be school occasions such as school assemblies, class day, and commencement, or they may be occasions outside of the school such as a civic Christmas program, or a memorial service.

The illustration of writing a letter to Santa Claus helps us to understand the meaning of motivation by revealing clearly the essential elements which give rise to a motive. The elements are of two kinds: intellectual and emotional.

There was present a realization of need—an intellectual element. Following this, there was a desire to satisfy the need—an emotional element. The combination of the two results in a motive. If it is sufficiently strong to set aside the contending motives for doing other things which are always pressing for attention, a decision is reached to attempt the satisfaction of the need. Action is thus launched and work begins.

In the second place, now, how important is it to find ways of adequately motivating the work of pupils in school? There is no way to answer this question finally at this time. No measures have been taken to determine how much less time a class of known ability will require to do a piece of work under the influence of adequate motives than they would require if such motives were lacking. Nor is it known how much more thoroughly pupils learn if urged by adequate motives. But that there are gains in speed and thoroughness when learning isactuated byadequate motives is quite evident.

That adequate motives for effort are a potent force in human progress is also rather easy to demonstrate. If we seek to understand man's many achievements during his rise from barbarism to civilization, the basic explanation is to be found in the great motives which have urged and impelled him to persistent action and effort.

An illustration will make this point clear. Within the last century, the handicap of space to intercommunication on the earth has been largely removed by means of the telegraph, telephone, and wireless. The time required for travel has also been greatly reduced by the application of greatly increased motive power to the means of travel on land and water, and in the air. All regions of the earth have been penetrated by explorers—the cold as well as the

hot, and regions under the surface of the water and the earth as well as great heights. Marked progress has likewise been made against the ravages of such dreaded diseases of man as yellow fever, scarlet fever, diphtheria, typhoid, tuberculosis, and smallpox. To make this illustration complete would require the listing of all of man's forward steps and conquests since the days of savagery, for each step forward has resulted from his persistent efforts under the urge of actuating motives.

It is evident, of course, that every step of progress has cost efforts, strain, struggle, and persistent hard work. If we ask why men applied themselves and did these things, we find but one adequate explanation—they were urged and impelled by those stimulating, inspiring motives which arose out of a realization of the need for each conquest made. In our own times the persistent urge of imperious motives still holds men to the task of trying to complete countless unsolved problems.

The importance of adequate motives for effort is evident not only in the great achievements of the race but also in the everyday work and affairs of men. They continually experience the stimulus and urge of strong motives in the work they do. Five large groups of motives will be noted.

(1) The motive of *commercial gain*, the desire to acquire property, urges men to work hard that they may succeed. With those who amass great wealth, it sometimes seems to be the dominant life motive.

(2) The motive of *personal growth* stimulates men to great efforts that they may grow in resourcefulness, forcefulness, and power. To attain this end they study and travel at great expense, sacrificing time and energy.

(3) The motives arising out of one's *relationships* inspire him to put forth efforts to carry worthily his responsibilities

to his family, his lodge, his civic associations. This is a very dominating motive, requiring often great sacrifices. Even life itself may be given in defense of one's family or his country.

(4) The motives arising out of our *feelings of obligation* impel us to efforts to achieve something to discharge our obligations. Any worthy alumnus of a college feels obligated to accomplish something of value in life in order to discharge in part the obligation he feels for the contribution made by the college to the fulness of his own life. In a similar way, we feel impelled so to live and work as to satisfy, in some measure, at least, the obligation we feel to the Church, and the State.

(5) Then, finally, there are the great *humanitarian motives* arising from the natural tendency of every normal human being to serve and to help those in need. Such motives immediately move us to undertake even hazardous measures of relief if our fellow men are suffering, or if human life is endangered, as may be seen when a community is stricken by a great fire, disastrous flood, or a deadly epidemic. The great relief measures conducted throughout the world by various welfare organizations, notably the American Red Cross, are made possible by the impelling motives arising normally from the human tendency to serve where needs exist.

It is under the actuating, driving power of one or more of the motives just discussed that mature men and women go about their daily work. If a person finds that his daily tasks are not richly motivated, that his work is drudgery to him, he begins to seek a change in his duties, in order that he may work under the inspiring influence of adequately impelling motives. With this primary purpose controlling them, many men and women make complete changes in their occupations.

If adequate motives for effort are so vital to happiness and success among mature men and women, how much more necessary must they be to boys and girls of school age, who are less trained and experienced in holding themselves to tasks solely from the standpoint of duty.

Common-sense observation indicates rather clearly that the need of adequate motivation is greatest in the child's earliest years. Every observant parent and teacher has noted how faithfully a child applies himself to the doing of anything, either at work or at play, for which he has sufficient motive, and how he avoids or shirks anything which makes no appeal to him. That which he feels no need for, sees no value in for himself, he has no motive to do or possess. On the contrary, he will work long and hard at anything which has significance or meaning to him by which he can realize some desired end.

This principle, as we have noted, is manifest both in play and work. A child will exert himself for hours, even to the point of exhaustion, playing some game of interest, such as baseball, football, blackman, or hide-and-go-seek. The pleasure he experiences in the activity is a sufficient stimulus to call forth all of the effort necessary. Likewise, he will apply himself faithfully in work to secure a sufficiently desired result—it may be the earning of money for a bathing suit, or it may be the building of a shelter for his pet rabbits. It matters not just what the work is. So long as he is realizing some need or accomplishing some purpose, his motives are sufficient to insure completion of the task.

The need of adequate motives for doing school work is clearly just as great as the need of adequate motives for doing any other type of work. That such motives may be operative, the work that the pupils do must be meaningful and significant to them. They must feel a need of the result

the school work will produce and must appreciate its value to them.

The acceptance of this principle and point of view by teachers will do much to guide them in the elimination of work and requirements which are meaningless and useless to pupils and which can not, therefore, be adequately motivated.

A vast amount of work which cannot be fundamentally motivated because it is not only meaningless to pupils but also intrinsically useless to anybody, still finds place in the schools. These tasks are really not work; they are drudgery, because the pupils do not and can not see meaning or sense in them, nor good reasons for doing them. For example, pupils are often assigned long lists of miscellaneous words to look up in the dictionary. They are asked to note the meaning of each word, its syllabication and its diacritical marking, and then use it in a sentence. Evidently such work is drudgery, for until the meaning and pronunciation of a word are familiar to a pupil, it is a lifeless, useless thing to him. All the work he may do upon it in isolation, by using the dictionary, merely bores and disgusts him, and accomplishes no end reasonable to the child. Solving long lists of problems that do not produce any solutions which he needs or which are of any value to him is likewise disgusting drudgery. In the same category, also, must we place the parsing of words, the drawing of maps, filled with many details, to mathematical scale, and the memorizing of long lists of unimportant dates in history.

The foregoing consideration of the importance of motive in work shows not only that adequate motives for effort have actuated the achievements of the race, but that they are indispensable to thorough-going work by anyone. They are so essential to application and success that mature

people sometimes change their work to insure the stimulus of adequate motives. Such motives are surely even more necessary to study and fundamental mastery on the part of the immature youth in the schools than for older persons.

It remains, now, in the third place, to show how the work of the schools may be adequately motivated as a prerequisite to thorough, certain, and economical mastery. This will be set forth briefly and concretely in the remainder of this chapter.

The adequate motivation of all, or practically all, of the work pupils should do in school may be accomplished if two considerations are sufficiently observed.

First, schools should endeavor to have pupils learn only things and processes which are of use and value in life situations. Motives for mastering all of those things possessing a life-value are fairly easy to discover. Most things for which the rank and file of adults will have need are also needed in some relation and to some degree by boys and girls of school age; or if not, their life-use can at least be understood easily by pupils. Such understanding on the part of the pupils may be used by the teachers to provide large motivating values.

As has been mentioned before, one reason teachers find it difficult to motivate much of the work of the schools is that they are required by the course of study and the text-books in use to teach a great deal of material which is of no use to anyone either in childhood or adult life. Most of the work done in any subject from the technical, definitional standpoint possesses little or no life-use value. Pupils should learn to use accurately those technical terms in each subject which are essential to economy in writing and speaking; but to require the mastery of the technical definition

of each is largely useless waste. Parents do not think of requiring their children to learn the technical definition of each article of furniture in the home, and yet, as rapidly as there is need for it, children learn to speak with accuracy of the chairs, beds, dressers, rockers, and the other furniture, just from the daily experiences of life. In similar ways, they should learn to use the common technical terms employed in arithmetic, geography, composition and grammar, and all other subjects in the curriculum. It is not possible to motivate the learning of useless things in any genuine or sincere way. The learning of these things is necessarily largely drudgery.

On the other hand, the learning of all of those things for which pupils have need, or for which they see they will have need later, is easy of motivation. In this list are included the ability to spell useful words, to use simple, accurate language in speech and writing, to figure all ordinary problems, to employ the useful facts and principles of geography, history and science, and to write legibly.

Second, all matters and processes mastered by pupils because of their use should be learned, in so far as possible, when the pupils need to use them in some concrete situation. If it is found impossible or impracticable to provide such an immediate need for something that thinking people generally agree should be taught because it will be needed in adult life, or because it must be learned in order that something else of value may be taught, then the pupils should be led to understand these reasons for its mastery. Thus they will experience the largest measure of motivation possible under the circumstances. For example, some arithmetic combinations for which no immediate pupil-need appears may have to be taught in order to equip the pupil with a complete mastery of other number facts which

experience shows are necessary in life. Likewise, for similar reasons, it may be desirable and economical to teach certain words in spelling, some facts of geography, history, science, music, and so on, without waiting until a specific need appears for teaching each item. But in such cases the motivating effect of an actual need for the rest of the series will be sufficient to render meaningful the mastery of the few items for which actual need did not appear.

Every experienced teacher who has sought to guide pupil learning from the standpoint of teaching those things or processes for which his pupils have a definite conscious need knows that any class has more actual needs in any given period, be it a week, month, or semester, than the school can possibly supply in the time available for meeting them. The wise teacher, therefore, guides his class to work upon satisfying those needs which he believes to be the most important from the standpoint of the child's complete education and socialization. Such guidance of the class by the teacher will also result in completing those bodies of work for which the grade has been made responsible by the course of study, provided always that the course of study is well graded and specifies for learning only those materials and process which have a life-use.

Typical needs, while varying with classes as to the way in which they present themselves, are easy to discover and tabulate. They may be expressed in terms of school subjects, or in terms of the pupil's need to participate in activities.

Expressed in terms of school subjects, pupils need to spell, to write, to express ideas orally and in writing, to figure, to sing, to draw, to chin a bar, to make a sled, to sew a dress and the like. This list may be extended to cover each kind of need that may be supplied by each of the various subjects of study.

It becomes clear, however, when one considers the reason for each need expressed in the form used in the preceding paragraph, that needs may be more fundamentally stated in terms of typical activities—things the pupils need to be able to do. The writer has set forth such a list of needs elsewhere,[1] so they will be stated here merely in summary fashion. These needs are to earn money or acquire property; to enter a contest for results, a reward, or an honor; to play successfully; to make things; to entertain; to share with others; to promote a favorable attitude toward oneself on the part of others; to grow, personally; to accumulate things of value; to extend one's power and influence over other things and people; and to prepare for a life occupation. The various activities the pupil should master in school will contribute toward fitting the child to do one or more of these things. The specific need which pupils may be striving to meet at any time, it will be found, is some aspect of one or more of the types of needs listed above.

The essentials in fundamental motivation, the need and importance of it, and the means of accomplishing it have claimed our attention in this chapter. In view of the considerations set forth above, it should be clear that it is easy to find ways of motivating all proper school work, and that the gains in learning under such a stimulus are so great that all formal, routine methods which merely impose book-tasks upon pupils should be dispensed with. Teachers who employ such a procedure will find their pupils at work always under the impelling, inspiring influence of adequate motives.

[1] Wilson and Wilson, *The Motivation of School Work*, pp. 47-53.

CHAPTER VII

The Problem Method of Learning

The solving of a problem is a real-life activity as old as mankind. The ever-present ability of the human being to face rationally his many new situations, to use his reasoning powers in helping himself and others, has always been one of his distinguishing characteristics. He has progressed upward through the ages by using his brain to the end of overcoming obstacles and of meeting other types of difficulties. The history of the race consists of a countless number of successful and unsuccessful efforts to solve all sorts of problems. Ages ago man succeeded in making the first cunning capture of the small edible animals, lost and won battles with the more ferocious ones. Today he has conquered practically all external obstacles and is turning his attention with renewed vigor to the problem of conquering himself.

Daily we face a procession of problems which must be solved—physical, vocational, avocational, civic, and moral in nature. The number of these problems is multiplying rapidly with the continually increasing complexity of society. Child life as well as adult life is crowded with activities involving both simple and complex problematic experiences. Even the crossing of a busy city street has become a serious problem, for it includes coping with crowds of pedestrians, avoiding congested vehicular traffic, and understanding many very necessary municipal regula-

tions. Hence if we as teachers are going to contribute towards making children socially efficient at all times, we must begin at the time these children first enroll in school to guide their activities into channels requiring the solving of real and essential problems of life.

That we may discriminate clearly between problem solving and other types of natural attacks in teaching, it is necessary that we define now what we mean by problem solving. Solving a problem is a purposeful act leading to the removal of a perplexity, or to the elimination of some other difficulty, through a process of reasoning. It differs fundamentally from project procedure, in the manner that the learner responds; the latter involves construction, creation, or both, by means of concrete materials, while the former is essentially a mental activity.

A common example of the problem procedure may be seen in the wise settling of a quarrel between two boys. The teacher interrupted them in the school yard and took them aside, together with other boys who had witnessed the quarrel from the beginning. She led the boys into a presentation of all the details which had given rise to the quarrel and then dismissed all but the principals in the fight. They then discussed, under her guidance, what was wrong with their actions, the effect upon themselves, upon other children, and upon the school. Finally they arrived at a decision not only about this quarrel but also about what their future conduct in similar situations should be.

In the teacher's clever guidance of the boys' thinking, she had presented to their minds the problem: "What is good conduct on the playground?" Surely this problem arose as a felt need, a real difficulty to be met. The boys were led to see their quarrel as an act affecting not only themselves but also a much larger civic group. They determined,

through an analysis of incidents which caused the quarrel, why it was wrong for them to fight. Then they reached a decision concerning the fight they had had and what they should do if the same conditions or incidents should arise again. Hence we have in the settling of the quarrel an illustration of a problem and also the technique for solving it. An intensive study of this problem discloses the principles of proceding in the solution of any problem. These principles are outlined below.

(1) Before a problem can be solved it must be understood by all who are involved in it. Thus the problem should first be clearly defined. A problem becomes meaningful and purposeful to each pupil only when he has a clear conception of what he is undertaking, and how it affects himself and others. When his interest is keenly aroused his resulting activities in turn become meaningful, important, and definite. These activities are then seen as the necessary experiences which lead toward a desired goal and in doing so produce a result which overcomes the felt difficulty.

An example of the need for clearly defining a problem may be seen in the work of an architect. When he is planning a house, he does not ask himself, "What about the roof?", and then proceed to draw one. Instead he develops a more careful and detailed statement of his problem: "What kind and pitch of roof is necessary for this house so that (a) it may be in keeping with its surroundings, and (b) it can withstand the heat of the summer, and shed the rains, support the heavy snowfalls, and keep out the cold of winter?" The statement of the problem in this careful and detailed way clearly defines it so that an economic and efficient solution may be reached.

(2) Knowing, now, just what his problem is, the architect

begins solving it by thinking over his past experiences in planning houses for somewhat similar situations. This exemplifies the next step in our teaching procedure, also. Having clearly defined a problem needing solution we must take stock of all information gained in the past which has a bearing on the solution of the new problem. Similarly the child must be led to ask himself the questions: (*a*) "What experiences have I had that were similar to the present one?", and (*b*) "Are they sufficient for solving this new problem?" It is the business of the teacher to guide the pupil in raising and answering these two questions. In this manner the child learns to make use of those elements in his past experiences which are common to the present one and which will prove a source of help in meeting the felt need. While doing this he will have become cognizant of his own shortcomings and the necessity of securing or acquiring information he at present lacks.

(3) This leads him directly to his next step in the solution of the problem. He must discover and collect all information that will be of use to him.

In this series of activities the teacher will be most valuable as a director, guide, and counsellor. He should create an environment of books and other materials which will contain as far as possible the essential information needed by the pupil. Through thoughtful suggestions and careful questioning he can lead the child to find additional materials, and through thoughtful guidance he can inspire and encourage him to organize purposively this information. The pupil, under this type of teacher direction will progress economically and efficiently. The possibility of failure will be minimized. The subject matter and experiences will be real and essential to desirable mental growth. These statements are not intended to imply that the teacher is to

do the pupils' work, however. The child, as the learner under this type of teaching, will feel, think, and act independently, and thereby grow in a way undreamed of.

(4) As soon as the pupil has acquired all of the available data which is more or less essential to his purpose, he must analyze and evaluate it, compare and contrast, discard the useless, retain the really essential, and finally determine the relative importance of the data retained. This process may be inductive, deductive, or both, depending upon the nature of the problem attacked. An explanation and discussion of the two types, induction and deduction, is included at the close of this chapter.

In this phase of problem solving, the intellectual development of the teacher may often tend to lead him into a too extensive participation in the child's activities. Frequently, the teacher must remind himself that the pupil is the learner. His own part in problem solving continues to be the same as in the preceding step. He should give the child wise guidance, thoughtful counsel and sound leadership, to the end that all essential information be utilized in the interest of effective learning, but he should allow the child to do his own thinking.

(5) As soon as the pupil has collected and organized, analyzed and evaluated, all of the data, he is ready to reach a conclusion. Until he has attained this point, his judgment should have been suspended. He should have the scientific point of view in regard to his data. A decision should be reached only after considering all the important evidence, and it should be impersonal. The decision should be, not necessarily what he would like it to be, but what it must be, if based upon the evidence.

Having carried on the necessary activities, and obtained the essential experiences, the pupil is then ready to make

willingly and earnestly his response to the situation. In almost every case where thoroughness and thoughtfulness have characterized his progress toward a purposeful end, his choice of responses will be satisfactory. However, some complex problems require almost as complex answers. Then he may still need the counsel of his teacher in making a decision. This will be needed rarely, because under the latter's guidance the pupil will complete his undertaking.

(6) He will be led to verify his conclusion in order that he may substantiate the correctness of it. When this has been done, he will have acquired from his experiences the desirable outcomes in terms of new essential knowledge, some improvement in skills, the development of better habits, and more wholesome attitudes. From the standpoint of his complete socialization, therefore, he will have become better equipped as a socially efficient person.

The problem, then, is solved by the pupil when he (1) has a clear conception of it; (2) recalls old experiences which may help in its solution; (3) acquires, out of new experiences, the additional information essential to determining the best reaction to it; (4) critically evaluates and manipulates these data to make them serve his needs, and, supplementing them, corrects his tentative conclusion; (5) arrives at a conclusion; and (6) checks it against the problem to determine the correctness of the response to be made.

"What are good problems for children to solve in the classroom? How do these problems arise?", teachers ask. The first question can be answered readily. Any problem that meets a real life-need of the pupils is a good problem, and the more vital the need appears to be, the greater is the justification for solving it. Therefore, the teacher must analyze all problems from two standpoints: (1) how meaningful and purposeful the problem is to the pupils; (2) how

essential the experiences are, and how valuable their most apparent outcomes will be in producing growth of the children from the standpoint of social efficiency.

The answer to the second question, "How do problems arise?", is not so easy to give. Problems arise in almost every life-situation, and in all fields of subject matter. Frequently they form the major phase of a life-situation, and at times minor aspects of it. They grow out of present and future needs created through past experiences. Hence the problem generally is a statement, in understandable form, of an actual felt need. It is met and solved by the series of experiences making possible a rational mastery of the situation. The problem may be introduced into the class by a pupil or a group of pupils. It may be raised by the teacher. Many times it will grow out of the combined activities of teacher and pupils. In any case it must appear to the pupils to be something of purposeful, meaningful consequence. They must see and attack it as their own.

The account of the quarrel and its solution under the teacher's guidance illustrates how all three coöperatively raised a problem which the boys accepted as their own, to be solved by them. The examples following not only illustrate practical applications of the principle of problem solving to classroom situations akin to life, but also indicate how the problems may arise in various ways, how they become the pupils' own center of interest. In some cases, the resourceful teacher accepted problems raised by the children; in others, she tactfully led children to raise problems; while in still others, she ingeniously guided them into accepting, as their own, problems which she had raised for them because she was cognizant of certain needs unknown to them, but which they would later meet. In the final analysis it will be found that the selection of a problem to

be solved is in general a coöperative undertaking involving pupil and teacher. The former faces a recognized need; the latter recognizes the educational advantages involved in its solution. The origin of a problem is relatively unimportant; but its acceptance by all as vital and important is a prerequisite to its effective use as a basis for learning.

Some examples of the practical application of the principles of problem solving to child learning, which have been selected from records of observed classroom activities will now be given. These examples indicate how varied the nature of the problem may be, and how varied the adaptation of good procedure becomes under the guidance of a careful, thoughtful teacher. These examples constitute, also, material evidence of the adaptability of the problem method of learning to children of any age or grade.

The pupils in the high first grade were observed by the writer when attacking a problem in nature study. They had decided to plant and raise some flowers for window boxes. Members of the class had written letters to the principal and to the supervisor of nature study requesting the most obvious equipment and materials needed. When the flower pots, window boxes, and bulbs had arrived, the pupils wanted to plant the bulbs right away. Their tactful teacher guided them into a discussion of the planting and growing of bulbs until they had raised the problem: "How can we raise beautiful plants from our bulbs?" In the chapter on "The Assignment," a stenographic report of this phase of the problem has been included.

When the pupils understood that they were confronted with a real problem, they recognized the necessity of solving it. With this in mind they contributed to the thinking of the class such information as they had already acquired from their experiences outside of school. They found out,

also, how and where they could get additional information. The teacher then furnished them with books which contained simple accounts and stories involving information about planting and raising flowers. These were read by

(*a*) individual children who were held responsible to the class for oral reports;

(*b*) small coöperating groups selected according to their comparable reading ability and the seeming difficulty of the reading material;

(*c*) the teacher, who supplemented her oral reading with necessary explanations when the accounts were too difficult to be understood by the pupils.

The information obtained from other persons was developed into simple compositions which were preserved by writing them on large sheets of paper fastened together into charts. The supervisor of nature study accepted an invitation to talk to the class about the various phases of planting and caring for bulbs. Every suitable source of information was consulted by the children.

All of the data thus gained were used later in their composition work, which the children eagerly undertook. Each pupil made a scrapbook entitled "How to Raise Beautiful Plants from Bulbs." As in the statement of the problem, so the title represented what the children accepted as the best wording proposed by any member of the class. In these scrapbooks they preserved their own individual or composite accounts of planting and raising flowers.

In solving their major problem—how to raise beautiful plants from bulbs—many minor problems of course arose. When the children had solved each of these minor problems, they assembled in order the materials dealing with each phase of the major problem, and pasted these materials in their scrapbooks under appropriate titles. After carrying

out the activity determined upon as the answer to a minor problem, they concluded the section of their scrapbook dealing with it by writing a statement of what they had done and what had resulted from their work. Each statement was illustrated by their own drawings.

In this manner they raised and solved the following minor problems:

1. What kind of soil do we need for our bulbs?
2. How shall we obtain the things we need for good soil?
3. How must we prepare the soil?
4. What is the right way to plant the bulbs so that they will grow?
5. Why must the planted bulbs be kept in a cool dark place for a while?
6. What care do the plants need while they are growing?

Carrying out the projects implied in the solution of these problems and keeping a careful record of them in their scrapbooks constituted the series of experiences which led to the final solution of the major problem. When the results of their activities finally appeared, the children were able to explain very thoroughly how to raise beautiful plants from bulbs.

The children of another class, a sixth grade, had undertaken the project of making a historical and geographical floor map of Europe. They had discussed and determined to their satisfaction what particular types of monuments and geographical and historical structures would be essential to give the best possible picture of the history and geography of Europe. They agreed to include miniature representations of the largest cities, seaports, and capitals of the various countries. Rapidly Liverpool, Glasgow, Paris, London, Brussels, Stockholm, Petrograd, and many other cities appeared. Then an obstacle arose. One group of

children who had assumed the responsibility of determining what cities of Russia should be included had disagreed over the proposed inclusion of Moscow. The chairman of the committee presented to the rest of the class the perplexity in the form of a question: "Is Moscow of sufficient importance to be given a place on our floor map?" This became a real problem for the whole class to solve.

In order that they might determine wisely the answer to this question, the children compiled a list of the significant historical, geographical, and other essential features which should form the basis for judging the importance of a city. They applied the criteria to several different kinds of cities which had been placed on the map, and proved to their satisfaction that these rightfully belonged there. They found that some were great manufacturing cities, others were great commercial centers, and so forth. Then they took up the question of Moscow. Soon they found out that they did not have sufficient information about the city to arrive at a fair conclusion. They agreed also that the committee on Russian cities had not made as careful a study as the subject seemed to require. The various geography and history textbooks, atlases, the encyclopedias, and magazine articles were distributed among the members of the class. All selections about Moscow were read and the information recorded.

When the reading had been completed, the important data were listed on the board by one of the pupils, as each member contributed the information he had discovered. Next, this material was grouped under the various points which were to be used as bases for determining the importance of Moscow. The final summary built up in the class indicated that Moscow (1) had been and continued to be a great center of political power in Russia, (2) was the center

of an immense region producing a large quantity of marketable materials, (3) was the point at which a number of roads and railroads met, (4) maintained a great center of commercial exchange. Therefore, the pupils decided that the city was sufficiently important to be given space on the floor map.

Another sixth grade geography class was studying India. The pupils had recently arrived at a decision as to what they thought the United States ought to do about the Philippines. While the teacher was explaining a new assignment to this class, one of the pupils volunteered the information that some of the inhabitants of India were advocating independence from British control. Another pupil told about reading a newspaper article which argued that India should not have its independence.

"Can we debate that?" asked another pupil.

"Would you like to do that?" asked the teacher.

"Yes," enthusiastically replied the class in chorus.

Immediately the pupils began their preparations for the debate. They concluded their preliminary discussion of the subject with the statement which was to be debated: "*Resolved*, That India should be allowed an independent form of government." Two debating teams of four pupils each were selected from among the members of the class who had not participated in the last two debates. Each team selected its own leaders, and the remainder of the class elected a chairman and a secretary for the meeting at which the debate was to be held. Also three "critics of performance" were selected. Then the pupils who had not been assigned any specific duty organized as a judging committee, electing one of their number as chairman. These preliminaries were expeditiously arranged, and the teacher called the whole class together.

"What help can we who are not on the debating teams be to the debaters?" she asked. The responses which she received consisted of offers to find and turn over to the debaters helpful material such as newspapers, magazines, and textbooks pertaining to the subject of the debate; offers to interview, if possible, travelers or natives of India who could furnish first-hand information; and the resolution "not to accept as final any decision until everything is known about the subject." This preparation resulted in activities which kept the pupils alert in finding, reading, and distributing materials and at the same time fair-minded, by withholding a personal decision in regard to the merits of the question until the debate had been concluded. The proposed debate became such a center of keen interest to them that its influence reached out and permeated their homes.

On the day of the debate many parents came to attend the class meeting at which the debate was held. Earnestly the teams presented the evidence, pro and con, while the members of the judging committee made lists of the points presented. When the debaters had finished, the judges carefully checked and paired the points and reached a decision based on the merits of the arguments presented. In the meantime the critics discussed the debate and prepared a series of reports upon the method of presentation by the various debaters. The chairman of the judges rendered the decision. Then the three critics of the performance presented their helpful suggestions and frank criticisms so that the whole class, as well as the individual debaters, could profit accordingly.

How a third grade had undertaken and attempted to solve a civic problem is indicated in the following letter written by a member of the class:

University Elementary School
Berkeley, California
December 19, 1922

Dear Mr. Kyte:

The traveling ladder is not being used right because the children are tackling each other. So our room was discussing it. We think that what we have been doing is going to help. We sent Claire and Carlton to the rooms from first grade to sixth. They asked the children if they would stop tackling each other. If you think that will help send an answer.

Yours truly,

TALLY TAYLOR
Low Third.

How the interest and effort of the pupils was maintained over a period of many months in solving a problem was observed in a fifth grade class. The teacher had read to them a story of Pilgrim life. In the course of the discussion which followed, one of the pupils asked, "Why do our fathers work in large places of business while the Pilgrims did most things at home?" Of course, finding a satisfactory answer required many weeks of study. The question was written on the board and never erased until the final conclusion was reached. A variety of activities was carried on with this theme permeating them. Many minor problems were discussed and solved. Some of the essential information became understood through the execution of projects by various individuals and groups. Other material was obtained from travelers who were invited by the class to speak to it. Some very important facts which continually recurred were drilled upon. Hence, in the activities, all types of teaching procedures were utilized to the end of solving the major problem.

Examples of the minor problems solved in the course of finding the answer to the larger one are as follow:

1. What were the physiographical and climatic conditions encountered by the Pilgrims, which affected their daily life?

2. Why was the Colonial family practically a self-sufficient industrial unit?

3. What conditions and factors in North America led to the expansion westward?

4. What changes resulted in American life because of the movement?

5. Why did cities develop rapidly in the new world after 1800?

6. How did the inventions of Whitney, Fulton, Morse, Bell, and others, affect home life and the industries?

7. Why were there such rapid changes in American social and industrial life, especially after 1870?

If the reader answers just the few questions included above he will realize that the outcomes from the activities included an insight into the evolution of industrial life and its inevitable effect on the home and family life, with the assimilation of a considerable amount of related information and conceptions. When these had been acquired by the pupils they were able to solve the major problem. They assembled all of the information into an organized whole out of which the final solution naturally emerged. Their complex but correct answers to the major problem were illustrative of thorough learning, culminating in highly desirable outcomes.

It was pointed out elsewhere in this chapter that the fourth step in the solution of a problem involves an inductive or deductive process. In many drill experiences, also, the one or the other occurs, but only as a phase of a larger activity. For example, when pupils discover a need for the ability to add fractions, inductive thinking becomes a part of the drill procedure. They learn that "¼" and "½" can be added together when the latter is changed to its equivalent, "¾." Also, the sum of "⅓" and "⅙" can be

obtained after "1/3" has been changed to "2/6." A series of similar drill exercises culminates in knowledge of, and skill in applying, the principle of addition of fractions. Having achieved the immediate end of the inductive drill lesson, the pupils utilize their new accomplishment in continuing the desired activities.

So much has been written on the subject of inductive and deductive thinking that teachers are not only familiar with the processes but generally have over-estimated their value, important though their place in natural learning is. In concluding this chapter on the problem method of teaching, only a brief resumé of the essential elements to be observed with respect to the place and use of induction and deduction in learning are included.

Inductive thinking is a process of forming general conclusions, general conceptions, principles, rules, or laws, from a study of particulars. In other words, induction is a mental activity in which the learner analyzes and evaluates a mass of data, to the end that a correct generalization may be reached. It requires reasoning from a series of detailed premises to a general conclusion. The examples of developing the rule for addition of fractions and of solving the problem, "When should a city be considered very important?", previously cited, illustrate the application of inductive thinking in teaching procedures.

Also, the fifth grade pupils' solution of the problem dealing with the evolution of industry exemplified the place and nature of inductive reasoning in a natural child activity. In order to determine why modern Americans are so interdependent, while their ancestors were not, the pupils had to determine and understand the large number of significant developments in our nation's history, each of which contributed to the growth of interdependency. No correct

general conclusion was possible until all specific factors had been considered. The illustration also indicates one of the most important points that teachers must keep in mind when their pupils are reasoning upon a given set of facts with a view to reaching a general conclusion. The children must be shown that no final judgment is possible until all the facts affecting a conclusion have been carefully considered.

Inductive thinking occurs in school work in situations where pupils need to find out the general meaning of many particulars. For example, the Parent-Teacher Association of a certain school offered first and second prizes for the construction of the best and the second best bird-houses respectively. The pupils entered into the contest with great interest. In their elementary science classes they set themselves the task of finding out how to make good bird-houses. Their discussions, questions, and comments may be summarized as follows: First they tried to learn what kind of houses birds like to live in. Some pupils who had previously made bird-houses gave their experiences. One boy stated that he made a beautiful bird-house, painting it in bright colors, but he couldn't get any birds to live in it. Another boy said that he had a bird-house made out of bark, without paint, and that a little wren lived in it every summer. Another boy said that he didn't paint his bird-house but he had stained it to keep it from rotting, and no birds lived in it.

On the basis of these and similar experiences, the class decided that a good bird-house should be just as nearly as possible like the natural homes of birds. Then questions were asked regarding the location of bird-houses: where food and water should be placed, whether cats and dogs should be kept by people having bird-houses, whether bird-houses should be in sunny or in shady places, and whether

different kinds of birds need different kinds of houses. The discussion led the pupils to observe a number of good bird-houses, after which they drew certain definite conclusions regarding good bird-houses. Finally, with these conclusions in mind, the work of making bird-houses began.

An analysis of the learning process involved in thinking inductively will disclose that the teacher should direct the children's activities so that they (1) are ready, *i. e.*, prepared, for the experience, (2) are able to analyze their assembled information, (3) have the ability to evaluate particular data, and (4) may feel confident that all steps have been taken which are essential to arriving at a satisfactory general conclusion.

Deductive thinking is a process of reaching specific conclusions or particular decisions by applying accepted generalizations, principles, rules, or the like. That is to say, deduction is that phase of a total learning situation in which some detail is understood or interpreted by applying a previously learned definition or conclusion. It is a process of reasoning from a general view or principle to some new particular which is to be understood. The conclusion reached depends for its accuracy upon the correctness of generalization which is applied in understanding or interpreting the new particular.

This type of thinking by the pupils occurred in the sixth grade solution of the problem "Is Moscow of sufficient importance to be included on our floor map of Europe?" The generalization consisted of the pupils' conception of the essential points by which they could determine how important any city is. In checking up Moscow's claims to importance they evaluated them in terms of these points. By deduction they arrived at the conclusion that Moscow was an important city and therefore gave it a place on their floor map.

As in the process of induction, deductive thinking of children should be directed by the teacher so that they are ready (1) to undertake the activity, (2) to analyze carefully their amassed data, (3) to evaluate it critically. They (4) should feel confident that all steps have been taken which are essential to arriving at a satisfactory specific conclusion.

The reader should refer to the steps in solving a problem in order to note again the place of induction or deduction in teaching procedures. It is especially essential for teachers to remember that neither process is complete in itself. Inductive or deductive thinking leads to a point where a conclusion may and should be reached and then checked up with respect to all information at hand, to determine its correctness. When this has been done, the result reached becomes valuable to the individual.

CHAPTER VIII

The Project Method of Learning

The word "project," as applied to teaching, had its origin in connection with the activities introduced into classroom procedure when manual training, home economics, and agriculture were added to the school curriculum. It was applied to the planning and completing of some activity which was primarily manual in nature. Such undertakings as planting, cultivating, and marketing a particular crop; planning, preparing, and serving a meal; and planning and building a bird-house, were designated as projects.

Students of method in recent years have adopted this term as applying to a certain teaching procedure, but with its adoption they have introduced various conceptions and definitions of it. Some consider the project method as an all-inclusive concept for any acceptable teaching procedure; others have retained its original meaning, with the exception that it has been extended to include constructive activities in subjects other than those just mentioned; while still others have formulated different concepts which are varying degrees of compromise between the first two. At present there are some thirty different connotations.

Wherever the term "project method of learning" appears in this text, it signifies that type of purposeful act which requires for its completion the construction or creation of an objective piece of work. It differs from the problem

method of learning presented in the previous chapter, in the manner of accomplishing an end. The solution of a problem is an abstract process of reasoning to a conclusion—a procedure based on abstract thinking. The execution of a project is a rationalized concrete production of the end sought—a procedure involving material *doing* as well as thinking. When an individual is determining how to write a play worthy of production he is solving a problem. When he is writing a play to be produced he is executing a project. Hence the project method of learning is a purposeful act involving the construction or the creation of a material product to the end of overcoming an obstacle, a perplexity, or some other type of difficulty.

This natural and meaningful procedure, like the problem method, employs reasoning as against memory; emphasizes child activity in motivated situations through meaningful and essential experiences, instead of employing a passive reception of artificially imposed and uninteresting facts. It culminates in a meaningful conclusion which may, generally, be expressed as a principle, rather than in the completion of so many pages of a textbook. The project method of learning is being utilized if children are making toys, scrapbooks, posters and the like; dramatizing a story, an historical incident, an industrial or civic activity and so forth; reproducing on the floor or in the sandbox such scenes as an event in history, a neighborhood park, an ideal garden, an industry; or constructing large geographical and historical maps, miniature models and similar material products of thinking and doing.

The steps in the execution of a project are almost identical with those determined for the solution of the problem. The difference lies in the inclusion of the concrete production in the former type. Therefore, the steps may be stated

as follows: (1) The pupil must clearly understand why he is undertaking the project so that he will have a real purpose in beginning it. (2) He should recall his past experiences to determine whether or not they can assist him in his new effort. (3) He must find and collect additional information which will aid him also. (4) All of this data must be organized and assimilated by the pupil so that he may arrive at the point where he can decide upon a plan. (5) When he has found a plan which seems satisfactory he constructs or creates that which he set out to produce. (6) The process of testing consists in putting the product to use in meeting the original purpose.

Since the procedure is so similar to that of problem solving the expansion of most of the principles governing the execution of a project is unnecessary. The reader can readily apply the principles set forth in the previous chapter to the steps in the project method of learning. In so doing it is important to keep in mind certain essentials which are characteristic of good project execution. Briefly stated they include the following points:

(1) There must be a real human interest in it for the pupil. It should originate with him or be accepted by him as his own in answer to a felt need.

(2) He must see adequate reasons for putting forth his best efforts. The project should be within the range of his understanding and its values should be appreciated by him.

(3) He should experience natural activities in natural situations. The experiences should be real and occurring in an environment similar to that found in life outside of the school.

(4) A good educative project should be broad in scope so that enrichment and enlargement of experience is possible throughout.

(5) The child must be availing himself of useful knowledge; that is, the project should be based upon sound educational purpose.

(6) Throughout the activity, the effort and the product resulting from it shall be the child's own. In the execution of a project the pupil must be the one required to do the thinking, feeling, and acting.

(7) The project method of learning should result in outcomes or successes either judged or measured largely by objective standards of achievement.

In the execution of a project, the length of time required and the scope of subject matter covered vary considerably. Some projects are of momentary duration. When a boy scout finds that he needs a stake to fasten a loose rope of his tent, he quickly fashions it. On the other hand, he may be one of a group who wish to build and furnish a small clubhouse. The first project requires only a few minutes for completion; the second, many months. A fifth grade class constructed a series of posters depicting the evolution of the American Flag. The activities required comparatively few hours of actual effort on the part of the pupils. The same class carried on a series of activities for over a year and a half, its interests centering around the building, ornamenting, furnishing, and landscaping of a miniature hotel and grounds. These four examples serve to illustrate the fact that the time element in the execution of a project is a variable based upon the nature of the activity. Just as long as the children are interested, and are making considerable effort which involves profitable experiences and progress in terms of desirable outcomes, the activity should be permitted to continue.

These examples also serve to illustrate the fact that the execution of a project may involve a single field of subject

matter, several fields, or many fields. The first mentioned was a manual training project. The third required study and experience in reading, history, and art. The second and fourth examples consisted of a series of activities leading directly into practically every subject of the elementary school curriculum.

As already indicated, the project may involve the efforts of one pupil or of a group of pupils or of all of the members of a class. All of these kinds of activities should be encouraged so long as the individuals or groups are working wholeheartedly. That teachers can apply the principles of the project method of learning to pupil activities is exemplified in the following illustrations observed in various classrooms and grades.

The sixth grade pupils of a city school found out that a considerable sum of money had been set aside by the Board of Education for enlarging and equipping the playground. Land was to be purchased, cleared, and prepared for this purpose. But no definite plan existed for the playground. These points were raised under the direction of the teacher and led to the decision on the part of the pupils to draw a plan, which was to be recommended to the superintendent. Early in their activities a member of the Park and Playground Commission appeared before the class at their request and expressed his appreciation of what these pupils were undertaking and promised that the plan which seemed most satisfactory would be accepted.

The project led to a study of budgeting the amount of money available for a reliable civic project. Finding out the cost of additional land and of labor in making it a part of the playground unit, computing the increased areas, theoretically fencing the property, and surfacing the new area, exemplify the type of arithmetic attack. These ex-

periences involved a study of decimals, a review of fractions, measuring and computing irregular areas and volumes, using a number of tables and solving many arithmetical problems.

The children obtained first-hand experience in civics as public servants; planning the playground meant planning for others, especially children younger than themselves. Also they found it necessary to study and discuss bonding, taxation, and the duties and functions of various city officials. The study of playground needs also necessitated understanding the correct uses of various types of apparatus, and a knowledge of wholesome playing and the reasons for recreation.

All of these studies were made possible through reading about playgrounds, physical education, and so forth. Considerable correspondence was carried on between the class and individuals who could assist them in obtaining this information. Many oral discussions arose, especially when the question of placing play equipment was considered. The pupils found it necessary to keep a record of their activities in order that they might have at hand, when needed, all of the essential information which would help them to make a correctly scaled map.

When all of this essential preliminary study had been completed, each pupil constructed a map of what he considered an ideal arrangement of the playground, the cost of which would be within the amount of money available. All of these proposals were organized into an exhibit. They were criticised and discussed until the five best were determined upon by the pupils. Then they invited the superintendent of schools, the Board of Education, and members of the Park and Playground Commission to hear their recommendations. The meeting was a very inspirational one.

The children explained how they had undertaken the study and gave a complete account of their activities as evidence of how thoroughly they had carried on the project. They concluded the program by presenting to the officials the five plans, pointing out the features of each and showing how any one of them met the requirements of a good playground.

In a class of younger pupils a fourth grade decided that they would like to make a large map. They wanted it to be so large that it would require half of the floor space of a classroom. When they had succeeded in finding such space available they undertook the project of reproducing the history of California on the floor map.

They constructed an outline of the state of California. Blue chalk was used to mark out rivers, lakes, bays, and the ocean, while mountains were sketched in brown. A careful checking up with the geographies dealing with California resulted in an excellent reproduction of the most important physiographical features.

On this map the children reproduced by means of models the romantic story of California. As this story was read and discussed, the progress in the historical account was marked by the gradual placement of models on the map. For example, Drake's treasure ship, *The Golden Hind*, sailed into Drake's Bay and an "Elizabethan coin" was nailed on a post as proof of English discovery and claims. Spanish galleons sailed along the coast and into the bays. Cabrillo's grave was marked by a miniature soap "headstone." Wherever the ships stopped, Indian traders bearing hides, cloth, etc., came to the shores and could be seen taking away beads and other trinkets. Father Serra's long, slow journey was marked by models of missions in which the activities of mission life were depicted. An adobe patio

was built in the center of a large Spanish ranch. Such important historical buildings as the Customs House at San Jose, Fort Ross, and Sutter's Fort were modeled. The appearance of "Sutter's Mill," with gilt beads in the stream near by, was followed by a series of prairie schooners and immigrant trains representing various stages of the gold rush to California. Near the new Donner monument stood a reproduction of the crude Donner Party hut. The tree in which Fremont slept and the building at Sonoma flying the Bear Flag were constructed and properly located on the map. The battleship *Oregon* steamed proudly out of San Francisco Bay on its memorable trip to the Atlantic.

During the year in which this project was carried on almost every conceivable kind of material was brought to the class and was used in constructing different types of models. During the time that the map was being made, and after its completion, the children planned talks and wrote stories about their map or phases of it. The following is an example of one of these accounts by a pupil of the class:

Our California Map

Our class has a map of California on the floor of an unused room. The map is about twenty feet long and about six or seven feet wide.

We are working now on the Donner party. We have put in the emigrants' wagons going to Sutter's Fort for help. Sutter was a very kind man. He had lots of land and very good crops.

The mountains which the Donner party traveled over are done in brown and white chalk, and the lakes are done in blue chalk. I made Fort Ross; it's a little above Drake's Bay. To make Fort Ross I folded some paper into the shape I wanted it. Then I cut a little door and drew the windows. Next I put the towers in.

Pupils from other schools, and older visitors, were invited by the children to hear about their map.

This project might have been worked out in paper on a wall map or by developing the important historical events into a series of pictures which would form a frieze for the room. The sandtable might have been used to show successively an Indian village, a pueblo, a mission, a mining camp in 1849, the constitutional convention, the city of San Francisco in the 50's, and the San Francisco Bay region of the present.

A project in a second grade had its origin in the transferring of a pupil. A popular member of the class was leaving to take a trip around a considerable part of North America. He had promised his classmates that he would write to them frequently, while they in turn promised to mail letters to him which he would receive at various points on his trip. The activity grew into a much larger one. One of the pupils suggested that they take a trip around the world instead of just going around part of North America. This was accepted and plans made accordingly. The pupils read all of the books on child life in other countries which could be obtained. They invited speakers to tell them about child activities as they had seen them in the course of their travels. Scrapbooks were made for each country "visited." These books contained pupils' drawings, individual drawings, and compositions, as well as some copies of composite work which was done. In the half year the pupils studied child life in twelve countries.

A fifth grade class had received six sets of puzzle maps of the United States. The pupils enjoyed working in competing to see who could assemble the map most quickly.

The interest became so keen that it led to an expressed desire to make a very large puzzle map. This became the

center of interest for some time. The size of the map was determined upon, and the scale for enlarging from a school map worked out. Each pupil was assigned one or two states to draw and cut out. He was also assigned to various committees, consisting of groups of pupils who were responsible for contiguous sets. When the patterns were completed they were tested and found to fit very poorly. This unsatisfactory result, they decided, was due to the fact that they had not coöperated with each other as they should. A new set of patterns was made. These were found to be very satisfactory and the final map was then constructed out of cardboard.

The class decided that this map could be made to help them understand their geography better. The members examined the various types of maps furnished them and found that their greatest need was one that would depict the products of the United States. They discussed ways and means of making their puzzle map serve this purpose. Their need was met by gluing on to the various states the actual products or pictures of the products most common to them. If they could not find pictures to cut out or products to be glued on to the map they drew their own pictures to paste on. When this activity had been completed they reassembled the map and used it to study the various industrial regions, which could then be clearly visualized.

The principal of a certain school had received a number of complaints from the neighborhood about the carelessness of the pupils in the neighboring playground. The principal called a meeting of the school to discuss the matter. In the course of the meeting the pupils suggested that they organize a Junior Park Commission, not only for the purpose of preventing a recurrence of the undesirable

reports but also for undertaking a program of constructively helping to beautify the park. Several meetings were held to perfect the organization of the Junior Park Commission and to plan its program of work. For a number of years this commission has functioned until now it is an institution of the school and the community.

A thrift contest had been inaugurated in a school system. Various ways of interesting pupils in an all-inclusive thrift movement were planned and carried out. Essay contests, poster contests, and talks on thrift are examples of how this educational work was carried on. A fifth grade class studied thrift by writing a play. This was called "The Money Family." The theme of the play suggested ways and means of preventing waste and of saving money. In another school, pupils of the same grade composed and presented a similar play entitled "Ethel and Her Savings Bank."

The above illustrations indicate the wide variety of attacks possible when the project method of learning is utilized. The reader will readily recall many examples out of his own experiences. They include plays and pageants, the making of booklets, sandtable presentations, the making of maps, the drawing of pictures and posters, and the constructing of models. In carrying on many of these activities children will utilize a wide variety of materials. Wood, cloth, clay, soap, paraffin, paper, and even stones, twigs, and other things found on the way to school find a place in various projects.

CHAPTER IX

The Appreciation Lesson

We are living in an age of highly specialized occupations, which in turn has resulted in keen, strenuous competition in nearly every vocation or profession. This condition tends to magnify our conception of social efficiency until in some quarters too much stress has been placed on its vocational phase. As time elapses this tendency will probably increase rather than decrease in the minds of the American people. Therefore, it is essential that the teacher maintain a broad conception of the aims of education if he is to insure the rising generation of school children a continuous and properly balanced growth in each of the various phases of social efficiency. This kind of growth should include due attention to avocational efficiency, which is oftentimes much neglected. To this end we must make certain that our pupils acquire a deep and lasting appreciation for the highest and noblest forms of art, literature, and music.

In developing right attitudes, ideals, and standards in our pupils—which can be accomplished if their interests and desires are only for the inspirational best—we must utilize more than we have in the past the teaching procedure which is most adaptable to our purposes. This is the appreciation lesson, the purpose of which is to provide the highest forms of artistic, musical, or literary enjoyment or satisfaction to the learner, through an inspiring experience in which he

assumes the role of listener or observer—becomes the audience. This procedure includes such activities as enjoying a story or a poem, hearing a singer or a symphony orchestra, appreciating a picture or a bit of scenery, or listening to an inspiring talk on travel or some historical event.

Because of the very nature of the appreciation lesson, it is one of the most important educational means at our disposal for influencing and transforming the attitudes, ideals, and standards of children. Appealing to the aesthetic emotions by presenting the beautiful, the harmonious, and the idealistic in music, literature, or art is just as much our educational business as directing children's activities into channels which provide vicarious vocational experiences or mastery of the "three R's."

Each social group consists of three kinds of people; namely, creators, interpreters, and listeners. The appreciation lesson is the one type of teaching procedure in which the larger part of the class, a social group, participates as listeners. In many instances the whole class constitutes an audience. The experience the pupils are gaining while so engaged must grip them for its own sake. In all cases this experience is based on the motive of entertainment and therefore must give pleasure and may besides lead them into something beyond its immediate motive.

The activities which may be included in the appreciation lesson are as follows:

1. Enjoying the beauties of a masterpiece of art and listening to an inspirational address on the achievement of the artist's ideal which is illustrated by the particular painting, sculpture, or other work of art which is being enjoyed.

2. Listening to good music rendered by soloists, orchestras, bands, and so forth.

3. Enjoying the oral reading of the finest literary selec-

tions and masterpieces in the fields of poetry, fiction, drama, biography, history, and accounts of travel and of scientific discoveries.

4. Hearing a talk upon his country by a foreigner, or one by a traveler upon a foreign country or upon interesting or unfamiliar parts of our own country.

5. Visiting a museum, art galleries, a historical monument, wonders of nature, and other sources of artistic, historical, or antiquarian interest.

Since the appreciation lesson is utilized to modify attitudes, by inculcating high ideals and standards, we must familiarize ourselves with good procedures which are to be followed in employing this type of lesson, and must understand the principles of presentation underlying it. In Hayward's "The Lesson in Appreciation" is quoted the following from the educational drama, *Flachsmann als Erzieher:*

> Your literature lesson was particularly good. Superb. Just superb. I never thought a real lyric could be brought home to a child. I see it can be done. You did not tear or hack the poem. You first carefully prepared the mind and mood; you got the soil ready for the poem, within the children, and then you raised the whole living plant, rootlets and all, and planted it straight in the children's hearts. Not first in their heads. That was a solemn moment. There was the true consecration of art. . . . You could hear their hearts throb. I must confess to you mine throbbed too. I, too, was your scholar. . . . When you stopped, all the children gave a "Ha!" I gave one too.

This quotation illustrates very well many of the principles to be kept in mind. The influence of such a lesson upon the pupils should be threefold. (1) They should acquire a wholesome respect for the masterpiece or subject presented and interpreted. (2) They should feel a desire

to penetrate more deeply into its meaning. (3) They should appreciate the contribution that it makes to the improvement of the individual and of society. The responsibility of awakening the interests of the pupils, developing their discriminating tastes, improving their intelligent listening, and opening up to them the means of keener enjoyment of the better things of life, rests with the teacher.

Therefore, the principles underlying the successful presentation of an appreciation lesson must be thoroughly understood and carefully followed. They include: (1) thoughtful, intensive preliminary preparation on the part of the teacher; (2) his genuine enthusiasm; (3) careful preliminary preparation on the part of the pupils; (4) an impressive introduction of the subject; (5) an interesting presentation throughout; (6) the adjustment of the treatment to meet the levels and needs of each individual; and frequently (7) the creation of new sources of interest in the pupils.

1. Hence, the first important principle of which the teacher must be cognizant, is the necessity of making his own preparation for the lesson a thorough one. Everything that has to do with the subject selected must be mastered. Even the life and thoughts of the artist or other person responsible for the material must be studied as intensively as possible. Then and only then can the teacher face his audience of pupils filled with his subject.

2. If he expects to exert a deep and permanent influence upon the pupils his own enthusiasm must be genuinely evident. The subject must give him even more satisfaction and pleasure than he can hope to instill into his group through the lesson itself.

3. The teacher must have prepared the pupils for the lesson. This preparation includes the building-up of an

apperceptive background in them, a foundation of knowledge upon which can be erected the structure of new materials. There must have been created an interest in and desire for the lesson. Such technical material as will contribute toward a better understanding and can be treated previous to the lesson should be presented. In taking the precautions mentioned the teacher is applying the laws of learning treated in a previous chapter. Too much can hardly be said about this introductory step—the previous preparation of the class.

4. The fourth principle brings us to the threshold of the appreciation lesson. The teacher's opening remarks should develop in the pupils a mind-set, a pointed interest, which will make possible a powerful impression through the thrills and climax to follow. There are a variety of ways of creating this immediate interest.

The following examples will serve to illustrate some applications of this principle. A foreigner's description of his own country is rendered more interesting if he dresses in his native garb and surrounds himself with materials characteristic of his native land. The presence of a bowl containing goldfish insures immediate interest in hearing about them. Careful, artistic organization of the setting for a painting to be discussed—a harmonious color scheme, the use of contrast or some other device—attracts attention to the picture. An introductory sketch of the events in the life of Francis Scott Key will make an audience which is to listen to the "Star Spangled Banner" more appreciative.

5. The presentation must be in simple clear-cut English; the treatment should be organized so that it will be a natural and continuous unfolding of the account, interpretation, etc. This is the fifth principle to be kept in mind. It implies among other things that the appreciation lesson must

be divorced from technique—"You did not tear or hack the poem." A digression into systematic analysis and formal teaching of technique will prove fatal to the purposes of the appreciation lesson. Of course, with an advanced group an appreciation lesson might be concerned with technique—the structure of a poem, the art of the painter, and the like.

6. The sixth principle is that the teacher must take into account the varying degrees of development of the aesthetic sense or interests of the pupils. The wide differences in the education and leisure interests of the parents, the home environment, travel, and similar factors affecting development enter into the situation. Also, the appreciation lesson must provide for continuous growth of the aesthetic sense in the pupils. Stagnation or stultification of interests must be avoided.

7. Finally, the teacher should direct the emotions and interests which have been aroused in the pupils into channels of purposeful activity, thus enabling them to profit by the application of the law of effect.

In concluding the statement of principles, one further question which teachers raise needs answering—"When should the appreciation lesson occur in the presentation of subject matter?" It should be used, largely, whenever a deep appeal to the emotions is desired. Hence, the lesson may be introductory to a new situation, or it may be the conclusion of an old one. At times it will constitute an intermediate unit in a series of experiences. Often it will be a complete unit in itself. The important consideration to be kept in mind is that the procedure should be utilized when any learning situation will be economically and profitably enhanced by its use.

The seven principles listed above will be expanded and

illustrated in the following pages which deal further with the place and use of the appreciation lesson in such fields as art, music, literature, history, and science.

Very few of the children with whom we come in contact during our years of teaching will ever develop into great painters or sculptors. Surely, therefore, our purpose in art instruction should not be to develop superlative artistic skill. Only in so far as art serves our common needs are we justified in teaching it.

When we are planning or selecting clothes, or a home, satisfaction is our guiding principle. This involves a consideration of appropriateness, attractiveness, beauty, and other qualities of design, color, and composition. The arrangement, furnishing, and decoration of our rooms, offices, homes, and public buildings require intelligence and appreciation of the artistic. In fact, everything that we create or construct out of materials should reflect the application of good art principles. Hence, the study of art in our schools should aim at the inculcation of the best tastes, a love for the truly beautiful, and a desire to improve personal appearance and surroundings so that they approach the highest standards and ideals.

Then, too, if we have been taught to appreciate the works of great artists, we have at our command another profitable and enjoyable way of spending our leisure time. How a great masterpiece can influence the lives of many people is evident in the almost countless interpretative uses that we see made of Rodin's great statue, "The Thinker."

Since good taste and an appreciation of the artistic are such desirable qualities, they should be developed in our children throughout the period of elementary school training at least. But if we are going to modify the attitude of our children toward art we must provide them with situ-

ations which will bring them in contact with the best in painting, sculpture, drawing, and architecture. Pictures of the greatest achievements in these fields, reprints, or photographs, may be used as the basis of appreciation lessons. But whenever possible the originals should be visited. The utilization of similar pictorial materials to illustrate facts in history, geography, and nature study, will be found to stimulate interest and appreciation in these subjects. History, and the meaning of patriotism, will be made more real to them by such an activity as listening to an inspiring interpretation of "The Spirit of 76" or of French's picture, "The Minute Man." Niagara Falls, the Colorado Canyon, New York Harbor, ocean liners, and other works of man and wonders of nature are merely empty, meaningless words to most children unless they see and understand pictures of them. The city boy will obtain a realistic conception of the country and country life, and an appreciation of it as well, through pictures. On the other hand, city life will be better understood by children in rural districts when they see it depicted in paintings or in good photographs.

The value of the appreciation lesson and its method of presentation can best be illustrated by an account of an appreciation lesson observed in a classroom.

For several weeks the members of a sixth grade class had been collecting pictures from newspapers and magazines which gave evidence of the influence which the art of the past and present was having on attractive advertising. The pictures were classified and filed so as to present in historical sequence the original art creations partly or wholly used in these pictures. This material was used in various ways by the teacher as a basis for directing further activities. The particular lesson observed by the writer was based on the sculptures by Rodin.

All of the pictures obtained by the pupils which showed the influence of Rodin's sculptures were studied with the purpose of finding out what thoughts they expressed. These thoughts were then tabulated and kept, to be used later, to see if the pupils could identify by means of them a picture of the statue that had been used as a basis for the advertisement. A period was set aside in which the class planned to play this game. But before the time arrived the teacher announced that she had obtained a very large picture of one of the most famous of Rodin's statues, and asked the class if they would like to have her participate in the game by attempting to find all of the interpretations she could of this one statue. To this the pupils agreed.

When the time came for making the presentation of the picture, the teacher first told the dramatic story of Rodin's life. When she found that the class was deeply touched by her account of the experiences that colored his masterpieces—the severe struggles and rebuffs that the artist faced, his indomitable courage and perseverance, and his final recognition—she presented to the class a very large picture of "The Thinker." She then related some of the criticisms that it first received, and showed how these criticisms were replaced in later years by more constructive and appreciative ones. She concluded her talk with a very confidential and spirited interpretation of what the great statue meant to her. The silence which reigned in the classroom during her talk and after its conclusion was very expressive of the influence it was having on the children. Turning from this picture to others she began to draw out individual reactions to them. The "game" was a game no longer. For the rest of the period the pupils earnestly and thoughtfully discussed the several pictures.

Music in the elementary schools should function in very much the same way as art. The educational purpose of the teacher should be to appeal to the feelings of her pupils through music appreciation. If our past efforts, colored by a thoughtless tendency to make accomplished singers out of all children, have created the desire for much of the popular music we hear today, then it is high time that we turn our attention to developing *listeners* who will demand better music. We must create situations for the enjoyment of good music.

The children's lessons in music appreciation should lead, first, to an acquaintance with the sources of good music—a knowledge of composers and interpreters; and secondly, to an enjoyment of and love for good music. "The pupil's first acquaintance with a beautiful song should be made through hearing the song sung in a beautiful manner; it should never be through a series of symbols printed in a book or chalked on a blackboard. His second acquaintance with a song should be made in the same way, and his third also. After that it matters little what happens. He will have learned to love the song and his love will be hard to destroy." (Hayward, *The Lesson in Appreciation*, page 133.)

In one of the new modern courses of study a committee of teachers has compiled a list of suggestions for developing appreciation in good music. This list includes the following:

1. Making use of school piano for programs given by a number of the class, a recital by members of the school piano class, a group of numbers by visiting artists, listening to accompaniments of songs.
2. Giving selections on Victrola.
3. Inviting an artist to come to school and give a program.
4. Attending concerts by soloists, clubs, oratorio societies, choirs, opera companies, bands, symphonies.

5. Classes singing for each other in the same school.
6. Schools singing for other schools.
7. School bands or orchestras playing for own school or for other schools.
8. Singing or playing for those at home what has been learned at school.
9. While pictures of operas are on the screen and a child tells the story, music is played on the piano or Victrola; or members of the class have made a series of large pictures of the opera studied, and groups of children sing selections learned, with or without dramatization.

One example of these activities, observed recently, occurred as part of a school program. In it one of the classes presented as its number "The Star Spangled Banner." The number opened with the class assembled on the platform supporting a large American flag. One of the pupils told very briefly about Betsy Ross and the making of the first American flag. Then a second member of the class told about the experiences of Francis Scott Key. When the account had reached the incident in the composer's life that made possible one of our great national songs the whole class sang it, thus concluding the number on the program. It was evident to the writer, that "The Star Spangled Banner" meant a great deal more to the whole audience because of this presentation of it.

Another example of how effective the appreciation lesson may be made in the field of music was noted at a symphony concert presented for the children of a school system. One of the artists expressed to a member of the school department his personal feeling of dissatisfaction at performing for the children, because of the reception that audiences of school children had given the orchestra elsewhere. The music supervisor of the city remarked to the artist

that he would in all probability be happily surprised by his audience.

Throughout the whole program intense interest was apparent and quiet was broken only at the intermissions, by enthusiastic applause. This died down quickly whenever encores were played. As soon as the concert was over, the artist approached the music supervisor and expressed his great pleasure and the sincere willingness of the members of his orchestra to play again for such a responsive audience. He then asked how it happened that these children were so different from the others for whom the orchestra had played. The supervisor explained that during the weeks preceding the concert the children all over the city had made a very careful study of the organization of a symphony orchestra. The number and arrangement of the instruments had been discussed, and in some schools models made and arranged. Moreover, all of the selections, which had been carefully chosen because of their adaptation to a youthful audience, had been studied in advance. Therefore, when the children were assembled for the concert an appreciative interest had been thoroughly aroused, and consequently the program was keenly enjoyed.

The appeal that literature makes to people is as old as literature itself. Almost all adults who read regularly or frequently have acquired an interest in literature that rests upon appreciation. The individual who has learned to enjoy the best from the pens of our great writers *lives* that which he reads. He understands, and, understanding, appreciates human kind and human affairs. The fact that he pursues this reading interest during his leisure time, and his growing attitude of sympathy and interest in his fellow men testify to his development as a thoughtful reader.

The growth of this type of person is accomplished through

activities involving the reading or hearing of inspirational stories. These activities should be begun far down in the grades. The more we turn to this type of presentation of literature the greater will be the number of children and adults who will read and enjoy good literature.

The use of the story by a resourceful third grade teacher will serve to illustrate how the telling of an appropriate story may become a good teaching procedure. Her class had become interested in Holland, especially in the geographical conditions which influenced the life and activities of the little Dutch children. The canals, towboats, windmills, dikes, and typical Dutch homes had been discussed. At this point the teacher told her class that she knew a story about a very brave little Dutch boy who lived near the dikes and asked whether or not the pupils would like to hear about him. A period was set aside by the class for this purpose.

Previous to this time the teacher had studied thoroughly the story which she proposed to tell to the class. When the story hour arrived she related smoothly and with considerable expression the story of "The Little Hero of Haarlem." So fascinating had been her dramatic presentation that on the following day the children begged her to tell the story again. This she did, and concluded by asking them if they would like to tell the story to her on the third day. Then followed a discussion as to how they could best do this. The group finally agreed upon a suggestion by one of the children to work out the story in the sandtable. Then followed the discussion and organization of the groups. By the next day there were completed in the sandbox three scenes: (1) the two children at play near the dike that was leaking; (2) the heroic effort of the boy checking the leak; (3) the arrival of help.

An excellent example of reading for appreciation was observed in a beginning first grade class. About five weeks after the new term had begun the teacher felt that most of the group were ready for a primer. One afternoon she distributed the books without comment and permitted the children to leaf through the books. She found that they were not only looking at the pictures, but were also busily engaged in finding words that they knew. Soon many of the children turned to the first page and began reading the story appearing there. The teacher walked around the room, stopping to help individuals with words that were proving too difficult.

During the days that followed, the children progressed as individuals, silently reading "The Little Red Hen," and the other stories in the book. From time to time the teacher checked up with each child to see that he was really reading this first book understandingly. For study purposes she selected a second easy primer on the basis of similarity of vocabulary with the first one. This teacher had wisely fostered the children's appreciation of reading in the first book by treating it throughout from the point of view of a medium for enjoyment and not as a task. The children's love of this book and of others read in a similar manner was conclusive evidence of the value of beginning reading for appreciation with the very first book put in the hands of the children.

Any teacher can think of countless other instances of appreciation lessons involving either story-telling or reading which illustrate the value of the appreciation lesson in these types of activities. Therefore it is unnecessary to include many examples here.

The use of the appreciation lesson in the social studies and natural sciences can be illustrated by a variety of

examples. A study of the Egyptian pyramids by a sixth grade class will serve to illustrate one excellent presentation. Shortly after this class had begun a study of Egyptian history the teacher told her pupils about a close friend of hers who had spent considerable time traveling in Egypt and who had made a collection of pictures and slides while there. The teacher asked the children if they would like to invite this traveler to come to the school and tell them something about Egypt. After the children had decided what they wanted most to know about, they wrote letters to the teacher's friend requesting her to tell them about the pyramids.

The resulting illustrated lecture contained a great deal of first-hand information about the traditions and life of the ancient Egyptian peoples. By means of slides, the traveler was able to present very clearly the purposes, meaning, and uses of the pyramids. How profitable this appreciation lesson was to the pupils is evident from the following account by one of the children:

A Trip to a Pyramid

When you go into a pyramid you have to go up a little pathway, which is built in the stone. It is only a foot wide, so that you have to put one foot in front of the other. This little pathway gets to be nine feet high. When you come to the entrance you have to get down on your hands and knees, for it is only three feet high. You go down this little passage for some way till you come to one that goes up, but the one that you have come down still goes down. When you get to the bottom of this one nothing is in this room. It was made to fool robbers. In order to get to the king's chamber you have to get across the one that goes down. In order to do this the guide takes you upon his back and jumps it. When you get across, it is very much easier to walk, for it is twenty-eight feet high. After you

go along this for a little way you come to a little passage that goes off the main one. At the end of this is a chamber they call the queen's chamber, but it was for a very dear friend of the king. If you keep on going along the passage that is twenty-eight feet high you come to the king's chamber.

Going up from the king's chamber there are two air shafts, eight feet square. They are made to bring air into the room. Above the king's chamber are four or five air chambers. They were put there to keep it from falling.

In another class the children were studying about China. They wrote letters to a very well educated Chinese in their city inviting him to come to their class and tell them about life in China. The teacher presented their letters to this man and explained to him that he could make his talk most valuable to the children if he would tell them about the life of the Chinese child in his home, in school, and at play. She also suggested that if he had the toys and other objects of interest in the lives of Chinese children he might use these to illustrate his account. The effect of this careful planning was apparent when the talk was given. For over an hour the children listened with interest to the speaker's account of child life in China and afterward they asked him questions for over a half hour.

Careful preparation of a lesson in nature study will illustrate the educative value of the appreciation lesson in this field. An aquarium and stand were placed in a classroom. Before the goldfish could be put into the aquarium it was necessary to make thorough preparations. Under the direction of the teacher the children studied about goldfish and also visited other rooms where aquaria could be found. Gravel, leaf-mold, soil, water plants, and the like were next collected. On a certain day the supervisor of nature study came to the school and very carefully assembled all of the

essential materials for the aquarium, at the same time explaining in detail what she was doing and why. From the time she put in the first materials until she finally had the fish swimming in the aquarium, the children watched and listened to everything she did and said. The aquarium has been a continuous source of interest ever since.

A study of the various illustrations of appreciation lessons which have been discussed in this chapter will disclose that the principles previously set forth as governing this type of procedure have been applied. These principles may, therefore, be used as a basis for judging the soundness of the procedure being followed. Another series of standards which overlap these and which add to them somewhat from the point of view of child participation may be found in *How to Teach* by Strayer and Norsworthy. These standards are as follows:

It is of primary importance that the teacher bring to the class an enthusiasm and joy for the picture, music, poetry, person or achievement which he wishes to present;

Children must not be forced to accept nor even encouraged to repeat the valuation determined by the teachers;

Spontaneous and sincere response upon the part of children should be accepted, even though it may not conform to the teacher's estimate;

Children should be encouraged to choose from among many of the forms or situations presented for their approval those which they like the best;

The technique involved in the creation of the artistic form should be subordinated to enjoyment in the field of fine arts;

Throughout, the play spirit should be predominant, for if the element of drudgery enters, appreciation disappears.

The above standards, together with the principles governing the appreciation lesson, will simplify for the teacher her problems in making this type of lesson effective.

CHAPTER X

The Drill Lesson

The one type of teaching procedure which has been the most frequently employed by teachers is the drill lesson. But it is a most difficult teaching procedure to carry out correctly and because of this fact it has been greatly misused. Perhaps this last fact has led extremists in method to advocate its elimination from modern teaching procedure upon the assumption that it is a non-essential type of attack when learning activities are intensively and extensively motivated.

Their contention that the solution of problems, the execution of projects, and the participation in appreciation lessons constitute sufficient experiences to insure thorough comprehension and adequate learning, ignores the primary principle of repetition or recall in learning. Scientific investigations of learning prove conclusively that in many instances economy of learning is secured through drill.

In the experiments by Wallin and by Winch conclusive evidence was obtained showing the need for more than incidental teaching of spelling. The investigations of Cook and O'Shea and of others indicate that direct instruction in spelling is necessary. Freeman's statistical study discloses that pupils who had specific and directed practice in writing, were able to write decidedly better than those who had not. In the laboratory experiments in reading by Gray, he found that speed drills increased the rate of reading with-

out appreciably changing the effectiveness. Peters confirmed these conclusions in other experiments. Thorndike, J. C. Brown, and Donovan independently conducted experiments involving drill in arithmetic, and each has reported that the groups exposed to drills showed marked improvement in skill and speed. Similar evidence has been found in experimental and statistical studies in the subject matter of other school subjects. All experiments point to (1) the need for drill, and (2) the economy of learning which results when sound processes of drill technique are employed.

Even though we did not have scientific evidence to prove the need for drill, the experiences of everyday life involving the varied activities of many persons are indicative of need for essential drill as a natural learning activity. When a new office-employee finds she must operate an unfamiliar type of computing machine, she recognizes at once that her general efficiency depends considerably upon the skill she may develop in using it. Therefore, she practices on it in her spare time until she has acquired a sufficient degree of proficiency. The stenographer who recognizes that her employer and his business require the use of a vocabulary different from any in her previous experiences, knows that success in her new undertaking is more certain if she masters this new vocabulary. She compiles a list of the new words which occur frequently, and their corresponding stenographic symbols, which she writes repeatedly until they are firmly fixed in her mind.

The laborer who daily wields a pick trains and develops the muscles of his body so that they will automatically perform his work, with economy of time and energy. The successful manager of a large business, with its innumerable and varied demands upon him, organizes and follows an economical program of business routine. By so doing he

conserves his time and strength for dealing with the unusual but important matters which arise. In life-activities, essential skill is developed, necessary habits are formed, and important facts are mastered through sufficient purposeful, intensive drills. In this way, the desired responses, of whatever nature, become automatic and consequently effective.

When school life is organized as a series of real-life experiences, situations requiring drill inevitably arise. Rapid and accurate use of the multiplication combinations is acquired only by intensive drill and abundant repetition of these combinations in examples. Legibility and reasonable rapidity of handwriting are developed by carefully planned and thorough drills in penmanship. The successful and rapid knitting of a sweater is possible only when the various essential movements of the fingers and arms have been habituated. Just as there should be specific and directed practice on the fundamentals of arithmetic, in penmanship, or in needlework, so drill is necessary in learning to read rapidly, understandingly, and critically; in acquiring fluency and accuracy in oral and written expression; in forming hygienic habits of living, and in mastering other similar habits and skills.

The real problem of the teacher, therefore, is not how to eliminate drill, but rather how to make drill lessons economically and efficiently productive of desired ends. These outcomes include the formation of right habits, the acquisition of desirable skills, and other requisite automatic responses to frequently recurring situations which will contribute to the development of a socially efficient person. Thus drill becomes a learning process which furnishes the automatic, essential, and recurring responses necessary in the interest of economy. Its purpose is to develop in an individual the

essential habits and skills which need to be used frequently in recurring situations.

In addition to understanding the nature and place of drill in natural learning, the teacher must determine when and how to guide pupils into drill activities. The laws of learning apply to the drill lesson as well as to the other procedures. (1) The pupils must be ready for a drill lesson if efficient learning is to be the result; that is, the undertaking must promise satisfaction to them. (2) There must be interest and effort on their part throughout the activity or activities which provide drill. (3) In fixing and strengthening a bond, habit, skill, or whatever other automatic type of response is being formed, the effect must bring satisfaction to the learners.

The application of these laws of learning to drill procedure may be expanded in terms of guiding principles which teachers should follow.

1. There must be sufficient motive actuating the pupil to render him anxious to form the habit or acquire the skill, or other automatic response. This is the step of motivation.

2. He must have a correct idea of just what he needs to do and how he needs to do it. This is the step of focalization.

3. He should exert a maximum of interest, effort, and attention during the acts of repetition. This is the step of repetition.

4. His greatest effort should be centered on the most difficult parts. This is the principle of relative emphasis.

5. The drill lesson must provide for adequacy and accuracy of responses including all materials which essentially and rightfully affect the desired bond being formed. No exceptions to the correct response should be allowed.

6. Repetitions must be provided over a period of time with gradually lengthening intervals between drills.

7. The extent to which the learning is carried should be in keeping with the need that the pupil has for it outside of school.

When teachers understand these principles thoroughly and practice them consistently and constantly in conducting drill lessons, effective learning occurs. To assist teachers to acquire a clear conception of the principles, they will now be explained.

1. The first concern of the teacher is to see that pupils understand why the particular result to be gained through a drill lesson is necessary. In their activities they encounter situations in which they can continue their self-directed efforts more economically if they possess certain habits or skills.

When children of the second grade play store, for example, they soon discover that they need to know how to add and subtract to become good "storekeepers"; that they must be able to read if they are to be able to classify or find their "goods" by means of the labels on them; and that they must be able to spell correctly in dealing with "customers." Consequently, such pupils welcome the opportunities afforded by the teacher for drill on what they know are essential elements, until they reach modern standards of proficiency in learning. Such children know why they are undertaking a drill, see a definite use for the habits, the skills, or the mastery of facts involved. With these objectives clearly in mind and the need for them apparent, the children desire very much to master them. Besides knowledge of the ends sought, insight into errors, and recognition of the time when the material learned is to be reproduced, an additional incentive to practice has been found in the effect on children of knowing the scores they achieve.

The drill lesson, therefore, must be undertaken in answer

to a felt need, a real and personal interest which makes instinctive appeal for mastery. To be functional to the pupils it must be motivated—purposeful and meaningful. The teacher must feel certain that the learning will be economical from the point of view of forming bonds whose values can be justified by immediate or real-life needs.

2. When it becomes evident that the child understands and appreciates the need for drill, the teacher must guide him to see clearly just what he is to master and precisely how he should proceed in order to do his work effectively. He must not attempt drill work on something beyond the possibility of reasonably efficient mastery. It would be absurd to lead a class of third grade girls to attempt to develop skill on a sewing-machine in order that they might satisfy a desire to make a house-dress. But this of course would be a justifiable drill procedure in the sixth grade.

This close adaptation of drill material to the individual child's ability and needs is necessary to insure a clearer and fuller understanding on his part of just what he is to do. Also the pupils must be given explanations or directions sufficient to enable them to know exactly how they are to proceed. When the upper grade girls learn to sew on the machine they must know how to control the stitcher, hold and move the cloth without pulling it under the needle, and follow guides such as chalk marks and other directions essential to proficient machine sewing. In many drill lessons it is worth while to conduct explanations even to the point of actually providing practice for the pupils until they become familiar with the procedure desired.

3. Knowing what to do and why he is to do it, brings the pupil to the situation of drilling on that which he is to master. He undertakes his study voluntarily. It is essential that the nature of his initial effort continue unchanged

throughout the drill. So long as his interest, effort, and attention are adequately motivated by his original purpose, this appeal should be utilized. However, in a series of drill lessons which extend over a long period of time it is often necessary to find additional motives. In so far as possible these should be as natural as the original one. For example, competing against his own record holds a pupil's attention wonderfully well. Appeals to other play interests are valuable. The only safeguard to be observed in motivating drill is to make sure that the game or device provides for economical use of time and effort in the achievement of the fundamental ends sought.

Variation in the drill procedure lengthens the span of the pupil's interest and minimizes the element of fatigue. Care must be taken, however, to retain constantly in the various drill exercises whatever is being habituated. There must be no doubt in the mind as to precisely what it is that is to be learned. When the young child learns to know red as a color distinct from some other, he is shown more than one red object. He is shown red clothes, red houses, red automobiles, red roses, and so on, all of which appeal to his interest. Through such a series of experiences he learns to associate the word *red* with its appropriate color. Correct form in letter-writing becomes automatic when pupils have actually written correctly many letters for various purposes to different persons. The many situations requiring them to repeat, in these exercises, a certain form common to all of them, develops skill in using that form. At the same time, the different situations provide variety and new interest. The same amount of drill on a single type-form provided by the teacher will produce considerably inferior results.

Someone has said, "Secure zeal, interest, and concentra-

tion of attention with short, snappy drills." All drill exercises should be characterized by uninterrupted and intensive maximum effort for comparatively short periods of time. Ten minutes spent on different types of drill produce better results than fifty minutes marked by interruption, fatigue elements, and the like. Rarely should a drill exercise on a particular subject, for children in the elementary school, exceed fifteen minutes. Scientific evidence upon this point has established this limit to a high degree of reliability. We can therefore accept it with confidence.

4. If the average teacher is told that she should not require pupils to drill on that which they know, she will remark "Of course not; who does?" Still, common practice is marked by just such waste of effort. For instance, children who are drilling on the multiplication table of seven, taking each multiplication combination in order over and over again, are wasting considerable time. Some of the combinations of seven are more difficult than others. Some are more difficult for certain pupils than for others. Not infrequently, however, each child is required to repeat "Seven two's are fourteen" as often as "seven eights are fifty-six."

Often spelling lists which children are studying contain many words which pupils are able to spell correctly before they meet these words in such lists. Occasionally all the pupils of the class may be found studying a word which practically everyone spells correctly, and they devote as much time to studying it as they do to one which is very difficult to all but a few. The reader is not to infer from these examples that pupils should not practice all the elements involved in a drill. The need for doing this is explained under the next principle. Most of the time and

energy of pupils' drill, however, must be utilized to eliminate the difficulties or obstacles. The analysis of sources of error or weaknesses of pupils provides both teacher and pupils with the information which makes it possible to place the stress in learning on actually determined needs. With this in mind, a pupil should keep a record of his difficulties for individual study. The teacher should also compile a record of the common mistakes and needs of his class which should be included in its drill lessons.

Opportunity for individual practice on individual needs is included in a good drill lesson. Besides drill on the very common general difficulties, pupils should practice to overcome their own particular ones. The child whose spelling lesson is perfect should give attention to other types of difficulties. The pupil who has failed to spell certain words correctly should study only those he has misspelled. Each pupil, therefore, is meeting his own and to some extent self-determined needs in this program.

In a second grade class, careful observation of this sound procedure was noted. A list of twenty words had been dictated to the pupils to spell without their having previously studied them. The papers were collected and the misspelled words corrected by the teacher. Next she wrote the words on the board, arranged in order according to the number of times each word had been misspelled. Each child was informed of the ones he had missed and these were the words to which he was expected to give his attention during the spelling study period. The children who had not made any errors in spelling took out their readers and began studying a lesson which had been assigned previously. The following section of a chart indicates how the teacher prepared herself to make the drill lesson in spelling thoroughly functional.

INDIVIDUAL SPELLING NEEDS

WORDS	TIMES MISSPELLED	CORRECTION	EXAMPLES OF CORRECTION
1. law (*loy*,[2] *low*[3]) (*left out*[1])	6	Visualization	Six children look at word *law*.
		Drill on syllables	What does *aw* say? Put *c* before *aw; p, str*, etc. Make sentence using *law*. Each one write word correctly.
2. yard (*yeard*[5])	5	Drill on syllables	Where do we play? How many letters in this word? All five write it on the board. Let us see how many words we can make with *ard*. All write word *yard* on paper.
3. ball (*boll*[3]) (*left out*[1])	4	Drill on syllables Enunciation	What do all boys like to play? What word rhymes with *all* in our lesson? Are you sure you know how to write *a?* Write word *ball*.
4. five (*fiv*,[1] *fife*[1])	2	Final *e* rule Enunciation	What does *i* say when *e* comes at the end of the word? Say these words: *five, hive, strive, dive*. What does *v* say? Write the word.
5. just (*jack*[1], *juch*[1])	2	Correct picture	Two children look at this word. Write it on the board. What word would you have if you put *m* before *ust? cr? tr? d?* Write *just* on your paper.
6. belong (*blong*[2])	2	Enunciation	What two words do we put together to make *belong?* Write *be* on the board; write *long* on board. Write *belong*.
7. low (*bow*,[1] *lowe*[1])	2	Misunderstood word Use in sentence	Same correction as 3.
8. tell (*till*[1])	1	Drill on syllables Use in sentence	Same drill as 3 and 7.

The first column contains the list of words in the order in which the teacher was to write them on the board. After these she placed on her chart the types and the number of misspellings. The third column contained her judgment as to the means of correcting the misspellings. The final column contained the memorandum notes of the way she proposed to obtain correct spellings in the cases where errors had been found. At the bottom of her chart the eight correctly spelled words were listed with the comment that intensive study on them was to be eliminated.

Teachers should make use of the scientifically assembled and organized drill materials now available. For example, the Courtis Practice Tests in arithmetic provide effective means for discovering and overcoming the weaknesses in pupils' use of the fundamental operations. If the directions for using these tests are followed carefully by the pupils they will learn more economically and efficiently than they will by means of the unscientific drill lessons planned hastily, perhaps, by a teacher. These tests conserve the teacher's energy, too, by obviating the necessity of spending time to plan and write out drill lessons—time which can be utilized to better advantage in constructive work. Another example of economy in using drill materials is to be found in the graded lists of minimally essential spelling words such as are found, for instance, in the Ayres list. In using this material as well as any other in drill lessons, however, teachers must be sure that the children are experiencing meaningful and purposeful activities, that their interests are naturally and normally motivated.

5. When the relative difficulty of various elements in a series such as occurs in the multiplication tables has been ascertained, the program of drill should be organized to include every member of the series. It is essential not only

to include "eight seven's are fifty-six" and "seven eights are fifty-six," but also to include these same combinations in a number of examples; e. g., "723 x 8," "57 x 8," and "28 x 7." The whole of a poem must be memorized as well as those parts causing greatest difficulty. Writing a whole sentence correctly as well as mastering the particular structural or other difficulty in it is essential to fluency in written expression.

In drilling on any one or all of the parts of a sequence, accuracy of response is very essential. If a series of repetitions includes an error, that error becomes more thoroughly fixed thereby. To eliminate it will require a greater effort than was necessary to have formed a first correct response. For instance, if a pupil has habituated "seven and five are eleven," he has to unlearn this mistake as well as master the correct response, "seven and five are twelve." When a pupil frequently uses "I have went" this bond between "went" and "have" must be broken and the correct bond between "gone" and "have" substituted and habituated in the expression "I have gone." The failure of teachers to insist on accuracy of response in drill, because of the seeming energy expended in so doing, will eventually lead to the necessity of someone else's expending a still greater amount of energy to eliminate these errors, at the expense of additional learning which such energy should be producing.

6. Scientific investigations disclose that the desired amount of skill, the formation of a habit, or the retention of information depends upon repetitions which are decreased in extent, over increasingly lengthened intervals. In order that pupils may subconsciously learn to spell a certain word accurately, they may be compelled to drill intensively on that word—perhaps two or three times the first day, once

or twice the second, once the third; then again at an interval of two or three days; once the following week; again a month hence; and so on, until correct spelling becomes the sole response when the word is written. Similar studies have disclosed the need of planning drill cycles over a period of several years in order to fix some of the very fundamental elements frequently recurring in life-situations. Spasmodic drilling has been found ineffective in the light of the automatic responses produced. Over-learning at the beginning, with subsequent ignoring of any further drill has also proved unsatisfactory. Hence teachers should seek the most scientific information in planning their initial and subsequent drill exercises so that over-learning and under-learning are avoided.

7. The educational value of subject matter, the real life-need for certain habits, skills, and other types of automatic responses must govern the teacher's judgment in determining to what extent permanent fixation is desirable. Each drill situation requires this thoughtful checking. Obviously, if children are going to need, for a short time, skill in drawing a certain design, drill to the point of an acceptable product is necessary, but when the desired end has been achieved and use has been made of the skill, further drill on it should not occur.

When a pupil in any elementary grade has achieved the accepted standard in penmanship for his grade, drill for proficiency in penmanship beyond this standard should not be given. The time and effort thus saved should be utilized upon real needs. Over-learning is as wasteful, in fact, of time and effort as under-learning is known to be.

A very common example of attempts to attain a desired standard, at the expense of underdevelopment in another phase of the same subject, is to be found in reading. Many

pupils are drilled almost to perfection in oral reading—in fact, to such a point that their rate and comprehension are seriously affected. The writer visited a third grade class whose teacher had won an almost enviable reputation because of the ability of her pupils to read orally. The Principal of the school boasted of the ability of this class in sight reading. Fifth grade readers which these children had never seen before were given to them. In turn each child opened his book, was told the place where the last pupil had stopped reading, and began. The regularity and ease of oral sight reading was astounding. At the close of the performance the writer requested the privilege of asking the children some questions. This was granted him. Just as expected, scarcely a child in the room gave evidence of having remembered or understood anything that he had read. Perfection in the mechanism in oral reading had been obtained at the expense of critical reading and thought-getting. The latter ends are more essential to life-needs. On the other hand, the one accomplishment which all of the children were developing is needed by very few individuals in the realm of natural living.

One of the best guides to determining desirable standards of achievement is the scientifically developed standardized test or scale. If the standards in these are accepted for pupils and classes, a considerable amount of over-learning and under-learning as well, will be eliminated from our schools. This subject is expanded in the chapter on scientific tests and their use and therefore needs only passing mention at this time.

Not only should real-life and scientifically determined standards be kept in mind when the drill lesson is being efficiently developed, but each of the products of such a lesson should find a place in the succeeding activities of

the children. When such uses or applications occur in pleasurable and satisfying situations, we are applying the law of effect to the learning process.

The evidence that drill lessons become natural child activities and effective learning experiences under wise teacher guidance is to be found in almost any modern course of study which has been coöperatively developed by teachers. Many recent articles in educational magazines testify to the way in which children's interest and efforts in drill exercises have grown out of real-life situations which require some skill, habit, or other automatic response in the interest of economy of time and effort. Hence, only a few illustrations need to be included here so that the reader may have them at hand to study with respect to how the drill principles are applied in the classroom.

The pupils of a fourth grade had undertaken an activity which required considerable letter-writing. When the first set of letters had been written, they were submitted to a committee of the class to select the best letter. When their choice was made, it was found that a new pupil who had entered the class for the first time that day was the winner of the honor. One of the older members of the class objected, on the ground that this pupil had not been in the class long enough to have become a member of it from the point of view of competing in the undertaking. The chairman of the committee replied that it was by far the best letter and therefore should be selected as such. The teacher took advantage of the situation to ask why it was the best. The members of the committee volunteered the information that it was (a) very neat, (b) well arranged and spaced, (c) very good in legibility, and (d) very satisfactory in its language. After a discussion of the latter phase, the question of legibility was again raised, and the

need for neatness, good arrangement, and proper spacing of a letter was debated.

As a result of seeing the need for better penmanship, a plan for improving handwriting was developed in the class. The children learned how to score their papers on the Ayres scale for measuring handwriting. Each pupil made for himself two charts on which he was to keep records of his improvement. One was used for recording monthly scores in both speed and quality, as determined by the teacher, on the standard test. The other was used for recording weekly scores in quality, as determined by the pupil, on one paper selected by vote of the class from the regular work of the last two days in the week. The pupils were encouraged to compare other specimens of their work with those on the scale at spare times. A large chart was drawn on the board and graphs constructed to show how the poorest, best, and average scores in quality improved in the monthly tests. Drills were provided and the written work in other subjects was frequently checked for penmanship. Practically every child showed marked improvement in penmanship in less than six months.

Ability to locate on an unlettered map of the United States the regions producing wheat, corn, rice, sugar, cotton, various fruits, lumber, coal, gold, iron, cattle, and so forth, was acquired by the members of a fifth grade class who seemed to obtain considerable enjoyment out of playing this game which they had invented. They would choose sides and compete by answering such questions as (1) "I bought wheat from ——?" (2) California is famous for ——?" (3) "What do Iowa and Ohio produce in common?" (4) "Where are the great lumbering industries to be found?" A score of right answers was kept on the basis of the inability of one pupil on a side to respond correctly, plus

evidence that the questioner on the other side knew the correct answer. This game required accuracy of questioning and of response from all concerned.

Another teacher of the same grade obtained drill on the same subject matter through a series of equally resourceful drill exercises. The pupils had constructed in sections, by states, a large map of the United States. They decided to convert it into a product map. Newspapers, advertising matter, and old magazines were searched for pictures which could be pasted on the maps. Some pupils drew and cut out of paper pictures which they needed but could not find. The products themselves, such as cotton, wheat, rice, corn, matches and copper wire, were obtained and glued to the map. Each child was held responsible for one or more states. Every day the pupils who had succeeded in finding considerable new material would hold up each article or clipping and ask who needed it. Others would answer, giving the name of the state. This activity afforded competition both in finding material and in recognizing where it came from in order to obtain it from the finder. Since a particular article is generally a product of more than one state, pupils had to be alert in order to be the first to claim it.

The concluding example illustrates good silent reading drills using the blackboard. The first grade teacher asked her pupils if they would "like to play the game of having some one do something." Clapping of hands indicated how much it appealed to the children. They came forward one at a time and whispered to the teacher. After she had written on the board each sentence that had been whispered to her, she called on some other pupil to act out what was written. The rest of the children eagerly watched to see if the response was correct. Some of the sentences written were as follows:

Play you are a kitty.
Run like a rabbit.
Play you are milking a cow.

When the children showed the least signs of tiring of the game, the teacher wrote on the board the names of ten children in the class. Turning to the pupils she said, "You are to put a line under the name of the pupil that this applies to." Then she wrote a question on the board. After a short pause she called on a child who answered by drawing a line under the name of the child to whom the question applied. Some of the questions were:

Who has a yellow dress?
Whom do I see with a black ribbon?
Some one has a red and black sweater. Who is it?
I see a girl with very black hair. Who is she?

A third type of drill exercise used by this teacher is illustrated by the action sentences she wrote on the board:

Put a book on the chair. (*Calling on some pupil.*)
Please give a book to Helen, Barbara.

Another type was introduced when the teacher put a list of words on the board, such as *laugh*, *with*, *come*, *run*, *sing*, *to*, *jump*, *play*. She announced that she was going to select several pupils to write on the board all of the words to be found in the list which told "what a boy can do." Three children were selected while the rest watched closely the performance which followed. When each had finished the others discussed the answers.

This variety of exercises included a number of drill elements, but throughout thought-getting was constantly present.

CHAPTER XI

Natural Child Activities in the Classroom

In each of the four preceding chapters, one major type of procedure was defined. Also, the principles to be observed in using each one as an effective means of promoting growth in pupils were presented. Illustrations from natural child activities occurring in classrooms were given to indicate the conditions under which a particular type of procedure may be used and to exemplify how the principles are applied in learning. In every instance, it was apparent that the laws of learning were observed.

At any given time, some one procedure is operative in an activity. It is equally true, however, that total, effective, and economic learning occurs when a variety of procedures are intermingled in a series of normal, natural experiences. In life, particularly in the normal activities of mankind in the business world, we find innumerable illustrations of this fact. For example, a secretary seeking employment is confronted frequently with the problem of deciding upon one of several opportunities available. Having selected that one which seems to be the best, she is exposed to a series of appreciation lessons. She is told what will be expected of her, what responsibilities she is to have, the types of duties that she is to perform, what relationship will devolve upon her, and so forth. Next, she undertakes a series of projects and faces many problems to be solved. Letters of a specific nature have to be written; files are to be organized

and maintained; and other needs of the firm must be encountered and dealt with satisfactorily. She soon encounters experiences which contain new and constantly recurring phases. Certain information peculiar to the business needs to be memorized. Strange words appertaining to the business are frequently used by her employer in his correspondence. A few new types of office machines are in the office. To be an efficient member of the staff, she drills to memorize the vocabulary, to form the new habits, and to acquire the necessary skills. This series of natural activities constitutes an organized program of learning in which the various types of teaching procedure are utilized in securing indispensable growth. As each new situation is encountered, after successfully coping with the last, the secretary turns to that type of procedure which affords her the most economic way of learning and doing.

The natural activities of adult life illustrated by the experiences of the secretary have their counterpart in child activities in a rightly conducted classroom. The purpose of this chapter is to illustrate to the reader how natural child learning may be guided in a classroom through a variety of teaching procedures, the basis of their selection being the economic and effective achievement of desirable outcomes. The solving of problems, the execution of projects, participation in appreciation lessons, and the mastery of drill lessons are woven into a continuous series of real activities in a natural environment wherever child growth is occurring normally.

"But when shall I lead pupils to change to another type of procedure than that which they are following?" the teacher asks. Her problem of selecting procedures is somewhat analogous to that of the carpenter in using correctly his saw, hatchet, chisel, and plane. All are used to cut

wood. In many instances, the same product can be obtained by using any one of the four. However, effectiveness in producing the desired result determines for the carpenter what tool he shall use. If a stake or wedge will produce the desired result, he does not resort to the slow process of shaping the object with his saw. Neither does he use his plane or chisel. Instead he obtains a satisfactory product very quickly with his hatchet. Oftentimes he faces cutting problems that only one type of tool can be used to do. When he is required to fit a rafter into place, or needs a particular width of board, the saw provides him with the most effective way of meeting his needs. If a small square hole has to be cut in a board or a close-fitting joint made, the chisel is used. If a smooth surface is required, the carpenter uses his plane.

In other situations, he needs more than one tool to achieve his ends. For example, a small piece of flooring has to be so shaped that it will fit closely between two other pieces of flooring and be flush with a small projecting tile of the fireplace. The carpenter uses his saw to obtain the right length of board. Then, with his hatchet, he chops off the tongue of the piece which cannot be worked into the groove of the fastened board. He lightly planes the edge to insure a smooth surface essential to a close fit. Finally he chisels a right angle notch in one end of the small board so that it will fit around the projecting corner of tile. Thus all four tools are brought into use before the piece of flooring can be adequately and correctly prepared.

Just as the skilled mechanic selects his tools according to the economic uses and ends sought, so must the teacher select his procedures, materials, and child activities according to the natural interests, normal economic efforts, and important outcomes which characterize socially efficient child growth.

We have seen in previous chapters that activities involving the solving of problems or the execution of projects result primarily in the acquisition of useful knowledge. The information given consists largely of principles, generalizations, concepts, and particular views or conclusions based upon accepted general principles. It was pointed out that the drill lesson develops habits and skills, and other kinds of automatized responses, and that the appreciation lesson most often inculcates in the individual such results as ideals, standards, desirable prejudices, appreciations, and desires. Further recapitulation of the relation of type lessons to outcomes is not necessary here. This reminder will suffice to assist the reader to recall other points.

In addition to the need for a variety of procedures in the course of a series of natural activities, it is essential to the development of a socially efficient person that his experiences lead him into all of the fields in which essential subject matter is to be found. Classroom activities which are marked by wise teacher guidance include experiences in the "three R's," the social studies, natural sciences, manual activities, physical education—in fact, the curriculum of many subjects treated in Part I.

Hence, variety in a unified series of activities (1) requiring the use of the various types of teaching procedures in the interests of effective learning and (2) insuring rounded development through experiences in all of the subjects of the curriculum, characterizes natural child learning. In other words, natural, normal growth of children occurs in natural situations where normal interests lead to purposeful activities. Resourceful teachers guide the interests and efforts of their pupils so that all types of teaching procedures are unified into a continuous series of essential educative and natural experiences. There is, therefore, an over-

lapping of procedures or a subordination of one type or more to a particular type where normal learning conditions are maintained.

For example, if a project is undertaken, minor projects and minor problems arise in the course of its execution; not infrequently appreciation lessons are utilized in connection with it; often the need for developing a skill or forming a habit is discovered in it by the pupils, and drill lessons, motivated accordingly, result. Again, when a large problem needs to be solved, the necessary information is acquired and assimilated by solving many minor problems, executing minor projects, enjoying appreciation lessons, and drilling on commonly recurring responses to needs. In other situations, activities involving problem solving or project execution grow out of interests created by means of an appreciation lesson. Sometimes a project grows out of another project or a problem.

The greater the variety of effective procedures employed, the more interested the pupils become and inevitably the richer will be their experiences. In the course of the year the multiplicity of interwoven procedures will incorporate all of the essential subject matter prescribed for a grade. This presumes that the resourceful teacher is carefully checking up the progress of her class from time to time. Natural activities are permitted to continue as long as they are promoting the normal growth of the pupil. When they cease to do this, other natural activities are brought into use under wise leadership, so that continuous development is maintained.

How natural activities are carried on in a classroom is illustrated in the following examples observed in various grades.

The children of a sixth grade were given the opportunity

of taking complete charge of a school garden plot. The offer was accepted by them, and the project of growing a crop of vegetables to be marketed was undertaken. After writing their letter of thanks to the principal, they entered into a discussion which produced a large number of problems to be solved. One of the first problems was "What shall we raise?" The solution of this problem required an extensive study of the vegetables commonly grown in the neighborhood, an understanding of the nature and productivity of the soil in the school yard, and a knowledge of the right time of planting various vegetables.

Some of the information was obtained by consulting books on gardening. Letters requesting pamphlets were written to florists, state agricultural officers, the agriculture department in the university. Speakers were invited, eagerly listened to and questioned. The supervisor of nature study, a very successful truck gardener, and a professor of agriculture contributed inspiration as well as information. Many letters of thanks had to be written and sent. This first series of activities ended with the decision to raise potatoes, lettuce, and carrots.

"How much of each kind shall we grow?" and "What amount of seeds do we need?" represented the next types of questions to be answered. Consequently, the plot was measured and its area found. The cost of seed was obtained by a committee sent to the florist. The class decided to divide the plot into three sections. In one half of the area, potatoes were to be grown; in one third of the other half, lettuce; and in the remaining sixth, carrots. The following examples of additional problems which grew out of the children's needs are indicative of the information which they had to acquire in meeting them and arriving at conclusions.

1. Should the plot be divided into three long strips, three wide strips or in some other way?

2. What differences in planting each type of crop must be taken into account in planning the division of the plot?

3. What differences in caring for each type need to be considered also?

4. How must each plot be prepared and what effect will the preparation of it have on the arrangement?

5. How can we be assured of a good potato crop, or lettuce crop, or carrot crop?

6. How can we prevent the water from getting from the lettuce patch into the potato patch?

7. What insect pests attack the several vegetables and how can their attacks be prevented?

8. How shall responsibilities be distributed over all of the members of the class?

9. What was the total cost in labor and materials for planting and raising the crops?

10. What was the cost per member of the class?

11. How can the crops be marketed most profitably?

12. What was the total return from the vegetables sold?

13. What was the amount of gain per pupil?

14. What was the per cent of gain on the investment?

15. How can we use the profits wisely?

16. What important needs of the class and of the school can our money meet?

These problems indicate the scope of the project and the inevitably wide variety of experiences growing out of it. In order to solve the problems, many different types of activities were carried on. Some of the problems were solved directly out of the previous experiences of the children. Others involved very extensive learning situations. Under the wise guidance of the teacher, the pupils were led into many educational channels requiring the study of

arithmetic, language, spelling, nature study, civics, and many other subjects of the curriculum.

The executing of projects, exposure to appreciation lessons, and motivated drill exercises constituted a series of activities just as essential to the purposes of the children as the solving of problems. They organized the class into a stock company. Officers were elected and committees chosen. Each pupil, the teacher, and the principal were allowed one share of stock in the company. For his share each person paid the sum of five cents and received a certificate. The cost of undertaking the project was found to exceed the amount thus raised. An additional small amount was borrowed from the school fund to meet the necessary bills incurred. This loan was to be refunded when the crops were sold. Also, interest at five per cent per annum was to be paid to the school fund for the use of the borrowed money. Account books were planned, made and kept. Minutes of the meetings of the "Company" were kept and read. Reports of committees were heard and discussed. Such persons as a student of entomology, a gardener, and a business man addressed the "stockholders." Drills on letter-writing, spelling, decimals, percentage, simple bookkeeping, and the like grew out of the actual needs of the class.

Another sixth grade class obtained very similar experiences in beautifying the kindergarten grounds. This was also true of another class which planned, built, operated, and kept a record of their activities in a model back yard.

The following record of the construction of a floor block house in a kindergarten is illustrative of good teacher guidance of natural child interest and activities into prolonged efforts productive of desirable learning. One child arrived at school shortly after the new school term had begun and

announced his intention of building a house. The teacher discussed it with him and suggested the possibility of getting other children to help him in his undertaking. Immediately, the child sought helpers and collected a small group who expressed a desire to join in the "building."

Soon a group was busily engaged in building a house. The first product consisted of four bare walls enclosing a single room. In it, the group of children "played house" day after day, adding furniture as they found need for it, using dolls for "children," making dishes out of clay, table-covers out of cloth and so on. In time, the one room became equipped as a living-room, bedroom, and kitchen. The "children" slept between pieces of cloth spread on the floor near the kitchen stove and the dining-room table. A piano stood near the pantry shelves.

After this type of activity had continued for more than a week, the teacher called this group of children and the other members of the kindergarten together. A serious discussion and criticism of the playhouse followed. This proved to be a valuable appreciation lesson upon the home and its use. The purpose of the various rooms, their appropriate furniture, their decorations and their essential conveniences were unfolded. The desire to build a "bigger and better house" grew out of this tactful guidance and discussion. Also, a much larger group became interested in the second undertaking. Practically all of the children were ready for the activity.

The one-room house was demolished and the materials put away. The pupils went home that noon with the intention of finding out just what rooms they would need to have and what furniture belonged in each. The next day the new activity was entered into in earnest.

It required weeks of coöperative effort by groups of chil-

dren to erect the new playhouse and to furnish it. This large project required of the pupils the solution of many problems and the execution of many projects. Need for drill became very evident also. First, there was the planning of a living-room, a bedroom, and a kitchen. Every kind of material which the children obtained proved adaptable to some purpose. In the living-room chairs, a table, a davenport and a piano were constructed of blocks; a vase was made of clay, and painted, and fresh flowers were kept in it; paper window-shades, a table-cover, and pictures were made; pieces of cloth were made into cushions, curtains and rugs. Similar materials were used to furnish the bedroom with beds, chairs, tables, dressers, covers, runners, curtains, rugs, and shades. The kitchen floor was covered with paper, upon which a simple square design had been crayoned to represent linoleum. Furniture was constructed out of wooden blocks; dishes and kitchen utensils were modeled in clay.

Many interesting problems arose in the course of constructing and furnishing the house. For example, the plan of the house had to be determined. "What room should be in the front of a house and what one in the rear? Why?" Also, "How different should the curtains be in different rooms?" The differences of the various rooms had to be discussed in the light of this problem. The conclusions reached led to a satisfactory plan of draping the windows. White curtains with blue overdrapes were cut out, sewed and hung in the living-room; white curtains trimmed with blue, in the bedroom; and plain blue ones, in the kitchen. The hanging of the shades raised the problem of why we should have large open windows in the sleeping-room.

When the house was completely furnished, front and rear yards were added, porches built and walks laid. Trees,

plants, and a lawn sprang up in front of the house. A truck garden and a chicken yard were constructed in the rear.

For many weeks, the house and its yards were used as a play center. Many of the activities of the family were enacted, such as giving a dinner, receiving visitors, holding a birthday party for the "children," decorating for Halloween and gathering vegetables. Once a week the house was thoroughly cleaned and put in order. The work of various members of the family and of the community were imitated. The teacher guided the children in their dramatizations so that the best in home and community life was experienced.

During this time need was felt for counting, careful paper cutting, drawing and other activities requiring drill exercises for improvement. Songs about the home and family life were learned and poems memorized. Such stories as "The Three Pigs" and "Brownies at Home" were told or read to the children. Pictures of fine homes and rooms were collected and a scrapbook entitled "Good Homes" made. The interest of the children did not wane until preparations for the Thanksgiving holidays were begun.

The pupils of a third grade had undertaken the study of many lands by gathering the information for a scrapbook which they were writing and illustrating. It was given the title, "How Children Live and Play in Many Lands." Each chapter of the book represented a country. In reality it became the material evidence that the class had solved a series of problems about each country; e. g., "How is the life of the Italian people affected by its geographical features?" The class program had been followed to a point where the Asiatic countries and those of southern Europe had been studied. The last chapter completed was entitled "French Boys and Girls at Home."

An invitation to a traveler recently returned from Holland had resulted in a fascinating account of how Dutch children worked and played. The following day the pupils listened to the teacher read the story of the heroic boy who checked the leak in the dike. "Hans Brinker" was read during the story hour. These appreciation lessons preceded the raising of the problem: "Why are Dutch children so brave, independent, thrifty, clean, and kind to strangers?" The information sought would also help to solve the problem: "What are the geographical influences which affect the life of the Dutch people?"

Many books on Holland were read, geography textbooks consulted and maps studied. The pupils reproduced in the sandtable a scene showing the dikes and lowlands, the canals and ditches, the truck gardens and dairies, and so on. "The Dutch Twins" was read and dramatized. In a variety of ways the pupils obtained and assimilated the information essential to solving their problem. About the time that they had completed the chapter in their scrapbook, "Chapter VIII—Hans and Katrinka of Holland," they were ready to solve their problem. They had acquired such information as follows:

1. The sea affects the lives of the people.
   a. It provides Holland with cheap and easy transportation.
   b. The steady winds from it aid manufacturing.
   c. The continual struggle to maintain the dikes has influenced the character of the Dutch people.
2. The many canals form a network of waterways.
   a. Transportation and communication is afforded by them.
   b. Irrigation is practicable and economical.
3. The soil has been very rich.

a. Farming is carried on in small units.
b. Grazing is also an agricultural pursuit.

4. Holland is very thickly populated.
   a. Hand labor is available.
   b. Many skillful trades have been developed.

When this data had been organized the pupils drew a correct conclusion to their original problem.

The fourth example is illustrative of how one type of procedure grows out of another when a teacher directs children's activities so that they are purposeful experiences. An elementary school was equipped with a library of many books. The children were anxious to get into it, but teachers and principal agreed that the situation should be utilized as an educational opportunity.

A series of appreciation lessons was planned and carried out, motivated for the sixth grade pupils by the thought that they could learn to manage the library for the school. The principal spoke to the class on "Right Conduct in a Public Library," concluding his talk by leading the class to discuss the subject. The class invited the librarian of the children's department of the public library to speak to them on phases of library work which would help them in their purposeful undertaking. The head librarian spoke to the class also, concerning the technical phases of library work.

Problems to solve and projects to execute were listed and a program of procedure developed. The children worked out a simple decimal system for classifying the books. The duties of a librarian were listed, and a schedule of library assignments planned to include every sixth grade pupil several times during the term. Some of the problems which would require solution were: (1) "What pupils in the school should be permitted to use the library?" (2) "What regulations are needed to govern the right use of the library?" (3)

"How can we protect the books against misuse?" To discuss these problems, a meeting of the school was called and various sixth grade pupils presented the problems and led the discussion of them.

After the meeting, rules for the library were discussed in class again and sets of rules drawn up. These were submitted to the other classes in the building who in turn reported back their criticisms and recommendations. When an acceptable draft was finally compiled, another school assembly was called. The rules were read, explained, discussed, and then adopted. They were as follows:

Rules for the Library

Rule 1. The library will be open from 8.30 until 3.30 every school day.

Rule 2. The library is for every child in the school who wants to use it.

Rule 3. Each child may have two cards, one for non-fiction and one for fiction.

Rule 4. There will be a librarian from the sixth grade who will help any child to find books. This librarian will also keep the library in order and see that all rules are obeyed.

Rule 5. There must be perfect silence in the library. If anyone makes unnecessary noise, he will not be allowed to use the library for two weeks. If he keeps on being noisy, he may not come into the library for the rest of the term.

Rule 6. Books may be kept for two weeks. If they are kept longer, a fine of one cent a day must be paid.

Rule 7. If books are soiled or torn, a fine of ten cents must be paid.

Rule 8. All books lost or defaced must be paid for.

The reader can surmise readily the number of problems which arose after the library was opened. Many meetings were held, letters written, books kept in repair, disciplinary

cases dealt with, and a system of keeping track of the books devised. The weaknesses of this system resulted in a series of activities. The original plan projected by the sixth grade pupils for keeping track of books taken out failed. The causes of its failure were listed, and ways of eliminating the weaknesses discussed. A new system was devised and explained to the other pupils in the school. Other weaknesses were discovered and a third system developed and put into operation. Each revision resulted in meaningful language experiences and purposeful drill in penmanship, as well as civic activities and the like.

In the above illustrations it is obvious that the teachers are subconsciously answering such questions as listed below.

1. Does the activity provide for natural interests and purposes on the part of the pupils?
2. Have the experiences fundamental educative values?
3. Is the natural interest of children being sustained?
4. Is the particular type of procedure being followed at present providing for economic and effective learning?
5. Into what new channels for introducing new functional subject matter can the pupils' activities be guided?
6. How can the environment of the classroom be improved so as to provide for greater enrichment and enlargement of experiences?

These and similar questions will be treated in greater detail in Part III, which deals with how to maintain efficient learning conditions.

PART III

THE ORGANIZATION OF CLASSROOM PROCEDURE IN ACCORDANCE WITH MODERN METHODS

CHAPTER XII

Planning the Work

In Part I, the authors have developed the educational elements in the background of classroom procedure essential to a clear understanding of the objectives, functions, and outcomes of teaching in the modern school. Part II contains an analysis of several teaching procedures, and of the principles of learning underlying each type of procedure together with an adaptation of each procedure and its related principles of learning, in the classroom, to the normal interests and activities of children, showing in this way how learning takes place as a normal, natural, functional process. In Part III, the concluding division of this book, there are presented various aids to teachers in organizing and directing child learning so as to insure economy of time and effort of all concerned.

The subjects treated in the chapters of Part III are arranged in the order that experience usually brings them to the teacher in the course of a year's work. As the beginning of a semester or a new school year approaches, the teacher must turn his attention to planning the work, first *for*, and secondly, *with* his class. This planning must provide for the continuity of growth of the individuals and of the group. Next, he must consider the organization of his program to insure a fair distribution of time in the interest of a well-rounded development of the pupils. Then, from

time to time, he must (*a*) plan assignments for and with the pupils, (*b*) train them to study effectively, (*c*) guide and stimulate them through questionings, and (*d*) plan reviews which will unify and establish relationships between the experiences and materials. At certain times he will have occasion to use visual aids and also scientific tests. These two practical aids to the educational process are presented in the last two chapters.

Upon an assignment to a new class, in beginning a new term's work, or in introducing some new unit of subject matter, the teacher has to make definite plans. How can this be done so that his teaching may become most effective? What important factors and elements enter into such plans? How can they be put into practice? These questions are typical of the many which arise and call for an answer at this time. There is a reason for such thoughtful queries on the part of the teacher. A not inconsiderable measure of his success during the new period of pupil learning will be due to the carefulness and soundness of the preliminary planning.

The many problems related to lesson-planning by the teacher fall into four large divisions. Each of these deals with an essential step in the efficient planning of the work. The four important steps are as follows:

1. The teacher should acquire a thorough knowledge of the prominent factors, elements, and differences which enter into the nature and characteristics of the individual pupil, and of the class, and which indicate the degree of readiness for the educational experiences involved in the new work.

2. He should determine the essential subject matter to be utilized in the new experiences, so that the outcomes essential to the desirable development of the pupils will be achieved.

3. He should make preliminary plans for using various

normal procedures, or natural activities, which might be employed in the classroom in order to provide the experiences necessary for effective growth.

4. He should consult with the class and plan coöperatively with it the activity or activities to be pursued.

The remainder of this chapter will expand each of these four points, employing actual illustrations to show how teachers have used such a program with profitable results.

1. In preparing to work with a class, considerably more is necessary than learning the names of the pupils, ascertaining their promotional status, determining their ages, and writing down their addresses. Every class is a unique cross-section of our exceedingly complex American life. The teacher who has made the greatest success of his work has recognized this fact and, therefore, has faced each class realizing that it provided a truly new experience.

The teacher must learn what his pupils need, what resources they have upon which he can draw in meeting these needs, what handicaps he must help them to overcome, what rate of progress he can expect of each individual, and what types of enrichment seem to be needed. This knowledge can be acquired by taking stock of (1) the community, especially as it is represented in the class, (2) the parents and homes of the children, and (3) the children themselves. The totality of data thus accumulated will indicate any marked differences or likenesses in the group.

Many teachers have been prone to overlook very significant factors about the communities in which their pupils live—factors which are exerting a powerful influence in the children's lives, and are creating dominant educational needs. Table I on the following page contains a few of the variable elements illustrative of some significant community differences.

TABLE I

SOME DATA WITH RESPECT TO THREE SCHOOL COMMUNITIES IN THE SAME CITY, INDICATIVE OF THE WIDE VARIATIONS TO BE FOUND

FACTORS	PERCENTAGE DISTRIBUTIONS IN EACH COMMUNITY		
	A	B	C
Nativity of Parents			
Born in the State	31	15	12
Born in Other States	52	38	19
Born in Other Countries	17	47	69
In British Empire	7	3	4
In Latin Countries	3	8	21
In Germanic Countries	4	11	6
In Scandinavian Countries	1	10	2
In Slavic Countries		6	32
In Oriental Countries	1	7	1
Miscellaneous	1	2	3
Race			
White	97	66	92
Black	2	27	7
Yellow	1	7	1
Citizenship Status			
American born	83	53	31
Naturalized	14	16	11
Non-naturalized	3	31	58
Occupations of Fathers			
Agriculture	2		1
Clerical occupations	9	15	11
Domestic and personal service	3	11	17
Extraction of minerals	1		
Manufacturing and mechanical indus.	12	49	44
Professional service	34	4	1
Public service	3	1	3
Transportation	4	13	15
Trade	32	7	8

School communities A, B and C were selected at random from the same city. One needs but stop and think of some general characteristics of a semi-urban, or of a rural community to realize other great differences not represented in the three vastly unlike communities presented in this table.

Geographical factors, traditions, and the like, inevitably introduce new problems in planning the work. A brief analysis of the illustrations will suffice, however, to indicate how the teacher should proceed.

On the basis of this data alone it is obvious that three teachers assigned to fifth grade classes in the three respective communities' schools would have to make very different plans. Teacher A has to plan for pupils who come from distinctly American homes occupied primarily by native-born, English-speaking people of the white race. This decidedly American community is the residence district for well educated and highly successful professional or business men. The atmosphere of their homes is one of refinement and culture. Many books and magazines comprise an important part of the supplementary educational material available to these children. The families are small. The parental aim for the future of these children includes the highest type of elementary and secondary education, as well as the further advantages of university training.

Teacher C, on the other hand, planning for pupils who have reached the same school grade, must take into account very different factors. The pupils come from the homes of the foreign born. The parents are mainly non-naturalized Italians, Portuguese, and Slavs, who live among peoples of their native countries, speak their native languages and live according to their native customs and traditions. Most of the fathers are employed as unskilled laborers. Many of the mothers are also working. Very little, if any, good literature or Americanizing material finds its way into their homes. The families are large and the educational opportunities of most of the children are confined to a few years in school. Not infrequently, these parents try to take their

children from school so that they may work and contribute to the support of the home.

The pupil common to Teacher A is the uniquely exceptional one in Teacher C's school, and vice versa. The general backgrounds, interests, views on life, needs, problems and aspirations differ vastly. A course of study can only serve as the point of departure in the teaching of each of these two groups. All that can be considered in common consists of a core of minimal essentials and some similar types of child interests and activities, around which vastly different programs must be constructed.

Teacher B has a more difficult program to construct, perhaps, because of the greater complexity of the community she serves. Her pupils come from city homes of almost every description. The pupils are descendants of different races, and of peoples from many lands. The adults have diversified citizenship interests, different industrial points of view, and a precarious financial outlook. In addition to the few parents representing each extreme in home conditions, there is a larger group of skilled mechanics, small store owners, and business executives. This group is in itself complex, educationally and otherwise.

Each of these teachers, then, must make very different plans for a term's work in the same school grade, solely because of the marked differences in these three communities in the existing influences, interests, activities, and possibilities, all of which are reflected in the lives of the children. Much that has been indicated concerning the factors of community differences applies to the effect of the homes and the parents on the teacher's program. Of course, the problem here is largely that of discovering the individual differences in a class which result from home conditions. A study of the parents unfolds to the teacher a basis for

understanding the interests, attitudes, pleasures, activities, and educational development of the individual children in a class. One illustration will serve to indicate the value of utilizing the information which can be obtained about the home and the parent.

In the class located in Community B, one pupil is the son of a university graduate and successful attorney. The boy's mother also graduated from a college. Every comfort that one might want is to be found in this home. There is a very large collection of books to which new publications are frequently added. One professional magazine, one dealing with home economics, one scientific journal, and several literary journals are received regularly. Both father and son collect stamps as a hobby. All three persons in the home are good musicians. Very expensive and well selected paintings adorn the walls of the various rooms.

Another pupil in the same class is the son of a bookkeeper. The father completed two years of a commercial course in high school and later, while working in an office, attended night school in a business college to study bookkeeping. The child's mother is a high school graduate. Their modest home contained the essential furnishings and nothing more. Because of the child's interest in reading, the one magazine subscribed for was a well-known boys' magazine. The library in the house consisted of books which had been received as birthday or Christmas presents.

The families of both of these boys were American born. But even though their parents happened to have common religious affiliations, political party interests, and fraternal memberships, the educational needs of the two boys differed widely.

Suppose the subject of science and the materials dealing with it were being planned. The teacher would have to

supply learning opportunities in the case of the latter boy which were already enjoyed by the former. At the same time she would have to find ways of enriching still further the learning of the more fortunate pupil. Different reading material constitutes one of the points of variation for these individuals. This is only one of many similar problems of meeting the needs of individuals from different homes. Doubtless many others will occur to the reader.

In addition to the differences due to the influence of dissimilar communities and homes, there are differences due simply to the nature of the individual pupils. Not infrequently twins vary widely in intelligence, in interests, in rate of progress in school, and in physiological development. How much greater will be the differences in pupils from different families, although the children may be in the same grade in school.

The table showing the strongest and weakest sections of a class, presented in the chapter on the subject of scientific tests, illustrates clearly the fact that each pupil is a unique individual. Another illustration of this point is to be noted in the various items of the table on the following page.

An inspection of this table will readily disclose how vastly different the three children are, in spite of the fact that all are to begin seventh grade work at the same time and, presumably, in the same class. Nevertheless, if each pupil is to learn effectively, differences in terms of their individual needs in the various subjects must be provided for, if possible, in the teacher's program. Further evidence of the necessity for so dealing with every class need not be included here. It is sufficient to note in passing that the same, or even greater, variation exists in nearly every class and grade, and needs to be taken into account.

2. What a very complex situation! Still it is possible

TABLE II

DATA CONCERNING THREE PUPILS IN THE SAME CLASS RECOMMENDED FOR PROMOTION TO THE SEVENTH GRADE

Data About Each Pupil	Pupils Recommended for Promotion		
	A	*B*	*C*
Sex	Female	Female	Female
Chronological age	12–1	11–5	9–9
Previous progress	Slow	Rapid	Very rapid
Age-grade status	Over age	At age	Under age
Mental age	11–3	13–7	15–10
Intelligence quotient	88	120	162
Intelligence classification	Dullness	Superior	Genius
Educational Achievement:			
Woody-McCall arith. score	22	32	25
Woody-McCall arith. age	11–2	14–4	12–1
Woody-McCall arith. quotient	87	126	124
Arithmetic accomp. quotient	96	105	76
Morgan-Ayres spelling age	9–7	13–2	14–1
Morgan-Ayres spelling quotient	75	115	144
Spelling accomp. quotient	82	91	89
Wilson language errors, Total score of *A*, *B*, *C*	49	62	72
Stanford Achievement Test:			
Paragraph meaning score	54	78	104
Sentence meaning score	28	74	76
Word meaning score	35	55	70
Total reading score	117	207	250
Computation score	80	120	128
Reasoning score	56	104	108
Arithmetic score	136	224	236
Science score	26	51.5	71
History and lit. score	8	68.5	61.5
Language usage score	17	38	52
Spelling dictation	96	152	172
Composite achievement	40	74.1	84.3
Composite achievement age	11–2	14–10	16–2

to plan a program adapted to it. By means of a series of studies, which do not require a very great time to make, the teacher is able to determine what experiences these pupils have in common. The course of study for the previous grade will indicate this in a general way. What the new experiences shall involve includes the essentials set

forth in the course of study for the present grade, together with the essentials of previous grades in which these pupils as individuals or comparable groups have been found lacking. This information will indicate to the teacher what general outcomes and standards she should seek to achieve. But departures must be made from the course of study in terms of individual needs and even of class needs, in order that each child may continue to grow in an all-around way. Having completed this phase of planning his work, the teacher is able to undertake the third step.

3. The third step in planning the work consists of thinking through various types of child activities which might be utilized as a means of affording the pupils such experiences in the classroom that the desired learning will occur. Natural child activities involving normal child interests must form the basis of every learning process. When these are combined with the essential subject matter into a series of experiences, learning in the classroom will be effectively achieved. The various chapters in Part II contain so many illustrations of these types of activities that repetition here is not necessary. When tentative plans of how the children might like to undertake the study of the subject matter—by solving problems or executing projects or the like—have been made, the third step will have been completed.

4. The teacher is now ready to undertake the fourth and final step in planning the work. This is an activity in which the pupils have a definite part. In determining the plan of work to be followed, especially in the upper elementary grades, teacher and pupils should discuss the actual needs to be met. The children should understand their own strength and their own weaknesses in order to appreciate their individual needs. The average child is interested in his own progress. He gains the greatest satisfaction out of

success. His interests and ambitions enter into many of his activities outside of school and they should find a place also in the classroom.

The plan of work must therefore include the subject matter which each individual needs to study, and also that which the class as a whole must learn. In addition, the group must agree upon some activity, or activities, which will afford the experiences in which the children express a desire to engage, and which at the same time can be directed by the teacher into the channels of learning he has determined upon as essential to growth. It is a safe rule to follow the most popular bent of the pupils, if their proposal has sufficient elements in common with any one of the tentative activities thought of by the teacher previous to meeting the class.

A principle discussed at length in the various chapters on procedure needs to be recalled and applied to the planning of the work. The activity which is to be employed in the classroom must be one which the children will undertake readily and with enthusiasm. Therefore, it must be one which they have suggested, or one which the teacher has suggested and they have agreed to adopt as their own. Only when one of these two situations has been developed will adequate motivation be present.

The length of time and the amount of energy required in planning the work are not so great as they may appear to be from the foregoing explanation of the procedure. Even if they were much greater, the resulting economy of time and effort for both teacher and pupil during the ensuing term would justify the careful planning. One of the major sources of the difficulties in which teachers frequently find themselves has its inception in the inadequacy of preliminary planning. Thoughtful planning makes possible the

sound teaching of the children through carefully selected and evaluated activities. Some illustrations of how plans have been developed by teachers in various grades will now be given.

A teacher of a sixth grade located in a city community not so highly select as Community A and yet decidedly American in complexion and interests, carefully followed the steps already discussed in planning a term's work. Some of the factors she noted about her class will serve to illustrate how she developed the plan to be followed. Although the community was decidedly native American, there was a sufficiently large number of foreign born whites, some of whom were not naturalized, and were in need of specific attention from the point of view of Americanization. Some few children from these latter types of families were in her class. The occupations of the fathers were varied, and the range of the children's interests was consequently wide. The individual pupils presented variability even greater than that apparent in the three cases presented in Table II. Among the subjects which these pupils had studied previously, in the fifth grade especially, were: elementary history of the United States; the geography of North and South America; spelling of words selected from the Ayres' List; composition, involving paragraphing and the simple connected story; and the reading of several school readers and a number of biographies.

According to the course of study for the sixth grade, the class was to study the background of early American history. In geography, the continents in the Old World were to be studied, with special stress on Europe. In spelling, a minimal list of words was prescribed, most of which were in the Ayres' List. The boys were to begin their second year of manual training, and the girls their second year of

home economics. The same general type of language work as was done in the fifth grade was to be continued in the sixth grade.

The teacher decided that a large part of the subject matter of the various subjects could be developed in a scrapbook, to be prepared and kept by each child, and that a floor map of the Mediterranean region could be worked out. Writing and presenting a series of historical and geographical plays would offer a third type of work. With these tentative plans in mind, she took up the further planning of the work with the class. After a discussion of the needs of the pupils, and an understanding of what they should learn in order to complete the work prescribed, she asked them how they would like to carry on the new term's work. It soon became very evident that what these pupils wished to do most of all was to write and present a pageant. This they decided to call "Progress."

Then definite planning began. "After much discussion and study," reported the teacher, "it was decided that this pageant should comprise the following: (1) Dialogue (Dramatization), (2) Costumes, (3) Stage scenery, (4) Music, (5) Dancing."

As the pupils studied the various subjects, they developed the pageant. This meant planning the work in manual training, home economics, art, history, geography, language, and reading so that these subjects would contribute to the activity constituting the major interest of the class. Need for spelling, penmanship and other drills grew out of the work. Some of these needs were specific ones determined for certain individuals, while others were found to represent difficulties which most of the class had to overcome.

The evidence of the success resulting from careful planning is found in the teacher's report:

The whole project grew into a much bigger piece of work than was ever intended at its inception. From time to time new ideas were introduced and new departures from the original plan were attempted. Instead of being completed in one term, a whole year was required to finish the entire pageant. . . . It is my sincere conviction that they (the pupils) never could have gained the knowledge that they did with greater appreciation or enthusiasm.

"The Progress of Civilization," as the pageant was called, finally was presented to several audiences because of the general community interest that it had aroused.

Sometimes a teacher may find that her tentative planning will have to be modified considerably more than the sixth grade teacher just cited had to modify hers. A case in point was that of a second grade teacher who had planned that the term's work should consist of a study of primitive child life through a series of dramatizations or similar activities. When she was ready to discuss the plans with her class, she was surprised to find the children uninterested. One of her former pupils had recently transferred to a city across the continent. Before leaving he had told the class about his proposed trip through the Panama Canal. Because of this the interest that had been aroused in the class centered around traveling. After much discussion the teacher found her class "set" on taking an imaginary trip. After all, the purpose of studying primitive child life is to contribute to a better understanding and appreciation of home and family life. Would not an imaginary trip to the homes of children in foreign lands serve this same purpose? The teacher decided that it would, and so plans were made for taking the imaginary trip. The planning and resulting activities involved valuable educational experiences in reading, language, spelling, art, music, nature study, arithmetic,

folk-dancing, civics, and the geography centering around child life in many lands. Many minor plans grew out of the major one. Some of these were: planning a series of geography booklets, planning a number of sandtable representations, and planning a world's fair.

The same geographical subject matter was used by a third grade teacher as a core in planning similar work. She discussed with her class what this second grade class was attempting to undertake. After several days had elapsed, she again raised the subject. This time she found her class well informed of what the second grade pupils were doing. Not only was there an enthusiastic desire on the part of the third grade pupils to begin similar activities, but they were ready with a wealth of new ideas for undertaking the activity.

How a fourth grade teacher developed with her class a plan for studying nature study by utilizing a nearby park illustrates how a resourceful teacher plans extensively and then takes advantage of opportunities as they arise. Among a series of tentative plans which she had made for various fourth grade classes in the school, she had always listed this particular type of study, with such suggestive ways of carrying it out as reproducing the park in miniature in the sandbox, making a paper drawing of the park on which was to be located the various trees, plants and the like, and writing a booklet entitled, "What We Have in Our Park."

Soon after the opening of a certain school, the principal received a communication from the park commission deploring the way in which the pupils in the neighborhood had misused the park and playground. The same communication had been sent to all the other schools. The fourth grade teacher obtained the letter from the principal and asked one of the pupils in her class to read the com-

munication to the others. Then followed a discussion which, to her surprise, culminated in a suggestion that the class form itself into a "Junior Park Commission" to assume responsibility for striving to improve conditions at the neighboring park. This was agreed upon. The resulting plans involved a series of activities that included and went far beyond all of the subject matter that the teacher had long hoped to incorporate into a similar class activity.

CHAPTER XIII

The School Program

In connection with planning the work of a school, which was discussed in the preceding chapter, the teacher faces also the problem of determining the relative amount of time which should be devoted to each of the various subjects—one of many factors which enters into the making of a school program. First of all the teacher must determine in the plan of work what would seem to be a reasonable amount of subject matter to be treated during a term. Then provision must be made in the program for each of the subjects of varying relative importance among which the subject matter is distributed. Furthermore, some subjects which are considered of approximately equal educational value, require varying amounts of time for mastery because of their very nature. In such instances the factor of relative difficulty is prominent, and in addition the nature of the class, its strength and weaknesses, collectively and individually, increases the necessity for a careful and specific distribution of time.

On the other hand, there is a fixed limit to the total amount of time available. The school term consists of a definite number of days, each of which contains a definite number of hours during which the teacher may work with his class. Within the time limits thus rigidly set, the distribution of time for each subject must be made. The making of the school program, therefore, must proceed simul-

taneously along two lines. In other words, the problem of program making assumes a twofold aspect and its solution must be in terms of both. The time allotment of all subject matter to be included must be planned in the light of what is to be accomplished during the term or in some other fixed amount of time, and at the same time a daily schedule must be organized, so that economic procedure will be assured. Of course, each of these two types of schedule needs to be modified from time to time according to the variations in progress by the class and by individual pupils.

Courses of study ordinarily offer some guidance to teachers in the matter of planning a program for accomplishing the term's work. In modern school systems, teachers are aware, of course, that the suggested distribution of time is for guidance only. Variations must be made in terms of particular situations. No class ever presents the average situation which such time allotments are planned to meet.

The reader can readily appreciate this fact from the evidence accumulated by Holmes in his study of the programs of representative cities.[1] The data disclosed that the distribution of time for the various subjects, throughout the country has not been determined with any degree of reliability. Extreme variations were very marked. For example, he found that the weekly time allotment for third grade music varied from 15 minutes to 75 minutes, and, more startling than this, that the weekly allotment for second grade reading varied from 120 minutes to 374 minutes.

What standard is the teacher to follow in the distribution of time among the various school subjects if such marked

[1] Holmes, H. W., "Time Distributions by Subjects and by Grades in Representative Cities." *Fourteenth Yearbook of the National Society for the Study of Education*, chap. ii.

variations occur in different systems? It is true that if at a particular time, say the present school year, the average of a fairly large number of representative programs were obtained, the effect of such extremes as might occur would be modified considerably. The average of a large number of distributions in the allotment of time may be assumed to be a reliable guide. Such a program can be derived from the investigations of Holmes. Table III contains the dis-

TABLE III

AVERAGE DISTRIBUTION OF TIME BY SUBJECTS AND BY GRADES FOR FIFTY REPRESENTATIVE CITIES[1]

Minutes per Week Devoted to	GRADES							
	I	II	III	IV	V	VI	VII	VIII
Opening Exercises	59	59	59	54	49	48	48	48
Reading	412	364	291	237	195	181	151	150
Language	116	122	145	164	179	182	207	220
Spelling	83	102	113	103	94	90	81	79
Penmanship	77	93	81	82	77	73	60	57
Arithmetic	93	149	203	231	223	226	217	220
Geography	25	11	77	128	157	166	151	118
History	42	48	54	88	103	110	141	181
Science	57	63	62	57	53	62	70	88
Drawing	151	84	87	82	77	77	77	76
Music	70	130	73	74	70	70	70	76
Manual training	65	73	62	70	77	88	112	115
Physical training	71	63	62	62	59	62	59	60
Recess	135	128	128	119	113	108	102	102
Miscellaneous	118	98	135	119	122	122	102	135

[1] See similar tables in J. B. Sears, *Classroom Organization and Control* (Houghton Mifflin), p. 163; and Strayer, G. D., and Engelhardt, N. L., *The Classroom Teacher* (American Book Co.), p. 215.

tribution of time by subjects and by grades so derived. The averages, therefore, are conservative guides, representing central tendencies in the allotment of time.

It is evident, as this investigator pointed out in his conclusions, that the older traditional subjects "still have the

TABLE IV

Berkeley Public Schools Weekly Time Allotment for the Elementary School Subjects

Minutes per Week Devoted to	Grades[1]					
	I	II	III	IV	V	VI
Opening Exercises	(Included under *Miscellaneous*)					
Reading	275; 250	200	200	200	150	120
Language	125	125	150	185	180	180
Spelling	25	50	75	75	60	60
Penmanship	75	60	60	60	60	60
Arithmetic	—	(60)[2]	200	200	200	200
Geography	—	—	60	90	125	150
History and Civics	50	50	65	75	100	100
Science	75	75	75	50	40	40
Drawing	125	90	90	90	90	90
Music	75	90	90	90	90	90
Manual Training[3]	60	60	60	60	90	90
Physical Training	100	100	100	100	100	100
Hygiene	25	25	25	50	40	45
Recess	100	100	150	150	150	150
Phonics	50	50	50	—	—	—
Miscellaneous	65	65	50	25	25	25

[1] Two numbers under one grade indicate different allotments for the low and high divisions of that grade.

[2] Where class has definite need for specific study and drill in arithmetic, the above approximate time is to be found by revision of the allotments.

[3] Domestic Science for the girls in the fourth, fifth and sixth grades.

lion's share of attention." He found, also, that the greatest variations in time allotments occurred in these subjects.

This study was made in 1914. Since that time marked changes have been introduced into the field of elementary education, owing to the scientific determination of what to teach, where to teach it, and how to teach it. The recent changes in the programs of many progressive elementary school systems would now modify considerably the averages presented in Table III. One of the most outstanding progressive, modernized school systems, in planning its new courses of study to include the accepted results in educational investigations, thinking, and practice, modified these averages as indicated in Table IV. In all probability, this program is one of the best guides for a teacher to follow, when conducting his work according to the procedures presented in this book.

A comparison of the distributions of time in the two tables will disclose to what extent the total allotment has been reduced in some subjects and how the time thus gained has been redistributed among the others. This modification was due to the fact that natural activities of children were to form the basis of learning in the classrooms. Hence, subject matter was given emphasis according to the place it had in these activities, and to its functional values in life situations. This type of program, too, was planned to meet such school conditions as (1) three teachers per grade, (2) two teachers per grade, (3) one teacher per grade and (4) two teachers for six grades, as the classroom situations varied from large urban to rural school types.

After the new time allotment had been tested in practice for approximately two years, the teachers in many instances departed from it. Not infrequently these variations in the time schedule were due to the teacher's understanding of

her particular problem and her ability to make the modifications necessary to meet it. One illustration will serve to indicate the desirability of such a procedure after careful study of the specific situation.

A sixth grade teacher in one of the schools was following a program which contained several marked deviations from the general one. For instance, she was allotting thirty minutes less per week to arithmetic and twenty-five minutes more per week to reading. These variations, she explained, were made to meet the essential needs of her class. By the application of intelligence tests she had found her class to consist very largely of pupils of very superior mentality; there were also a small number of normal intelligence and two who were slightly below normal.

At the close of the previous term, the results in a standardized arithmetic test had showed that almost all pupils were achieving up to capacity. Their mastery of fractions was exceptionally good. Hence, practice exercises at intervals, together with problems raised in the classroom, were the only continued experiences necessary for desirable future growth in arithmetic. With the exception of a small group, the same condition existed with respect to reading achievements.

After the pupils had entered into their new activity—the project of determining a satisfactory budget for a family of five—their earnest attack on the drill work in decimals and percentage had produced such a facility in this work that effective arithmetic learning was accomplished in less allotted time than was generally provided and required.

On the other hand, although books were plentiful in the children's homes, the types of books holding the place of prominence in these homes were not very desirable from the point of view of style and content. The influence of these

books upon the tastes of the children had become so marked that the teacher felt something needed to be done to counteract it. Therefore, she took most of the time saved from arithmetic and allotted it to reading. With the increased time of the reading period, she planned to direct the pupils' selection of reading material from a library coöperatively built up in the classroom. Having adequate time to supervise this reading, she was developing their literary tastes.

When it was pointed out to her that a time would probably come when this extra time would not be needed any longer for reading and, at the same time, would not be required for the arithmetic work, she replied that she expected that condition to exist soon. In fact, she hoped that such a situation would arise very soon, because she wanted to transfer the extra time allotment to the language period. She felt certain that in their compositions her pupils were not expressing themselves in keeping with their ability, even when writing upon subjects of real interest to them. Extra time upon this work would enable her to secure the desired language improvement in her pupils.

When the teacher has completed his time distribution by subjects, he is ready to undertake the second phase of program making—the daily schedule. Before this can be organized with any degree of satisfaction, certain factors in the interest of economy of time and effort must be investigated by him. Inevitably, they center around the needs of the pupils. Almost all of the factors may be grouped under three general problems, as follows:

(1) What provisions must be made for effectively organizing into a program the study, recitation, and recreation time of the pupils?

(2) In what order shall the various subjects be presented so as to provide for most efficient learning?

(3) How shall the program be organized so as to provide adequately for both individual and class needs, interests, and capacities?

The solution of any one of the three problems cannot safely be made off-hand by the teacher, and yet this is what occurs very frequently. Hence, at the end of a school day, many teachers complain of being "worn out." This condition can be largely avoided by properly solving the problems fundamental to daily program making.

In organizing the daily classroom activities, it is well to keep in mind the fact that there must be variety even in unity. Although the greater part of a school day is devoted to pupil activities which contribute to the solution of some large problem or to the execution of some large project, continuous work upon it without change is fatiguing. On the other hand, too long a period of play will result in an idle waste of time. Therefore, play, study, and recitations must be alternated in a program so as to avoid fatigue, procrastination, and monotony.

In turn, each of these classroom means of development must be considered with respect to its nature, functions, and usages. These aspects of the study period have already been discussed and therefore do not concern us now. One point, however, should be kept in mind very conspicuously in program making. Whenever possible, study periods should occur in the schedule at such times as teachers are free at least in part to supervise the pupils thus engaged. Otherwise, studying may result in a very considerable waste of time. In the chapters on the assignment, on the planning of the work, and on questioning in particular, much has been said about the recitation. But some supplementary points should be considered which apply more directly to our present problem. Teachers are prone to provide too

much time for recitations at the expense of thoughtful study and work, self-effort, and reasoning on the part of the pupils. Recitations are generally either too numerous or too long. They result in much talking by the teacher, and little independent initiative by the child. Many easily avoided disciplinary problems arise out of these situations.

The recreational periods, especially the recesses, should occur frequently enough to eliminate fatigue from the classroom efforts of both teachers and pupils. However, the intervals between such periods should be sufficiently long to insure productive effort on their part in work, study, recitation, or whatever other activity is carried on in the classroom. The teacher who is most successful with his pupils will provide in his own schedule frequent opportunity for being with and observing his pupils during some of their play periods. By so doing he becomes much better acquainted with their natures.

The various subjects of the curriculum must be given the same thoughtful attention as the manner of utilizing them in learning situations. Some subjects are more confining than others. Reading and arithmetic periods illustrate this fact. Other subjects may be presented so as to provide relaxation. This is particularly true of music, folk-dancing and group games. Some scheme of alternating these various types of subjects must be provided.

Again, though subjects vary in their content, their consecutive sequence may prove unsatisfactory for other reasons. It is a very easy matter thoughtlessly to arrange a group of subjects so that the pupils remain seated too long. Reading, spelling, and written composition presented in this consecutive order would have this undesirable effect. The frequent use of the rod in our old-time schools resulted, in part, from following this type of program.

Careful thought on the part of teachers will lead them to refrain from teaching penmanship immediately after a recess period. It may quiet the overheated, hard-playing boy, but as a writing lesson it will prove a failure. In fact, the condition of most pupils after a play period is such that they are physically unfit for any exercise involving writing.

Some subjects need not be included in the schedule every day. The amount of time allotted to them per week is often such that it would not be economical to attempt to include them in small daily units. This is especially true of manual training, home economics, and other handcraft subjects. In the same way the time for history, geography, and nature study may be so allotted as to occur only on certain days of the week. Physical training and music should find a place on the daily program largely because of their recreational aspects. Definite provision must also be made daily for drill subjects or drill phases of subjects. They require only short intervals of time for presentation, but, as was pointed out in the chapter on the drill lesson, frequent repetitions are necessary to insure thorough mastery of the material involved. Penmanship, spelling, mastery of the combinations and fundamental operations of arithmetic, and the correction of physical defects are in this group.

The daily program must provide opportunity for the class and for individual members to meet their respective needs and carry on their activities. Since coöperative effort centering around a natural activity governs good classroom procedure, provision must be made for class conferences, discussions, and united effort. The opening exercises, planning the day's work, making assignments to groups, dealing with school problems, and developing various phases of the major activity of the class require the time and attention of the whole class.

Adequate time should be allowed for the opening exer-

cises, so that they may be made interesting and inspiring, and so aid in unifying the class. To a large extent, the attitudes of children toward their class and its activities throughout the day are influenced by what occurs during the first ten minutes of the morning session. The truth of this can be tested by any teacher who will try the experiment of exposing his class to Grieg's "Ase's Death" on a given day and to Sousa's "The American Patrol," the next.

If the daily program of the class is organized to be as similar to normal life schedules as possible, the pupils will turn naturally from the conclusion of the opening exercises to the next order of business of the school day. They will be interested in checking up the progress that has been achieved on that which has been holding their attention. It is necessary to determine what can be undertaken next. Hence, the various assignments can be developed, and the day's work will soon be well under way.

Since individual differences in every class are so great, the schedule for each day must provide time for meeting individual needs. Study periods, drills, and recitations should be planned so that the child whether of superior, normal or subnormal intelligence will be able to make progress in keeping with his capacity. How a teacher should go about doing this is well illustrated in the chapter on the use of scientific tests.

If the above factors are kept in mind, the teacher will develop a daily schedule that will serve as an excellent guide in aiding him to make the most of the school day. How effectual such programing may become is illustrated in the daily schedule of a certain fourth grade teacher. Her program, together with the comments of a supervisor whom she had asked to spend the day with her, will prove helpful to others. It is included in the chart on the following page.

THE DAILY PROGRAM OF A FOURTH GRADE TEACHER

Supervisor's Record and Comments

Time Schedule	Items for the Day	Meeting the Schedule	Comments
9:00 to 9:10	Opening Exercises	Mutual greetings; the pledge of allegiance led by a pupil; a song selected by the class.	A businesslike and still human and social affair.
9:10 to 9:20	Making Plans for the Day	Discussed the geography and history booklets in the making; decisions of what to undertake next—individual and class assignments.	Some excellent oral-work; teacher skillfully developing excellent motives for further work; no evidence of hurrying and still no waste.
9:20 to 10:00	Study Period	Individual and small-group study and other types of work.	Teacher moving around the class giving suggestions and help to individual pupils studying their particular difficulties; many different subjects being studied. A small group working on a sandtable project; a number of children using Courtis Practice Material.
10: 00 to 10: 10	Recess		All pupils sent out to play.
10: 10 to 10: 50	Reading	Many different books including readers, geographies, histories, literature, pamphlets.	Some pupils studying to make contributions for their booklets. Teacher heard a very few pupils read orally, but a number answered questions which she asked them about the story they reported as finished; drilled a small group in getting the thought from a page read rapidly. One pupil read very well a

THE DAILY PROGRAM OF A FOURTH GRADE TEACHER

Supervisor's Record and Comments

Time Schedule	Items for the Day	Meeting the Schedule	Comments
			short poem to the class because he thought it good enough to be shared with others.
10:50 to 11:00	Penmanship	Practice and drill.	Pupils practiced on difficulties reported from their last set of compositions. Speed and quality test given.
11:00 to 11:10	Recess		Teacher went out to play with her girls; alternates so as to be with the boys the next time in the yard.
11:10 to 11:57	Arithmetic	Solved several problems. Drill. Long Division.	Involved division. Used Courtis Practice Test—ten minutes total time in giving, scoring and handing in the books. Stress on the common difficulties—board and seat work.
11:57 to 12:00	Dismissal		Straightened up room and gave out notices for the principal.
12:00 to 1:00	Lunch Hour		
1:00 to 1:50	Geography	Recitation on previously prepared lesson. Assignment.	Pupils reported as if they were committees with ideas to be worked into materials for the booklets. Involved a problem skillfully raised by the teacher out of the class discussion.

THE DAILY PROGRAM OF A FOURTH GRADE TEACHER

Supervisor's Record and Comments

Time Schedule	Items for the Day	Meeting the Schedule	Comments
		Study.	More than half the period.
1:50 to 2:00	Recess		Teacher wrote on the board words misspelled the previous day, underscoring those which had been most difficult.
2:00 to 2:15	Spelling	Group and individual difficulties.	Pupils studying misspelled words each as an individual had wrong in the previous day's dictation. Perfect group working on other needs.
2:15 to 2:35	Music		Sang a few songs; practiced a new song; enjoyed a record played on the Victrola.
2:35 to 2:58	Language	Discussion and writing.	Discussed briefly and then wrote a composition on geography to go in booklets.
2:58 to 3:00	Dismissal		Straightened up desks and room before saying "Good-night."

The supervisor's comments and criticisms are so extensive that very little additional explanation of the teacher's program is necessary. Such subjects as history, nature study, art, and manual training do not appear in it because they were alternated with music, geography, and reading. The type of spelling lesson observed was due to the fact that the teacher was following the drill procedure similar to that

discussed in the chapter on the drill lesson. The application of other principles set forth in previous chapters will readily occur to the reader.

The writer had occasion to discuss with a rural school teacher the making of a daily program which would be in keeping with the utilization of modern educational procedures. "Can it be accomplished effectively in rural school situations?" she was asked.

"Well, I am attempting to do it with my class," she replied. "I have the fourth, fifth, and sixth grades—twenty-one pupils in all. They are constructing that large map of the world over there in the corner of the school yard. The fourth grade pupils are responsible for the historical and geographical material dealing with our state, and with the relation of our state to the rest of the world. The fifth grade group is studying the history of the United States and the geography of the Americas. Of course, our country is not isolated from others and, therefore, the pupils find it necessary to learn how other countries are concerned with our national life. The sixth grade pupils are working out the backgrounds of American history and the geography of Europe. These are interrelated with our own history and geography. Often when the whole class is working together, I wonder if I could teach without having all of these groups together.

"The various activities these three grades can carry on together are numerous. For example, I plan to hold all study periods of the three classes, in reading, geography, history, and language at such times as I can be free to supervise them. All pupils will be studying geography at the same time. Also, many of the recitations in geography and history occur with the three grades participating in them from various angles. I try to make these periods ones in

which the pupils are striving to do good work in oral composition. You can see how easy it is to carry on the drills in arithmetic, penmanship, and spelling for all three groups. Spelling, after all, is largely a problem of individual needs. If I have to so plan for one group, it is just as easy to extend the planning for the whole class, and all pupils can study or take dictation at the same time. Art, music, nature study and other subjects we have also been able to organize so that any one of them may be profitably undertaken by the three grades at the same time."

"But do you not have to treat all of the pupils in a grade as if they were very much like average children of that grade?"

"Oh, no," the teacher replied. "Two of my so-called fifth grade pupils will be ready to undertake seventh grade work next term, while two in the fourth grade will enter the sixth. There are others who may be able to profit by higher grade placement, but I am not sure of them yet. The gains of these pupils have been made possible through the opportunities for individual adjustments which the program permits. For instance, one of the pupils rapidly caught up with the class above his own through the drill exercises in the various studies and his efforts in the many group activities of two grades."

CHAPTER XIV

The Assignment

The assignment is that phase of the process of learning through natural activities which deals with answering the question: "What shall we do next?" Our lives are marked by a continuous series of experiences or adjustments growing out of attempts to respond satisfactorily to this question, which involves the facing of a new situation.

Before we can attempt to meet a given situation economically, we have several decisions to make. First of all, we must determine whether or not we should undertake the activities required in meeting the situation. If there are adequate reasons for doing so, we must clearly define what they are. Next, we must plan what we should do in order to achieve the ends involved in these purposes. Then we must decide how to proceed most efficiently to accomplish our purposes. Finally, we must understand what use to make of the experiences thus gained. These are the steps, the elements, therefore, which govern the making of an assignment.

When we stop to analyze these elements, we find that they are very similar to the principles which should guide in planning the work coöperatively as presented in Chapter XII. This is just what should be expected, since the assignment merely carries out in detail what was blocked out in general in the planning of the work for a given period. In fact, planning the work is really making an assignment of

considerable magnitude. Its formulation provides the basis for developing a series of more specific assignments. Upon the successful carrying out of these depends the success of the larger plan.

Hence, the purpose of the assignment is to further the pupils' growth by aiding them to gain (*a*) a thorough knowledge of what they should undertake in order to carry on their activities effectively and (*b*) a clear understanding of how to think and act with economy of time and effort in the attainment of their goal. For example, the second grade pupils referred to in the chapter on planning the work, determined upon certain specific assignments requiring the effort of each pupil or of various groups. When they understood what they were to do and how to proceed, the successful attainment of their purposes contributed to the success of their imaginary trip around the world.

A proper observance of the standards governing the assignment depends upon one's knowing the essentials of a good assignment. These essentials may be discovered by noting the marks of strength and weakness in different types of assignments. At least three types in use by teachers are easily distinguishable.

The most common type occurring in the classroom is the least common type found in life. Generally it is introduced and completed by such instructions as: "For the next time, study pages 17 to 26," or "Study chapter eleven in the text." Not only does this assignment require that the pupil discover for himself what he is expected to do and how he should proceed, but it also fails to provide him with a source of interest for engaging in whatever activity is necessary. Undoubtedly, the purposelessness, vagueness, and extreme difficulty of such assignments often account for the fact that the pupil appears in class unprepared.

The second type of assignment is exemplified by the following instructions: "Tomorrow we will discuss the topic, 'The Exports of South Africa.' You will find it treated in your geographies on pages 122, 123, and 124," or, "Write an original letter inviting your friend to an imaginary party. There is a model on page 176 in your language book." Although this is a more intelligible kind of assignment, it does not grow out of an effort to guide pupils in realizing natural purposes. It gives them only a hazy notion of what is wanted. Consequently, the task is nearly always too difficult to be performed satisfactorily except by the most gifted pupils.

The third type of assignment possesses the following characteristics, which distinguish it from the other two. (1) It is made coöperatively by the pupils and the teacher, with the definite purpose in their minds of meeting some thoroughly understood need or needs. (2) Specific directions are worked out so that all pupils understand what they are expected to do in making their contributions to the major activity forming the basis of the assignment. (3) How to proceed has been discussed sufficiently for all to know what methods will be most economical for them to employ in carrying out the assignment. (4) Each pupil has acquired an insight into what will constitute a satisfactorily completed assignment.

This desirable third type of assignment is well illustrated in the following one developed by a teacher in conference with a sixth grade class:

TEACHER: "We have summed up our reports and know what information we have obtained. What have we decided to do next?" (*Pause.*) "John?"

JOHN: "Find out more about what each person said in the last council meeting and what arguments were used."

TEACHER: "Why do we need that information?" (*Pause.*) "Mary?"

MARY: "We need to know because it has to do with the arguments for and against building a tunnel."

TEACHER: "What else have we to do to get information for our debate?"

PUPIL: "We should read the engineers' reports. They are full of points, too."

TEACHER: "Is there anything else we can do?" (*Pause.*) "Harry?"

HARRY: "Study the sections in all of our geographies which tell us what products are sent from the regions which will benefit by the new transportation route."

ANOTHER PUPIL: "The sections, also, will help us to decide for ourselves whether or not the amount of products is great enough for the state to make such a large expenditure."

TEACHER: "Yes, and the two suggestions indicate what we must do after we get our information. Can we do more than that?"

PUPIL: "Yes, we can arrange the arguments for and against."

TEACHER: "Why?"

SAME PUPIL: "So as to know what arguments we have for our side, and what arguments for the other side which we will have to find answers to."

TEACHER: "That is correct. Is there anything else to do?" (*Pause.*) "John?"

JOHN: "Make our outlines covering all of the points we have found."

TEACHER: "Yes." (*Pause.*) "Is there anyone who does not understand what he is to do?" (*Pause.*) "Then you may begin studying. If you need help, I will come to your desk when you raise your hand."

In this stenographic report, all steps essential to securing natural, economic effort on the part of the pupils during study are included. The teacher guided the pupils'

thinking and discussion until a very definite assignment had been developed.

1. Obviously, there were many real reasons for undertaking the work. The pupils were gathering information, cooperatively, for a debate with representatives from another class. The specific assignment was made to provide guidance for gathering additional information from new sources. Even old sources were to be reviewed, so that undiscovered data which they contained would be recorded for use. Each pupil understood and appreciated why it was important to do accurately and thoroughly the studying which was necessary to satisfy the known needs of his class. Each one was being given an opportunity to contribute to the class project, through doing his work well.

It is evident that the teacher had guided the pupils into a thorough understanding of why the specific assignments were made. Their class loyalty, their desire to compete with another class, their keen interest in making contributions to their side of the debate, had aroused them to exert satisfactory effort. The undertaking they had planned would be attacked vigorously because of their intensive interest and serious purpose.

Whenever the process of solving a problem, executing a project, or planning an essential drill lesson is well motivated, the pupils will be ready to work for some time and with good effort. The motives will be sufficient to affect their attitudes, which will in turn give added impetus to their work. Hence, every assignment should provide for definite understanding and appreciation by the pupils of the purpose involved in it.

2. The illustration indicated, also, the need for planning carefully what specific activities were to be carried on. There were certain studies for the pupils to complete before

the next class discussion. By questioning the pupils, the teacher led them to determine what subject matter was to be gathered, and from what sources. This participation by the members of the class helped them to develop consciously a definite knowledge of what activities would afford them the most help.

Pupils who determine in similar ways that which is to be studied or thought out, will enter into the activities very willingly. In fact, the pressure of the enthusiastic group upon any member who attempts to shirk his share of the work proves a very effective remedy. Rather than arouse the displeasure of his classmates, he will make an effort to study.

3. The assignments which the pupils worked out co-operatively involved a thorough understanding of how they were to prepare for the next reports and discussion. They knew why they were to recall past experiences and review a phase of their work which would give them additional information, also. They developed methods for obtaining other data from the new sources available. The discussion indicated a definite plan for organizing the information acquired.

Analysis and criticism would constitute aspects of this work. The method of testing the material was simple but relevant—to find out whether or not it contributed to "the arguments for or against."

4. When the third step was completed, the pupils knew what final step needed to be taken. Their assignment provided that the information they obtained was to be organized into an outline. It would serve as a basis for making the new reports and for discussing the value of the contribution. This assignment, therefore, provided for a definite use of the accumulated materials.

Teacher and pupils alike understood what was expected. The former was in a position to direct the study of the latter, while they in turn, knew why, what, and how to study.

Two additional examples of good procedure in making assignments will supplement the above illustration and make clearer the considerations which a teacher must have in mind when applying the principles of this phase of teaching and learning. They will serve to show, also, that the teacher may more nearly realize her own purposes and plans by encouraging pupils to make their own assignments, with the result that they make a natural attack in doing their work.

The pupils of a high first grade had decided that they wanted to raise some flowers for a new window box which they had received. In response to their letter requesting bulbs, they obtained from the supervisor of nature study, enough to fill their box. After they had written their letter of thanks, the following discussion took place:

TEACHER: "Now that our letters are finished, what shall we do next?"

FRED: "Plant the bulbs."

MARY: "We haven't any dirt."

GLADYS: "I can get some from home."

JAMES: "We can dig some in the lot across the street."

TEACHER: "Do you think that we will need anything besides earth to make our plants grow the best that they can?"

A NUMBER OF CHILDREN: "Water."

GLADYS: "And fertilizer. My daddy just bought some for our flowers."

TEACHER: "Do you know why your father bought fertilizer, Gladys?"

GLADYS: "Yes. He told me it would make our flowers grow better."

MYRTLE: "My big brother always piles up the dead leaves in fall and saves them until now. He calls it a com— something."

TEACHER: "A compost."

MYRTLE: "Yes, that is it—a compost. He mixes this with the earth in his vegetable patch. He says it makes them grow better."

HENRY: "We used manure in our patch."

TEACHER: "There are many ways of making the soil better, then. Before we can plant our bulbs what must we do?"

SEVERAL PUPILS: "Make a compost."

OTHERS: "Get some fertilizer."

TEACHER: "We can't get the leaves now to make a compost. Myrtle, tell us again why your brother has it now?"

MYRTLE: "He saved the leaves in the fall."

TEACHER: "Also, some of our class have told us different things to do. What do you think we had better do first of all before we begin to plant our bulbs? Think carefully. Let me see how many can think of a good answer. Raise your hands so I can see when you are ready to answer. What must we do first?" (*Pause, during which many hands were raised.*) "James, you were ready first."

JAMES: "Find out what is good to plant the bulbs in."

TEACHER: "That is good. Mary?"

MARY: "Shouldn't we find out what is the best?"

CLASS: "Yes! Yes!"

TEACHER (*to class*): "You seem to think Mary's answer is better than James."

CLASS: "Yes."

TEACHER: "Charles, what do you want to say?"

CHARLES: "I think Mary's answer is better. It will help us to get started. But what are we going to do next? Don't we have to know all about growing the plants?"

TEACHER: "Class, what do you think?"

(A number of responses accepting Charles' suggestion.)

TEACHER: "Then before we can be sure that we will have fine

flowers, we will have to learn all about how to plant and grow them. Shall we do this?"

CLASS: "Yes."

TEACHER: "What have we to do now? Anyone."

FRED: "Find out the best way to grow our flowers."

TEACHER: "Do you think Fred is right or wrong, class?"

CLASS: "Right."

TEACHER: "Can you think of ways that we can find out what we need to know?"

RESPONSES: "Ask people who know."

"You read to us."

"Read it ourselves."

"Have Miss P—— come to tell us."

SEVERAL PUPILS: "Oh, let's do that."

TEACHER: "But we ought to know something about the planting and growing first so that we can ask questions. I think all of the suggestions are good. I have found these books which I am sure you can read. On my desk are some that I will gladly read to you. Also, we can find out many things we want to know from other people."

Then followed the assigning of tasks and the distribution of books, marking the beginning of the serious undertaking. "How can we raise beautiful plants from our bulbs?" was printed on the blackboard by the teacher and remained there during the time that the children were solving their problem, and carrying on the projects which grew out of it.

The next illustration is from a third grade experience. The children of a third grade had completed their reading of several stories dealing with life in Holland. One group had read Campbell's "The Story of Little Jan, the Dutch Boy"; another group had finished reading Cary's "The Leak in the Dike," which was found in a supplementary reader; and a third group had completed the reading of Perdue's "Jacob and Katrina." The teacher had been read-

ing Dodge's *Hans Brinker* to the class, during the story hour. Many reports and discussions had resulted from these activities.

When the teacher felt that the children had, through this series of appreciation lessons, developed a keen interest in Holland and had also acquired a considerable knowledge of that country, she led her class into a discussion, which culminated in the following assignment:

TEACHER: "Do you think that the Dutch children are as happy as you are?"

(A difference of opinion was expressed.)

TEACHER: "I am going to ask those who think that the Dutch children are not as happy as we are to tell us why not. When you are ready to answer, please raise your hand." (*Pause.*)

(A number of children gave various answers.)

TEACHER: "Now those who think otherwise may answer."

(Many answers given. A general discussion followed and the conclusion was reached that Dutch children are as happy as American children.)

TEACHER: "We were led to think differently about their happiness because of the difference in the way they live and the way we live, as Jane suggested a while ago. Why do you think that they need to live, play and work so differently from us?" (*Pause.*) "Jane?"

JANE: "One reason is that they have so little space in which they can play. Another reason is that the frozen canals all over Holland become real playgrounds."

TEACHER: "Can anyone else give additional reasons?" (*Pause.*) "Mary?"

MARY: "The Dutch people have to watch the dikes all of the time and repair them so that they will not get drowned. The children have to learn to look for leaks and tell somebody right away."

TEACHER: "John, your hand was raised."

JOHN: "There is so little land and so many people on it that they have to use every bit of it carefully. They have to be very thrifty."

GEORGE: "They are thrifty in lots of other ways."

(Other answers given to the same question.)

HARRY: "Miss T——, can we—I mean, may we—make a Dutch scene in the sandbox like we did when we studied about the French children?"

(Considerable enthusiasm shown by the class.)

TEACHER: "How many would like to do this?"

(Almost every hand raised.)

TEACHER: "Do you remember what we had to do first in order to make our French scene a very good one?" (*Pause.*) "Jack?"

JACK: "We found out all of the things we could from the books we read."

ELIZABETH: "We read some other books, too. I saw some new books about the Dutch on our reading table this morning."

TEACHER: "James Whitney?"

JAMES W.: "We collected many pictures."

TEACHER: "Fred?"

FRED: "We used the sets of pictures in the folders and the stereographs, too. We wrote our own play about the 'French Twins' and played it. I would like to do that again. Is there a 'Dutch Twins' book?"

TEACHER (*picking up a number of books from the reading table*): "Yes, Fred, here is a book called *The Dutch Twins* and another one called *The Dutch Twins Primer*. We can dramatize these stories very easily, if the class wants to do so."

(Enthusiastic clapping and expressions of approval.)

TEACHER: "How shall we begin our work for the sandbox scene and for writing our plays?" (*Pause.*) "Mabel?"

MABEL: "Each of our groups should take a set of the new books to read and study."

TEACHER: "Ethel?"

ETHEL: "We must get the information out of our other ones, too."

HARRY: "Use the pictures and collect new ones, too."

TEACHER: "As we are working, we must try to find other ways and other things to help us. Shall we select our books now?"

(Class is evidently eager to begin at once.)

TEACHER: "We are going to hold Jane's group responsible for reading and finding out the helpful ideas in *The Dutch Twins Primer*." (*Set passed to Jane.*) "George, your group will enjoy studying for us this story about *Our Little Dutch Cousin*." (*Set to George.*) "Harry, your group can find out for us a lot of new things in *The Dutch Twins;* Fred, will you give particular attention to the possibility of dramatizing the story?" (*Set to Harry.*) "Elizabeth, here is a story about a little Dutch girl for your group, *Marta in Holland*." (*Set taken.*) "Helen, there are many interesting things about the Dutch in the first two stories in Smith's *Holland Stories*. Suppose your group reads them." (*Books taken.*) "Gregory, your group should look for some strange things about the Dutch people in the next two stories—three and four." (*Books taken.*) "Whenever a group has finished, I will help it find other new material. Some of the books that one group has been assigned, I am sure others will want to read, also.

"We must remember to review all of the reading about Holland we have covered during the past week or so. Every one of us should do this. It will require us to set aside a part of our reading and geography periods. Let us start our review by beginning with the Dutch story on page 66 in Perdue's *Child Life in Many Lands*. What other ones do we need to review?"

(Pupils enumerate the list and teacher writes the specific references on the board.)

TEACHER: "This list of numbers which have been written above the review work, you will notice, refers to the stereographs and slides. All of them are about Holland. Then you should study carefully the many pictures in your books. They will give

you a number of ideas, also, which you can work into the sand-box scene and use in your designs for stage scenery and costumes." (*Writes on board under general assignment*, "Study all pictures carefully. Make notes about them.")

TEACHER: "It is just about recess time. After recess would you like to begin reading the new stories?"

(General agreement.)

TEACHER: "All right. When you return to the room, assemble in your respective groups, get your books from your captains, and begin reading."

If the reader analyzes these examples of effective assignments, he will note several things which characterize them. First, he will note that the resourceful teacher chooses his leads from the responses of the pupils, and guides their planning into the channels which will involve some type of experience productive of the ends he has determined upon as essential to growth. He seizes upon the natural interests and the normal activities which the discussions of the children indicate are uppermost in their thoughts. At the same time, he is careful to lead them into undertaking something that has been developed through their own thinking, making sure, however, that the assignment is definitely and clearly understood by all.

Second, the teacher is reasonably certain that the difficulty of the assignment is in keeping with the capacity and achievement of the various children participating. The actual distribution of materials to be read was made by the teachers with this in mind. Also, to insure that an assignment can be executed by all, helps must be provided for some that others would not need.

Finally, the teacher must determine when an assignment is to be made. This is one of the most difficult aspects involved. Whenever possible, the assignment should grow

out of a recitation and be developed so that the pupils can begin studying soon afterward. Then their interests will be thoroughly aroused and their efforts will be correspondingly greater. Such assignments, too, are generally made without haste, because of the sufficient time the teacher finds available. It is very essential that sufficient time be taken in developing a good assignment. Less time may be provided for recitation or study, but the assignment should never be hurried or incomplete. More important than any other item in learning is a clear understanding of what is to be learned, how it should be learned, and why it should be learned.

CHAPTER XV (7)

Training Pupils to Study

Training pupils to study is a comparatively new educational responsibility. From the first establishment of schools, teachers have understood that they are responsible for equipping their pupils with a certain amount of knowledge, and for rendering some of that knowledge into habit. It is only in recent years, however, that schools have begun to recognize their responsibility for training pupils in right methods of study. Very limited progress has been made thus far in the development of a technique for training pupils to study.

Studying may be defined as what one does to learn. It consists in acquiring the ideas and experiences of others with the object of adding to one's ability to do things.

The object of developing in pupils the ability to study is to render them able to work alone—to make them capable of learning independently of teacher help. The teacher who has trained his pupils to study effectively has done one of the greatest things possible for them. Knowledge, skills, and appreciations are all valuable, but most valuable of all is the ability to study independently, and with confidence that the results achieved will be reliable. One who knows how to study knows how to form habits, how to break up wrong habits, how to gather and evaluate data, how to draw correct conclusions therefrom, and how to test the validity of data and conclusions.

The guidance needed by teachers in training their pupils to study may best be supplied, perhaps, by answering the following questions which crystalize the difficulties that confront the classroom teacher when he turns his attention to the discharge of this duty: (1) How may a teacher best go about training his pupils to study? (2) What things must pupils be able to do well in order to study effectively? (3) What conditions are necessary to good studying? (4) What devices and detailed procedures of use in thorough study should pupils be trained to employ? (5) What should be the relation of the teacher to his pupils during the study period? Each of these questions will be treated in order below.

(1) *How may a teacher best go about training his pupils to study?* The experience of successful teachers indicates conclusively that pupils may be most thoroughly, satisfactorily, and economically trained to study by having them use proper and thorough study procedures constantly in their work from grade to grade. It is a clear case of learning to do by doing. From time to time the pupils should be directed in analyzing and noting what essential things they do when they study well. By this process of analysis and reflection, the pupils may rationalize for themselves the essentials in good studying.

Learning which takes place by the natural procedure continually employs the essentials of good studying. This was illustrated over and over again in Part II. Learning can take place only by reason of good studying under such a procedure. This method of study eliminates the rule and domination of textbooks. By this procedure, the textbook takes its rightful place of affording one good source of help when the pupils are studying. Thorough learning, upon the basis of natural activities, is good evidence that the pupils'

study activities have complied with the requisites of good studying.

(2) *What things must pupils be able to do well in order to study effectively?* To discover the essential steps employed in good studying, one merely needs to note what he does to secure satisfactory results in any natural learning situation. The things done vary somewhat, of course, according to whether his learning procedure involves (*a*) problem solving, (*b*) project execution, (*c*) drill, or (*d*) appreciation. The details, the emphasis especially, vary with the procedure used and with the complexity of the undertaking.

(*a*) Analyzed experience reveals that the following steps are inherent in the study involved in an educative situation requiring problem solving:

1. A problem of significant importance requiring solution is determined upon. If the problem is sufficiently significant to the pupils, the motive for its attack and mastery will be adequate.

2. Data pertaining to the solution of the problem should be gathered from all conveniently accessible sources, such as textbooks, supplementary books, encyclopedias, excursions, laboratory experiments, visual materials, magazines, people, and the like.

3. Data gathered from any source are supplemented from every other reasonable source and also by the pupil's own constructive thinking.

4. Judgment is continually exercised in considering what to do and how to proceed in solving the problem; the soundness and worth of the data gathered must be constantly judged.

5. The data gathered which are deemed pertinent to the situation must be organized in order to focus it upon the solution of the problem.

6. Judgment as to the correct solution of the problem must be held in suspense until all data are collected and carefully evaluated.

7. As the solution of the problem moves forward, those things

which are likely to be needed in future situations should be memorized. Such memorizing as should have been done, but which was not done while the solution was under way, should be given the necessary attention after the solution of the problem is completed.

8. A conclusion is reached in reference to the solution of the problem; if the conclusion seems correct, the problem is considered solved.

9. The conclusion reached, or the plan determined upon, is applied if possible. If the conclusion is an abstract result which it is not practicable to apply, the final result is checked back against the best-known authorities.

Each of these steps was so fully and so frequently illustrated in Part II, where each learning procedure was analyzed in detail, that further illustration seems unnecessary here. The reader is, therefore, referred to Part II for concrete illustrations of each of the steps taken in studying.

Two results which should be secured from these activities in the process of problem solving are worthy of mention. Each pupil should do each of the things involved in the solution of a problem with such independence of thought and action as will be calculated to preserve his own individuality. From continued experience in working thoroughly and logically in the solution of problems, good study habits and good procedures in doing any piece of work, should be built up and fixed in the pupil.

(*b*) In project execution, the steps in study are essentially the same as in problem solving. In the eighth step in the project, the conclusion is the plan decided upon for carrying out the project. Study up to that point was directed to finding out how to do the thing the pupils decided in step one to do. Step nine, application, consists in putting into use or operation the plan decided upon.

(*c*) In the process of learning through drill, the skill to be acquired is first definitely decided upon. If the need for it is sufficiently apparent, the pupil's motive in working to acquire the skill will be adequate. Second, the learner gets clearly in mind just what he must do to acquire the needed skill. Third, he practices until he possesses the skill sufficiently to use it. Memorization enters in here. Fourth, he makes use of the skill or applies it. In the drill procedure, all steps do not appear with the completeness that they appear in problem solving and project execution.

(*d*) Learning by the appreciation procedure does not ordinarily involve studying alone by the pupil in the same sense that it occurs in problem, project, and drill procedures. This type of procedure is used, when pedagogically employed, because it is believed that the problem to be solved, the question to be answered, or the need to be satisfied, can be better cared for by this procedure than by either of the other three. This may be owing to the largeness or the difficulty of the undertaking or to the limits of time. The procedure starts, as usual, with a conscious need on the part of the pupils. The data are usually all gathered and presented, however, by the teacher. A conclusion is desirable and is often reached, but it is not forced, nor is an application required.

The foregoing brief summary of how the study activities vary with different learning procedures will serve to emphasize the teacher's responsibility for training his pupils in the use of each procedure. It should ever be borne in mind, as has been noted, that it is much more important that the pupils acquire good methods of working than that they acquire extensive knowledge and skills.

(3) *What conditions are necessary to good studying?* There are several conditions which should obtain in order to secure good study efforts. We shall discuss them briefly.

First, as has been implied in answering the first two leading questions in this chapter, the pupils must have a significant question to be answered, an important problem to be solved, a baffling difficulty or obstacle to be removed, or a need of real consequence to be satisfied. Only when such a condition exists is the first requisite for thorough study present. In fact, outside the school, in the world of affairs, no one studies in the sense of searching about and investigating unless this first essential in study obtains.

Second, what is to be attempted, and how it is to be done during the study period should be definitely indicated by the assignment. For the details of how the assignment should be made and of its essential features, the reader is referred to the chapter on The Assignment.

Third, there should be a definite time for study. It is quite as important for the pupil to have a definite time to study each subject—a time that he can rigorously observe—as it is for the teacher to have a definite time, that can be adhered to faithfully, for meeting each class. School programs should be constructed so as to give regular and adequate study time in so far as possible. Of course, a part of the study time of older pupils must be arranged by them, to occur outside of school hours. But this outside schedule should also be a definite one, and should be faithfully and rigidly observed.

Fourth, all distracting influences should be eliminated as far as possible. A quiet study room in which there is no talking or other disturbance is very desirable. If another class is reciting in a room where pupils are trying to study, a situation which is very disturbing, except to those who have excellent powers of concentration, is created. Economic considerations often make it impossible for schools

to provide study conditions free from such distracting influences, but whenever possible they should be avoided.

Fifth, the physical conditions of the room should be so favorable that the pupil does not find it necessary to try to change them. The temperature should be right—68° to 70° F. The light should be adequate, but not too intense. The air should be kept pure by changing it gradually. A table and chair, or a desk and seat, of the right size and height, should be provided for each pupil.

(4) *What devices and detailed procedures of use in thorough study should pupils be trained to employ?* There are a number which help greatly. Each may seem of small importance; but when all are combined, their proper use contributes greatly to economy and efficiency in study.

First, the pupils should be trained to understand the mechanics of a book and make use of the helps and economies of time which it offers. The index, table of contents, and paragraph headings are all intended to make the help the book offers easy of access. Pupils should not only know what these mechanical features are for, but they should make use of them.

Second, they should know and use reference sources in the interests of economy and thoroughness in study. The dictionary, encyclopedia, magazine index and library catalogue are sources to which the pupils should become accustomed to go for help.

Third, materials needed as study moves forward should be at hand. These include notepaper or cards of suitable size, well-pointed pencils of two or three colors, a suitable eraser, pins or clips for fastening together notes pertaining to the same topic, and the like.

Fourth, the pupil should arrange about himself all helps to be used in studying so that he can make use, when neces-

sary, of several of them at once. He should be able to look from the book which is occupying his main attention to the map or maps which he may need to consult, and to discussions by other authorities of the same topic which he is studying in his basic book.

Fifth, each pupil should study himself to find out when and under what conditions he works best. He should know at what time of the day he can study a certain subject with the most satisfactory results. Some pupils find it best to do their difficult work first. Others do better if they "warm up" on easy work, doing the difficult work later. The pupil should also learn whether brief periods of rest promote economy and thoroughness of work.

Sixth, one's mental attitude during study should be so controlled that good results are possible. From the moment study begins, the pupil should address himself seriously to what he is to do. He should try to prevent his mind from wandering and other interests from creeping in to divide his attention. It is usually a good idea at the beginning of study to review the larger points which are related to the new things to be mastered. As study goes forward, the pupil should stop at intervals to think over what he is reading, with the object of gathering its essential meaning and of organizing it at least in his mind. In this connection, he would do weighing and evaluating. As study progresses, it will often be found that much reading has to be done to gather just the needed points. In the interest of economy, the pupil should train himself to "skim" those pages in his reading which seem to offer little of the help he needs.

Seventh, there are a number of mechanical things which the pupil should be trained to do as he studies—especially if he owns his basic books. Some of these are: underscoring important or key expressions; annotating in the margin as

he reads; making notes of thoughts or ideas suggested by his reading; summarizing in the form of notes the essence of his reading; and outlining more or less fully as study progresses.

Eighth, thinking of applications and uses of the things one is mastering is an aid in study. He may keep lists of questions regarding matters not clear to him which he wishes to ask about or to look up further. He may think of uses for the knowledge and the ability and skills which he is acquiring.

(5) *What should be the relation of the teacher to her pupils during the study period?* The teacher's answer to this question is of great importance because of its effect upon her practice.

Negatively stated, the teacher should not be a "crutch" for her pupils during the study period. She should not do for them what they can and should do for themselves. The pupils should not be allowed to feel that the teacher is a convenient device to be used by them as a means of lightening their work in study. On the other hand, the teacher should not sit by and allow the pupils to stumble along to a greatly delayed success, or as often happens, to a wasteful, discouraging failure which might have been prevented by timely wise counselling and guidance.

Positively stated, during the study period, the teacher should guide and inspire each child to go about his work to the best of his ability and in keeping with the essentials of good study as set forth above. He should help each child to develop the plan of working which is best for him. He should guide each child, as need arises, and keep before him what he is to accomplish during the study period.

Instead of doing the pupil's thinking for him when he meets difficulties, the teacher should make suggestions

which will enable him to solve his own difficulties. Often a single apt question properly put will start the train of thought or the line of investigation needed to render the pupil's own study successful.

Pupils who work from grade to grade, obeying and conforming to the laws of learning through natural procedures, and who adhere to the essentials of good studying as set forth in this chapter, are certain to become independent, virile thinkers. The main object of guiding the pupils' study activities is to insure that each shall become a real student or investigator—one who can undertake a problem proposed for solution and, by careful, thorough study, follow it through, step by step, to a sound conclusion.

CHAPTER XVI

Enriching Learning Through the Use of Visual Aids

In directing the learning of children through normal activities, the teacher will find that visual materials are necessarily used very extensively. Almost every experience that the pupils participate in will involve, directly or indirectly, some sort of visualization. Since the seventeenth century, when Comenius produced his "Orbis Pictus," the extent to which teachers have been turning to visual materials as instructional aids has been increasing. For generations, children have been studying more or less profusely illustrated books. In the last few decades, there has been introduced into the classroom a wealth of other materials—sets of pictures, maps, charts, globes, exhibits, stereographs, and slides, and recently the film has rendered some service of value. In recent years, some school systems have maintained distributing centers for supplying the teachers in their schools with such visual instruction materials as could be obtained.

With the introduction of so many visual aids into the classroom, it seems strange that until recently none of our school systems have undertaken careful investigations as to the value and correct use of this educational material. It is only within the last few years that scientific investigations and experiments have been undertaken with these significant problems in mind. To date very few facts have been produced. However, with the impetus that the

motion picture has given to the use of visual materials—even to the point of producing a new type of extremist, the claimant that visual aids are the cure for all educational ills—scientific study of visual materials will continue until a better understanding of the way in which they should be used has been developed.

While the scientist in education is studying the various problems dealing with the place and use of visual materials in the classroom, we are confronted with the problem of determining how to use, to the best of our ability the many sorts of visual aids that we have. In the chapters dealing with the various types of procedure, we have seen that reality and concreteness are essential in the classroom. The various illustrations brought out that visual materials were used whenever they were needed and because they were needed. The important thing to note in these illustrative lessons is that the visual aids used became an integral part of the class work because they made a positive contribution to economy and thoroughness in learning.

The opposite of this last principle must also be kept in mind. Exposure to visual material and nothing more is not educative. Mere picture-viewing which does not lead to purposeful effort has no more educational value than the reading of a book without some significant, definite aim or purpose in mind.

The writer observed a teaching situation in which this type of exposure was used. The boys of a certain school were assembled in the auditorium to be exposed to six reels showing the manufacture of an automobile. Surely such a subject has exceptional educative values for the boy of today. He knows a great deal about the automobile and undoubtedly, with wise guidance, can be led to learn a good deal more about it which will be valuable to him. Hence,

the motive for the picture can be justified. How was it accepted?

The classes crowded into the building with evident anticipation of seeing a "movie," in much the same spirit as if they were going to a "thriller" in the local theater. During the first few reels they watched the pictures with considerable interest. Two motion-picture machines were used so that no time would be wasted. In spite of this fact a restlessness developed. The waning of interest became very noticeable. Rapidly it approached a climax, when it became evident that the picture would require a little time beyond the usual closing hour of the school. Shortly before this time arrived a continual stream of boys began seeking their respective teachers, asking to be excused. The last reel was run with a large number of the boys leaving or returning to their seats, another group watching the results of their classmates' efforts to get out, and a small number still interested in the films but greatly disturbed by the others.

Such a condition of affairs will always arise in the wrong use of any type of visual material. The boys had not come to the picture with a definite purpose in their minds other than that of being entertained. Any one of many motives could have been developed by the teachers which would have made the showing of these pictures a valuable educational device. But because this showing of the pictures was aimless, and led to no subsequent effort, what might have been of great educational value was only a waste of time.

Not infrequently, teachers make the same mistake in using pictures with their classes. Many a child has studied the reading matter of a profusely illustrated history textbook without getting any value from the illustrations. "But they are in the book where he can see them over and

over again," is often offered as probable proof that eventually he will profit by merely seeing them. One needs only to attempt to recall what pictures hung in any one of the classrooms in which he sat for some one hundred and sixty days or more to realize how absurd such a contention is.

How, then, are we to use visual aids in the interest of economy of time and effort in learning? For a period of two years, a committee of teachers and principals in the Berkeley, California, public schools studied intensively the problem of visual instruction in an attempt to answer this question. They gathered information "from all possible sources, in reference to (1) the various sorts of materials which might be used in visual instruction and (2) any results which had been secured from the use of such materials." (Berkeley, California, Public Schools, *Elementary Schools Monograph*, No. 7, "Visual Instruction.")

In concluding the statement with respect to the place and value of visual instruction, this monograph says:

> While there are no exact measures as yet of the advantages to be secured from the proper and successful use of visual aids in teaching, enough is known to justify large faith on our part in the results which will surely follow from their use. However great the advantages and savings may prove to be from the use of visual instructional materials, no one should consider that they are proposed as offering any "royal" road to learning. While all means of education which add to the pupil's interest, economize his time, and increase the efficiency of the learning process should be brought into modern school procedures, it should always be borne in mind that it is fundamentally impossible and quite undesirable to set aside, or to eliminate the necessity for actual work on the part of the pupils. All that educational means can do is to make problems and the work attempted in their solution more meaningful to the pupil and to provide more means and sources of help in their solution. Visual mate-

rials are of value in stimulating thinking, in clarifying the factors involved in the solution of a problem, and in rendering more thorough the mastery attained.

Not only will the use of visual instruction materials not eliminate work, but it will not set aside the proper and sensible use of textbooks and libraries. Rather, visual materials will provide stimulus to go to textbooks and library sources of information for such help as the visual materials themselves cannot give.

The study carried on by the committee led to the following conclusions as to the types of service that visual aids can be made to render in the learning process.

First—Visual aids are valuable as a means of introducing new subject matter.

Second—Visual aids are necessary in the preparation of assigned work in the execution of a project . . . to solve some problem, explain some difficulty or enrich some phase of the lesson.

Third—Visual aids are also valuable in reviewing a series of lessons or experiences in a concrete, connected way.

Fourth—Visual materials are invaluable as a means of fascinating, wholesome entertainment.

It is evident that the first three uses . . . occur in serious classroom work. The fourth use should occur less frequently and would ordinarily not grow out of or be related to the regular classroom work of the pupils. It does not meet a real need, however, in discharging its function of training for the right use of leisure.

In organizing the treatment of procedure the committee had in mind the same conception of what constitutes visual instruction materials as is held by the writer. Anything that makes a sensory appeal is to be considered a visual aid, whether it is the excursion, the chart, the graph, the map, the diagram, the picture, the globe, the model, the stereograph, the slide, or the motion picture.

From the foregoing, the reader will readily see the answers to the question which was raised with respect to how visual aids can be used effectively and economically. These answers may be summed up under three heads, which constitute the three principles which should govern the use of visual instruction as a phase of our procedures. The principles are as follows:

(1) There must be a careful preparation of the class by the teacher or under her guidance before the visual aids are used, in order that genuine interest may be aroused and meaningful needs felt.

(2) The pupils must understand thoroughly that the visual materials presented afford the means of meeting their felt needs.

(3) The teacher must direct the pupils' interests and efforts growing out of the exposure to the visual aids, into activities which provide adequately for the review of the materials and the new uses to which they are to be applied.

Of course, this is nothing more or less than the application of the laws of learning—readiness, exercise, and effect. The pupils will have in mind definite purposes which they desire to accomplish; they will be ready for the experience involved in the presentation of the visual materials; and they will utilize this experience, to accomplish with success and satisfaction their original purpose. In this way their learning will have become enriched and effective.

The teacher's technique must be just as thoughtful and purposeful whether she is using moving pictures, slides, flat pictures, or other visual education materials. It is not improbable that through such careful adherence to sound educational procedure she will find that visual aids "will supply some of the intermediate steps in the grasping of large conceptions" on the part of her pupils. (Editorial by Bagley in *Visual Education Magazine*, January, 1923.) The

enrichment of children's experiences by means of visual aids will be evident in any of the types of natural attack in teaching. The solving of problems, the execution of projects, the use of appreciation lessons, and the motivation of drill become productive of better outcomes as a result of the thoughtful introduction of visual materials.

Some concrete examples of teaching through visual aids illustrate the practical application of these principles. The first case illustrates the correct use of the motion picture as an aid to enriching learning in the execution of a project. The pupils of a sixth grade class were studying Africa. In order that they might construct a floor map of it, they were consulting a large collection of textbooks, books of travel, the *National Geographic Magazine*, and a variety of other materials which they had obtained. While they were in the midst of their activity, the pictures filmed in Africa by the naturalist H. A. Snow were advertised as a coming feature by a local moving-picture theater. The resourceful teacher turned the attention of her pupils to this possibility of getting at first hand some important information about Africa. She visited a theater in a nearby city where the picture was being shown and took notes of its educational possibilities. These she used as the basis for discussion with the children so that when they saw the picture they would have in mind some very definite, meaningful problems which the production would materially help them to solve. With this adequate preparation for an appreciation lesson, the class attended the special morning show for school children.

The afternoon geography period was given over to a discussion of the picture, as a beginning of the activities involving review. In this first review even the materials read in books and elsewhere were introduced and criticised in the light of the morning's experiences. During the next few

days compositions were written about the pictures, illustrations were drawn, models made, and other similar activities were carried on. Thus the materials from the pictures were assimilated and utilized by the pupils, through a series of interesting projects requiring repetition of subject matter.

Another sixth grade class enriched its learning by means of a second type of visual aid. The members were studying Egyptian history, having in mind the solution of the problem: "What constitutes the essential historical information which will show Egypt's contribution to the progress of civilization?" This problem needed to be solved before the pupils could continue their project—the writing of a pageant depicting the progress of civilization. With this definite need in mind, they planned a trip to the museum to see the Egyptian mummies and other ancient relics of this early civilization. Under the teacher's guidance the pupils developed a program, listing the objects they were to study and what they wanted to find out from first-hand observations. This involved careful planning, to the end that the essentials, even to important details, would not be missed. The children organized themselves into groups, to each of which they assigned special responsibilities. These were natural activities for them in the light of their interests and purposes. Therefore, their excursion to the museum presented to them an exceptional opportunity for enriching their experiences and increasing their knowledge by a real experience—exposure to materials representative of the life and customs of the ancient peoples.

The visit required the whole of one school day. Teacher, pupils, and many of the parents spent a fascinating time in the one small section of the museum. There was little evidence of any desire on the part of anyone to go elsewhere during the time spent in the building. Discussions, expla-

nations, and questionings were indulged in, similar to those which adult research students would have carried on in the same situation. For some time thereafter this experience served as a basis for much oral and written composition involving a review of Egyptian life and customs. All through the remaining periods spent on the study of Egypt the influence of the visit to the museum was very marked in the thinking, acting, and feeling of the children. Its influence was noted in the contributions it made to their major project in such activities as the writing of a section of the pageant dealing with Egyptian history and geography, the making of the necessary stage scenery, the designing and making of appropriate costumes. The products of these purposeful experiences were concrete records of the desirable outcomes attained.

The use of slides by the children of a fourth grade class illustrates how these enrich learning when, first, careful preparation, secondly, meaningful exposure, and thirdly, purposeful follow-up or review activities are observed in using them. The class was studying about the missions of California. The special responsibility of one group in the class consisted of developing and presenting reports on mission life to the rest of the pupils. This group went to the auditorium and examined carefully a collection of slides. They read the accompanying descriptions. The businesslike discussions which followed led to the selection of a limited number of good slides. Then these children planned their series of reports. Several times during the course of these activities, the teacher joined the group and gave the pupils the benefit of her suggestions and criticisms. The whole performance proved so interesting to me that I sought an opportunity to see it carried to a conclusion.

When these children reported to the class, actually using

the baloptican in rendering their appreciation lessons effective, the other members listened and observed with intense interest. The questioning and discussions which followed the presentations were sufficient proof of the enrichment in learning that had occurred.

A similar procedure by second and third grade children using stereoptican pictures and stereoscopes in reporting to their classes, which were taking imaginary trips around the world, presented corroborating evidence that the development of a good technique in the use of visual aids inevitably enriches and enhances learning.

It is possible for anyone whose interest in children's learning leads him to observe their activities where natural situations are maintained in the classroom, to add many examples similar to those presented. Undoubtedly some occur to the reader at this moment. Therefore, it is unnecessary to continue at length the presentation of concrete evidence of how visual aids may enrich learning. In conclusion but one more example will be cited. It is introduced because it exemplifies this type of teaching where very young children are concerned.

The pupils in a kindergarten had planned the project of building and furnishing several stores, using Patty Hill blocks for this purpose. The teacher led her children to discuss the various kinds of stores which contribute in large measures to the comfort and welfare of the home—the grocery, the bakery, the hardware store and the like. In concluding this discussion, she planned with the class a series of visits to the stores near the school.

Before these excursions were begun, she went to every store and made mental notes which she felt would help her in guiding the children to obtain the best returns from their trips. She discussed the proposed visit of her class with

each of the storekeepers until she felt that most of them had acquired a sympathetic attitude with what she was attempting to do for her children. Her visits convinced her that these business men and women could contribute materially to make the lessons very effective. Just before the children started on each excursion, the teacher worked out with them some questions which she planned that they should discuss when they returned to the kindergarten. By this careful preparation she stimulated their observation. The stores that the children built afterwards, and the activities dramatized in them showed plainly how valuable visual aids become to young children, when careful planning accompanies their use.

Every teacher in every class can obtain the same results when she observes the laws of learning in making use of visual materials. The learning of her children will be greatly enriched through their use if she provides them with: first, an opportunity to prepare adequately for the program of exposure to visual materials; secondly, the wise guidance during their exposure which will make it a purposeful and meaningful one; and thirdly, the opportunity to carry on activities after the experience, by way of review, which will involve the utilization of the content gained from the materials. The outcomes achieved will be sufficient proof to her that learning has been enriched through the use of visual aids.

CHAPTER XVII

Questioning

After an exhaustive and critical study of questioning as a phase of schoolroom practice, Dr. Romiett Stevens expressed the opinion that "eight-tenths of the school time is occupied with questions and answers."[1] While the best modern practice would hardly accord the question and answer so large a part of the school time, yet it has and must always have, a large place in teaching. For this reason, and because of the ends it serves, questioning occupies an important place in the teaching process. It is desirable, therefore, that teachers be skilled in the proper and effective use of questions.

It is necessary, at the outset, to distinguish between the natural and the formal, or teaching, question. A natural question is one asked, either in school or out, by a person who wishes for himself the information or advice his question asks. A formal, or teaching question, is one asked by the teacher as a means of furthering the educative process in which he is guiding his pupils. Usually the teacher who asks a question knows the answer and so is not asking it to secure for his own use information or advice.

The somewhat limited place of the purely natural question in teaching is apparent at once. Many questions asked by the teacher will not be natural; but those asked by the

[1] Stevens, R., *The Question as a Measure of Efficiency in Instruction.* (Teachers College, Columbia University, 1912.)

pupils should be natural. Of the two thousand questions asked in the twenty stenographically reported lessons studied by Dr. Stevens there were but thirty natural questions. Most of these were asked by the pupils, such as: "Can you have rhyme in blank verse?" "Can't the ammonia vapor turn back into a liquid?" The teachers' questions were natural when they were inquiring as to the progress of pupils on assigned duties. It must be borne in mind, of course, that Dr. Steven's study was made before the natural procedure in teaching, such as is advocated in this book, had come into general use. A similar study now, because of the many modern, progressive schools, would probably yield quite a different result.

The more nearly the school secures child learning through using natural procedures such as are employed outside the school, the greater will be the use of natural questions. When pupils and teacher are planning together as co-workers how to attack and master some phase of history or geography, the teacher's question is a natural one when she asks: "Of the ways proposed for doing this work, which do you prefer and why?" As such work proceeds, also, many of the questions asked by the teacher are quite as natural as those asked by the pupils. The best type of teaching—that which aims to guide and direct learning in the most effective ways—makes large use of the natural question.

The formal, or teaching question is a definite schoolroom tool which has its use and place in furthering economy of learning. It is an economic means of enabling the teacher to find out whether a pupil possesses the knowledge upon which the next topic or problem is based. It is, also, a means of recalling experiences which are related to a new experience or idea which the teacher wishes the class to

grasp. For example, in the study of American history, as each new aspect of our territorial expansion appears, a few well-put questions will cause the pupils to recall such previous knowledge as will assist in the mastery of the new aspect of the question. This type of question is a means, also, of deepening investigation and thinking. It is, moreover, used by the teacher to display before the entire class the final results of each pupil's study and thought. It may also be used as a means, before finishing the work in a given subject, of causing the pupils to think through their experiences in a large way, organizing, clarifying, and deepening the results and conclusions of their own work. The more natural the procedure used in promoting learning, the less formal will the questions tend to be. To the extent that questioning can depart from the formal type and employ the natural question, will the learning situation be cooperative, rich in motive, and filled with inspiration for the pupils.

Whether the questions used in promoting learning be natural or formal, good questions have certain characteristics, and certain standards govern the use of such questions in teaching. With these every teacher should be familiar. If anything like eight-tenths of the class time of the school is consumed with questions and answers, the largest possible guidance is needed by teachers so that their questioning may be as efficient as possible.

The teacher should realize the difference between questions asking for facts and questions seeking reasons. He should appreciate the difference in the value of these two types of questions.

Fact questions test the memory. They are "who," "what," "when," and "where" questions. A pupil knows the answer to such a question or he doesn't know it. He

can't combine things he already knows to determine the answer to such a question.

Questions seeking reasons call for reflective thinking. They ask the "how" or "why" of a thing or situation. They stimulate to further reading, inquiry, and investigation. They give experience in understanding relationships. They require the kind of thinking which is largely employed in solving the difficult questions and problems which arise outside as well as inside the school.

The reader will recall that one of the school illustrations of problem solving exemplified how a class undertook practically a whole term's work in American history in an effort to answer the "why" question raised by one pupil with regard to the changes in American home life. Consider, also, the examples of a good assignment in an earlier chapter containing many "why" and "how" questions.

Educational investigations show that teachers ask many more fact than reason questions. An investigation conducted in a certain school revealed that only 139 reason questions were employed to 622 fact questions. Dr. Stevens did not summarize her results from this standpoint, but an examination of the lessons reported stenographically in her entire study reveals a great preponderance of fact questions. There is large reason to believe that a study of good socialized teaching now would show a marked numerical increase in the questions asking for reasons.

It is of some value, also, to classify questions as pivotal and developmental. A pivotal question is a comprehensive one which goes straight to the heart of the matter under consideration. It neglects details for the time being. In planning a new educational experience with his pupils, the teacher is concerned to make sure that five or six, let us say, large points are understood. These may be brought

into prominence by means of five or six pivotal questions which should serve a double purpose. In the first place, they should provoke thought on the part of the pupils in the direction of the proposed experience, and secondly, they should provoke thoughtful and pertinent questions by the pupils, which when answered will in turn contribute to the understanding of the educational experience. The teacher should always utilize these questions as much as possible. By so doing the interest and alertness of the class are encouraged.

The developmental question is useful in getting pupils to relate one detail to another in order that their proper meaning and significance may be seen. The skillful use of the developmental question may lead pupils so to relate details as to enable them to solve the problem stated by a pivotal question. A few years ago, much more than now, we hope, the use of this type of question was carried to unreasonable lengths. It should be used to secure careful, related thinking, looking to the reaching of conclusions which are clearly possible, and for no other purpose. It must be frankly recognized that some things would better be told or looked up in an authoritative source. Questioning to evolve them is wasteful of time and destructive of good habits of thinking.

Questions of a certain sort are properly regarded as objectionable. Generally speaking, direct, leading, and alternating questions are to be avoided.

The direct question expects "yes" or "no" in reply. It is of little value, because it may be answered usually with little thought or knowledge. Too often, the answer is a guessed response and nothing more. This is obviously true, for the child soon learns to appreciate that if his first answer is wrong, the second one will be correct. This type of question has other objectionable features. It is one of the two

types which directly exposes pupils to the effect of making a wrong response. It sets up a bond which must later be broken. Sometimes this is not so easy to do. Again, it may leave the pupil with a confused impression of which answer was right and which wrong, for some time after the question was asked.

However, this type of question has its place in learning, when it is so stated that the response will not be forthcoming until considerable thinking has taken place. "Do you think that the type of leadership which Andrew Jackson brought to bear on internal politics was very essential at that time?" is a question which will require careful weighing of evidence before a pupil can respond. He may be asked to defend his position and therefore must give careful thought to the question before answering.

The leading question is so put that it clearly suggests the correct reply. It is possible to formulate a fundamental question so that pupils can read out of it the one answer involved. The question "Was Washington's manœuvering around Yorktown, which resulted in Cornwallis' surrender, influential in the ultimate success of the American cause?" may seem like a complicated one, and it is, but the answer to it is obvious. The pupil does not need to think over the information he possesses in order to answer it correctly. It requires practically no more mental effort on his part than when he answers the question, "Is the tiger a wild animal?"

The alternating question is likewise almost valueless, for it limits the answer to one of two possibilities. "Has a plant-eating bird a long slender beak or not?" is a question with all of the same undesirable characteristics as the one, "Has the plant-eating bird a long slender beak?" The same weaknesses can be noted in the question, "Which crop is of the most worth to California, prunes or oranges?" If,

however, a question of the latter type is such that the pupils choose sides with the object of each side's honestly defending its position in debate, in the hope of arriving at a true decision, then it has value. Hence, when the alternative answers possible give rise to a debatable issue, and that issue is used as a basis for a series of thoughtful activities resulting in a correct conclusion, the type of question producing this experience is worth while.

Whatever type of question is used, there are certain characteristics which always distinguish a good question. It will be worth while to point these out briefly. All of these characteristics are essential if questioning is to fulfill its real function in the educative process; viz., that of guiding the pupil's thinking and activity into educative channels, and inspiring him to achieve to his full capacity.

In the first place, a good question should be clear and single in its purpose, so that it is easily understood by the pupils. The question which is vaguely understood will produce unreliable responses. "What about the Louisiana purchase from the French?" is a question, for example, which will call forth a variety of answers containing right responses and yet, from the point of view of the questioner, be wrong. Perhaps the best response from the observer's judgment was that of the child who answered the teacher, "I don't know just what you want." The teacher then reworded the question, stating it as it should have been stated originally: "What new policy was established by the United States in the purchase of the Louisiana Territory?"

An examination of the last question will disclose many of the qualities of a good question. The question is definite, concise and complete. It is, therefore, clear to the listener just what is wanted by the questioner. Eighth grade pupils who have studied United States history to this point in the

rise of the nation should be able to answer this question. The vagueness of the first, however, would challenge even a specialist in this particular field of American history.

A good question should, in the first place, be *adapted to the experience and ability of the pupil.* Otherwise it will be vague to the one questioned. Such a condition arises when the question asked is not within the range of a pupil's ability and achievement. How essential it is to take precautions to insure that the question is within the comprehension of the pupil is very evident in all intelligence tests. Only questions involving the degree of comprehension which the individual has attained should be asked. Correct answers to the question, "What's the thing to do, if you find that your house is on fire?" are given by a very large number of children, six years or more old. Five-year-old children, or younger ones, do not answer this question very well, because it is not yet within the range of their experiences and ability. On the other hand, they will respond readily to the question, "What must you do, when you are cold?" Therefore, we must ask only those questions which are within the range of the pupil's ability and development, if we are interested in obtaining correct responses.

In the second place, a question should be *briefly and concisely stated.* This makes for ease of understanding, and renders the question comprehensible to pupils of varying degrees of intelligence. Brief questions, also, avoid waste of time. It takes less time to state them and less to interpret them. They render the teacher less talkative.

In the third place, a good economic question is *related closely and intimately to the purpose and interests actuating the pupils at the time.* This is necessary if they are expected to give the question their undivided attention, with resulting thoughtful effort. One of the examples of a good assign-

ment indicates how pupils in the first grade will answer and even ask questions thoughtfully and with a great deal of interest when they deal with some activity which has caught their attention and which they are anxious to undertake. Through questions skillfully introduced by the teacher, the pupils were led to assemble information obtained in their previous experiences, to determine where they could find additional data, to make definite plans to carry out their project, and to begin on various assignments which would help them to solve the many problems involved in it.

The fourth characteristic of a good question has to do with how it is presented to the group. Since questioning is for the purpose of guiding the entire group, each question should be *so put that all the pupils are required to listen, understand, and try to think the answer.* This result may be best secured by stating the question clearly, and then pausing, to give all the pupils time to organize their thinking, before calling upon one of them to answer. The reader will see many obvious reasons for following this formula. As has already been noted in distinguishing fact and reason questions, care should also be exercised in questioning so to put the question as to stimulate and require thought. Asking, "What makes Chicago a great city?" does not make nearly the demand for careful thinking that is made if the teacher asks, "What do you think are the important factors which have helped to make a great city where Chicago is located?" The first appeals to the memory, while the second stimulates the pupil to think carefully and to reason accurately. The effects of good questioning manifest themselves likewise in the thoroughness with which pupils express the results of their efforts in a given subject.

Not only is it important to formulate questions in the way described above; the manner and attitude of the

teacher in asking a question has much to do with its effectiveness. The teacher should put no question which she does not feel a genuine interest in asking. Then she should listen with real interest and seriousness to all worthy efforts to answer it. When possible, the teacher should ask pupils for pertinent information which might come out of their individual experiences and which she might, therefore, not possess. Such natural questions exercise all of the good effects on the pupils which have been pointed out in previous paragraphs. Whatever procedures the teacher may use with economy to enable the pupils to feel and appreciate that they are partners with the teacher in the problem or project under way will exercise great influence in deepening their interest and efforts.

The remaining points to be made regarding questioning may be best stated, perhaps, in terms of procedures to be avoided, as follows:

First, do not repeat a question after it has once been properly stated and heard by all. If a teacher makes a practice of repeating her questions, she will soon create a very undesirable atmosphere of inattention in which careless answers on the part of the pupils soon appear.

Second, teachers should not repeat the answers which pupils make to questions—largely for the same reasons that questions should not be repeated. The first correct response of the pupil is placed at a premium when it is not repeated. The person in any walk of life who has formed the habit of repeating the statements of those with whom he talks is considered an uninteresting conversationalist. If the teacher, who follows this practice is similarly considered by pupils in her class, she has only herself to blame.

Third, do not frame questions in the language of the textbook, or read questions to the class from a list printed in

the textbook. Such questions are usually not adapted to the unique needs of the pupils nor to the special requirements of the situation in which they are working. They are likely to mechanize the pupils' efforts and produce superficial results.

Fourth, do not call upon pupils in any fixed order, such as the order of seating or the alphabetical order. Such a practice is not good for several reasons. It is mechanical rather than rational. A pupil should be called upon for some good reason apparent in the situation and often to all or several members of the class. One essential of a good manner of questioning, as noted above, is that it shall require each pupil to look upon the question as a personal one that he is expected to think about and answer.

Fifth, do not call upon a few pupils for practically all of the responses. Certain bright pupils are always ready to respond. The temptation to use them unduly is sometimes great. So doing enables the work to move with apparent smoothness and dispatch. But such a practice is very unwise, because its results are not a true index of the progress of the class and because it is discouraging to those who are called upon but little. Justice and fairness require that the work and opportunities to respond should be distributed as evenly as possible among all the pupils. In fact, it is part of the teacher's duty to plan questions which are within the range of comprehension of the less gifted children. If such children are to feel that they have a worthy part in what is going on, they must have opportunities to recite successfully, thus being stimulated to their further best efforts and to a proper self-confidence.

Sixth, do not do too much questioning. Develop other ways than questioning of securing effort on the part of pupils and progress in the work. Many evils arise from too

much questioning. In the first place, it produces a highly strung nervous tension on the part of pupils and teacher, whereas there should be natural and normal conditions for thinking and reflection. From her observation of one hundred recitations in six subjects, Dr. Stevens derived data from which the following table is constructed:

TABLE SHOWING AMOUNT OF QUESTIONING IN ONE HUNDRED RECITATIONS

Items for Each Subject	Science	History	English	Latin	Mod. Lang.	Mathematics
Classes observed	13	20	19	14	17	17
Total questions asked	929	1624	1623	1217	1538	1555
Average number of questions per recitation	71	81	85	87	90	91
Fewest questions in any recitation	15	41	39	42	10	35
Most questions in any recitation	122	142	200	122	176	165

This table shows that on the average, questions were put at the rate of about two per minute of the actual teaching time (about thirty-five minutes) in a forty-five minute recitation period. With such speed, deliberate thinking and careful reasoning are impossible.

In the second place, so much questioning means that the teacher rather than the pupils is doing most of the work and thinking, whereas this situation needs to be reversed, if pupil growth is to result. In a one-page stenographic report of a history lesson, the teacher used 444 words while the pupils used but 82 words. In a three-page stenographic report of a chemistry recitation, the pupils spoke but 113 words. In the entire twenty stenographic lessons, it was

found that the teacher did 64 per cent of the talking while the pupils, collectively, 20 to 40 per class, did but 36 per cent.

In the third place, questions cannot produce the results expected from them when they are put at such rapid-fire rate. Only mere verbal memory and the most superficial thinking are employed. Reflective thinking and careful reasoning are wholly impossible.

In the fourth place, such speed in questioning makes impossible any adequate opportunities for the pupils to express themselves with care or completeness or for the teacher to give the pupils training in good expression. The answers, quoted below, from the stenographic report of an English lesson, made for Dr. Stevens, shows the limited opportunities for expression which these pupils had:

"Five."
"On the second syllable."
"I don't know."
"Too choppy."
"Flashes."
"By flashes was the darkened wood lighted."
"I think 'The darkened wood by flashes was lit up'."
"No, too many syllables in the first part."
"Blinding to sight."
"Can you have any rhyme in blank verse?"
"Too many syllables."
"That is a rhyme."
"No, I don't think so."
"Three out of five."
"Four out of five."
"Yes."
"'Rain' and 'twain' a rhyme."
"When he started to draw the circle."
"Yes."
"Very good."

During the first twenty minutes of this recitation, pupils expressed themselves forty-seven times in brief answers similar to those just quoted. Three answers occupied a few words more than one line, and one answer occupied two lines. No answer required more than one sentence. By actual count, during the first twenty minutes of this lesson, the teacher was doing 85 per cent of the work while the pupils, collectively, did but 15 per cent.

It must be evident from the foregoing that questions should be so regulated in number and in the speed with which they are asked that the following qualities may characterize pupil's answers to them.

An acceptable answer must (1) be an adequate response to the question asked; (2) be as purposeful as the question; (3) represent the best effort of which the pupil is capable; (4) be well expressed—clear, concise, definite, and complete.

CHAPTER XVIII

The Review

The review as a type of teaching procedure assumes new meaning to the teacher who is guiding his class to learn through natural activities. The concept of the term "review" in this chapter is the same as that in general use. The review involves the recalling to consciousness of such knowledge, habits, skills, and attitudes as have been acquired through past experiences, and their reorganization to meet some new felt need. It may occur in almost every phase of the learning process, from the first coöperative planning of the work in the classroom to its completion.

Hence, the review may be an integral part of the planning of the new activities to be undertaken by the pupils. It is, very generally, a phase of the modern assignment. Frequently, the efforts of pupils while studying must include it. Invariably, it constitutes a significant aspect of each procedure. It is an important aspect of the work involved in solving a problem or executing a project. It is the best foundation upon which the performer builds his appreciation lesson if his audience is to be interested. Surely, economy in drilling, memorizing, or developing a skill requires that the learner utilize the review in order to determine his own shortcomings and so place the practice emphasis on the discovered weaknesses. These phases of the review were presented in considerable detail in Part II, and therefore need not be repeated here.

The function of the review is implied in the preceding paragraph. It is to provide the pupil with the means for reorganizing familiar materials from a new point of view, and for establishing relationships between hitherto unrelated experiences and their unrelated outcomes. This involves the expanding and fixing of essential outcomes—the products of past experiences—through new experiences requiring their recall and use. The most important experiences must be repeated, utilizing new subject matter whenever possible. Hence the review is a means of relating the old to the new so that growth will be natural, gradual, and efficient.

In making the review a functional aspect of teaching technique, the teacher must keep in mind certain purposes which it fulfills. The most important are as follows: (1) Effective reviewing will help the pupils to reorganize subject matter and activities from a new point of view, so that they may acquire a better understanding of the former, and greater returns from the latter. (2) It is a means of securing interest in some new phase of subject matter and directing the children's activities into new channels of experience in which they will find need for utilizing it. (3) It is the tool in the teaching procedure by means of which the teacher can uncover to the pupil his strength and weaknesses, what essentials he needs to fix better, what new ones he needs to acquire and how he can help himself in his future work through the gains he has already made. When so used, the review places the teacher in the eyes of the pupil as one who is a valuable guide rather than a harsh judge.

The discussion of the pupils and teacher in the sixth grade lesson cited in the first chapter of Part III, with respect to the planning of a pageant, illustrates these points.

In the course of planning what to do, the children learned what had not been done sufficiently well in the previous year and therefore needed their further attention. The past experience of each group was shared with others, and out of it all a new plan was evolved.

The purposes of the children did not differ greatly from those of the teacher. The review furnished them with sound motives, interests, and purposes for undertaking a series of activities. Conceived in their true perspective, by means of the review, the real value of these activities, from the point of view of work aswell as of play, became apparent.

In conducting the review work of the class, whether it is written or oral, the teacher should be guided by several principles. Perhaps there is no other time in the learning process when it is so important for the teacher to have uppermost in his thinking the laws of learning. These laws have been restated so many times in the development of the principles which apply to the various teaching procedures that their repetition at this time is unnecessary. The reader will readily make the application to this particular phase of teaching procedure.

A review of the outcomes which have been acquired through past experience provides the means of relating them to future learning. It develops new aims on the part of the pupils, prepares them for embarking upon new experiences, and creates for them a true perspective of their new learning. This principle is very well illustrated by the account in Chapter X of how the kindergarten children demolished and rebuilt their floor block house. The new activity grew out of the old, the pupils profiting by their past experience and by their knowledge of the accepted standards of what constitutes an orderly house. New ideas obtained from home had to be related to the old ones in

order that the right kind of house might be constructed the second time.

By carefully guiding the review, the teacher will be able to determine what desired educational results have not yet been assimilated or mastered. A fourth grade review, which involved an explanation by the pupils who had constructed it, of a floor map of their native state, led the teacher to see that they had failed to learn as they should have in what ways their own state was dependent upon other states and upon the rest of the world. Hence she knew that the pupils needed to undertake a third activity especially involving this aspect of geography. The review was utilized to point out to the class their serious shortcoming. The result of the discussion which followed was the decision to make geography booklets entitled "Our State and the Rest of the World."

This example also illustrates another principle to be kept in mind. The review should deal with relevant material. In general, details of lesser importance should be omitted. In this way the essentials will be raised to greater prominence.

At the conclusion of any unit of work, there should nearly always be a review. But when the review is used in this way, for the purpose of examining pupils, it is not so effective a learning tool as it becomes when it is used to form the basis of a new series of experiences. The best type of review, then, is that which is a natural activity growing out of a preceding natural activity. How the review can be made a natural activity is exemplified by the work of the second and third grade children who had taken an imaginary trip around the world and studied child life in many, many lands. When the class had completed the trip, the teachers felt that there were many good reasons for review-

ing the essentials of the information involved. The pupils and teachers, therefore, planned a miniature world's fair which required not only the making and decorating of booths for the various countries, and the planning and presenting of a program, but also the writing and presenting orally of a series of reports. The last-mentioned activity constituted the children's own explanation of their previous activities to the superintendent of schools and the members of the board of education, who were the special guests at the fair. Two of the pupils' reports will illustrate the use of the review as a normal effort in child experiences.

In preparing the guests for the appreciation of the program, one of the boys reported as follows:

Our Speakers

We have had several people come to school to talk to us. While we were in China, Dr. Wong of the University of California came to talk to us. He told us about the queer schools in China. The children have to turn their backs to the teacher when they recite.

While we were in India, Miss Bentley came in and gave us a talk. She talked to us a whole hour, and we could have listened longer.

While we were in Italy, Miss Hartwell happened to visit our room. She told us how the little children of Rome are taught to beg. She said that one day a beggar boy came up and begged for money. When she refused to give him anything, he opened his eyes and ran away laughing.

While we were in Germany, Mrs. Howard of the High School came and talked to the whole school. She told us about the old castles on the Rhine. She also told us about the clock at Strassburg. She brought with her many lovely pictures. She sent us some little French dolls to look at.

While we were in Sweden, one of our teachers in this school, Miss Kinell, came in to talk to us. She told us about Christmas

in Sweden. Instead of a Santa Claus they have—I bet you can't guess—a goat.

We have been enjoying our whole trip very much.

A second pupil made the following report:

NATURE STUDY

As we went from one country to the other we found many kinds of climate. We found very cold weather in Alaska, but in India and Egypt we found just the opposite—very, very warm. We found many of the same kinds of wild flowers on our trip as we have at home. Our California poppy is a beautiful orange color, but in France it is red. We had fun learning about the different kinds of trees in each of the countries. We also learned about the different animals in each country.

In the chapter on the project method of learning, the illustration taken from a sixth grade activity, the planning of a playground, shows the use of the review in a series of reports summarizing the work and findings of the pupils. Such a review was very valuable because of the added motive of actually recommending a playground plan which was to be followed in equipping the school's playground. Such a motive as they had was far superior to what would have been true if the review had taken the form of merely "cramming" for an examination.

Throughout the book many examples of good ways of using the review have been included. The reader will recall many others which he has seen or experienced. Additional examples are therefore not needed here.

In conclusion, one question which teachers frequently ask needs to be answered. "When shall I set aside time for review?" This question, of course, applies to the more general type of review in which there occurs a summing-up of the most important values obtained from a unit of com-

pleted work. When the material is of such a nature that automatization of it is essential, and this has been accomplished through drill lessons, repetition should occur in new experiences at frequent intervals of increasing length. When the review consists of an application of that which has been gained through a series of activities, the importance of the experience or of the subject matter involved is the only basis upon which to determine when, and how much time should be set aside. Whenever the teacher feels that unification of experiences or essential subject matter is necessary, taking time to direct a review in the class in any of the ways suggested will be justifiable. The teacher should remember that the review which tests her own teaching, as any good review does, is valuable to the pupils.

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CHAPTER XIX

Scientific Tests in Education and Their Use

In comparatively recent years the field of education has become a center of scientific research. Efforts in this direction have been productive of marked achievements in the sound understanding of (1) what the fundamental purposes underlying teaching are, (2) what should be taught in order that learning shall contribute to progress and development, and (3) what methods should be followed so that learning will be most effective and economic. Until science had contributed to the solution of these problems, teachers were forced to trust to opinion based largely upon guesswork as to what they should teach, how they should teach, and why they should teach. In elementary education particularly this uncertainty and blind groping is being replaced by scientific data which deal directly with the why, what, and how of that education which contribute to the development of a socially efficient person.

The time has arrived when it is essential for every teacher to acquire an understanding of scientific methods in education and an appreciation of the valuable assistance which these methods can render in removing many of the obstacles which he faces. In a considerable part of his work he may now rely upon scientific data for understanding what he is doing and checking up the achievement of his pupils. He has at his command scientific means of diagnosing the needs and shortcomings of pupils and therefore does not have to trust, as formerly to vague and unsatisfactory opinion.

Probably the field of scientific research most important to teachers is that of scientific tests and measurements. The experts in educational research have been for some years contributing partial and accumulative answers to three questions which teachers have always raised. These questions may be stated as follows:

1. How can we determine the native ability or inherited intelligence of the children in our classes?
2. How can we determine their educational needs and the progress each is making in meeting them?
3. To what extent are our pupils achieving up to their capacity?

In their efforts to answer the first question Binet, Terman, Goddard, Yerkes and others have constructed scales for measuring the intelligence of human beings by means of individual examinations. These educational scientists recognize frankly that we do not know what intelligence is but that we do know what it does. Hence in the analogous sense that we do not know what electricity is, but recognize its attributes and through this knowledge make use of it, the psychologists have developed the testing of intelligence into an educational means.

We know that practically all human beings have memory, are able to reason, adjust themselves to new situations, acquire knowledge, and develop comprehension. By determining to what degree an individual has these qualities we are able to establish an index of his mental development. With this in mind the psychologists have formulated a large number of questions, problems, and situations. By the use of this material in the careful study of children and adults of varying ages, experts have determined the age degree of ability required for satisfactory responses. The elements which it was found measured most accurately age units of

ability were selected and grouped according to their scientifically determined values. These were organized into scales for measuring the mentality of individuals. The use of these new measuring sticks makes possible an understanding of the native intelligence upon which we have to build an educational program in the classroom.

Through study and practice in the use of these intelligence tests under the direction of experts who understand and use them properly, teachers can become proficient in a very short time in administering these tests. Facility in the use of this scientific tool adds to the efficiency of the teacher because he is thereby better enabled to cope with the perplexing educational problems presented by the individual differences of the children in his classroom. He can obtain, by testing, a record, or index, of the actual differences in mental capacity in different children. For example, if he were testing a third grade he might, and generally would, find in his class three or more children 8 years of age chronologically. Although these children have lived the same number of years, their mental development may be quite different. The tests may show that Pupil A has the mentality of a 6-year-old child, Pupil B the mentality of an 8-year-old, and Pupil C the mentality of a 10-year-old. The mental age of A therefore is only 75 per cent of his chronological age, while that of B is 100 per cent, and of C, 125 per cent. These percentages or quotients are designated the Intelligence Quotients of these children; that is, the Intelligence Quotient of an individual is the ratio of his mental age to his chronological age.

Having determined these quotients for all of the children in his class, the teacher has at hand the scientific information which enables him to classify his pupils into comparable mental groups. He has an index of what achievement

and rate of achievement he may expect each child to approximate. In planning for the progress of the various individuals he has the data which indicates the normal rate of progress of each in terms of his mentality. The class divisions made by means of mental testing are more accurate, more meaningful, and more reliable, and the progress to be expected of each pupil can be predicted or foretold with almost scientific accuracy.

The time and energy required to give an individual test to each of the children in a regular classroom, valuable though the results may be, are very considerable. The development of group intelligence tests, first by Otis and later by Thorndike, Whipple, Haggerty, Terman, Yerkes, and others has made possible an economic procedure for measuring intelligence. Such tests as the National Intelligence Test, Army Alpha, and Terman Group Intelligence Tests are acceptable for testing large groups of children at the same time. Some of the group intelligence tests which have been produced and marketed are not very reliable however. Therefore, the teacher should seek authoritative advice in selecting a group intelligence test.

When a test has been selected and applied to a class it has been found advisable to measure by an individual test the extreme cases; i. e. the ones about which the teacher still feels doubtful. In general this amounts to testing by means of an individual intelligence test approximately the highest 10 per cent and lowest 10 per cent of the class.

In attempts to answer the second question (what are the needs of children and how well are they being met?) authors have marketed literally hundreds of educational tests. The purpose of these has been to measure the actual achievement of children in the subject matter of various school subjects. Courtis, Ayres, Thorndike, Starch, Monroe,

Buckingham, Charters, and many other experts in educational research have devised tests and scales in efforts to measure the amount of knowledge retained and skills developed in the use of materials in arithmetic, reading, spelling, and other subjects. For example, Professor Thorndike has constructed a scale for measuring the visual vocabulary or the word knowledge which children have acquired at various ages and in various grades. Woody and McCall have devised two forms of a test for measuring the achievement of pupils in addition, subtraction, multiplication, and division. The handwriting scales by Thorndike and by Ayres have been constructed so as to contain specimens of penmanship ranging from very illegible to very legible examples with which any person's writing may be compared and scaled accordingly. Similarly scientific means for measuring rate and comprehension in silent reading, the attainment of children in spelling and progress in other subjects which teachers desire to know about have been provided.

The giving of these tests is a very simple process which teachers can learn very readily. Simple instructions are provided for the teacher so that he can test his class and score the results. Also the instructions to be given the children are formulated into simple statements and directions which are to be followed without deviation by the teacher in using the tests.

All tests have been planned and constructed to provide means for evaluating the achievements of a child by comparison with hundreds, or thousands, of other children of his own age or grade. The average of the scores made by the children of a grade in all types and kinds of schools is set up as the standard for the test. When the average score has been found by giving the same test to a large number

of children of the same age, this average of the scores is the scientific index of attainment which is called the norm. These two types of scientific score values, the standard for grade scores and the norm for age scores, provide concrete, numerical measures with which the achievement of any individual may be compared.

The teacher can see readily the value of using these types of measures determined for an educational test as illustrated in the following example: For the Woody-McCall Arithmetic Test in the mixed fundamentals the grade standard for the finishing fourth grade has been found to be 18.5. The age norm for the average child who has just become 10 years of age is 18.3. Pupil A, who is about to finish the fourth grade, is 10½ years old and has scored 19 on this test. Apparently he is not achieving quite as high a score as the norm for the average child of his own age. However, he is attaining results up to the standard established for the grade he is finishing. Therefore, in this subject the teacher has a scientific basis to support his judgment that Pupil A should be promoted. On the other hand, Pupil B who is the same age as Pupil A and in the same class scored, let us say, 15.8 on the Woody-McCall Test. The standard score for the finishing third grade is 13 and the norm for 9-year-old children is 15.2. Hence, Pupil B scored far below the standard and norm for his grade and age respectively. Hence he is not ready to make the same progress as Pupil A. Pupil C, 10 years of age and in the same class, scored 20.9. The standard for finishing the fifth grade is 24 and the norm for 11-year-old children is 21.5. Therefore, Pupil C is not only ready for promotion to the low fifth grade, but could be prepared easily to take his place in a still higher grade. A similar analysis of the achievements in the other subjects based on the results

obtained by using educational tests would prove very valuable in solving many of our classroom problems.

The most serious problem which the teacher must face in selecting an educational test for use in his class is that of obtaining the best. Some tests are very good and others very poor. Therefore careful selection must be the guiding principle in deciding upon a test. Teachers should raise certain questions such as are discussed below with respect to a group of tests and select the one which meets most satisfactorily the requirements set up. If the following five questions cannot be answered in the affirmative with respect to a test the teacher should seriously question its scientific validity.

1. Has the test been validated? That is, does it measure what it purports to measure? The author of a test must submit scientific evidence to show conclusively that in developing his test he has controlled or checked up his testing situation so that the sole product of his test is the measurement of the specific thing measured. For example, the author of a test in measuring comprehension of silent reading must be able to prove that he has measured comprehension in silent reading and not the ability of children to solve puzzles, to adjust to complicated reading situations, or to rely on native ability.

2. Does the test provide for objectivity of measurement; that is, if the group of children were able to erase from their minds the experience of taking the test under one person and were given an opportunity to take it again under the direction of a different person, would the results be the same? In the author's answer to this question he must show that the instructions to a test, both for giving and for scoring, are so simple and explicit that the difference in the results obtained when given by different individuals will be a negligible quantity.

3. Is the test reliable? That is, will it give the same result if given a second time in the same situation under the same circumstances? The author of a test must submit evidence that any form of the test will give the same results as any other form, all other conditions remaining the same. He must be able to show conclusively by means of scientific evidence that there is no reason to doubt that children will attain the same result tomorrow as they have achieved today if they could be placed in the same situation and under the same circumstances.

4. Has the test been graded, or better still, scaled? Has the difficulty of each section of the test been determined by an actual test of large numbers of children and these parts arranged so that they appear in an ascending order of difficulty from easiest to most difficult? This requires the maker of a test to determine mathematically score values for each element or part of a test and to provide a sufficient number of parts so that the easiest one can be answered correctly by practically every child in the class and the most difficult one can be answered by almost none. Also in the time allowed for giving the test the poorest child will have achieved a measurable result and the best child will not have completed the test. When these conditions have been met, the achievement of every member of the class can be ascertained.

A graded test becomes a scaled one when score values for the test are mathematically related. On a scaled test an accomplishment of 8 is equal to twice as much as an accomplishment of 4. Also the difference between scores 5 and 6 is comparable to the difference between scores 7 and 8 or any other two consecutive scores. Not many of the educational tests have been so scaled, but grading, that is, ranging from easiest to most difficult, has been resorted to in a large number of cases.

5. Has the test been standardized? This can have been done only by giving the test to a large number of representative children. On the basis of their attainments, standards for the grades which they represent, and norms for the ages of these children, can be established.

After requiring that a test be so constructed that it is validated, objective, reliable, scaled, and standardized, the teacher may find several such tests which are satisfactory in these respects. In order to determine the one he should use he should analyze them to see first how applicable they are to the situation he proposes to measure; secondly, how interesting they are; that is, what appeal they will make to the children; thirdly, how many forms of the same test exist in case one or more additional tests are to be made; and finally, how diagnostic each test may be.

The last factor mentioned requires a study of the possibilities of tabulating the series of elements measured to determine strengths and weaknesses in the specific subject measured. For example, a test in addition is more diagnostic if it contains examples of different addition combinations, such as bridging the tens, single column addition, and carrying with and without broken columns, than if it measures only column addition involving carrying. This may not always be essential. Therefore, it may deserve only secondary consideration in selecting a test for use.

In reviewing the questions which have been raised as to what constitutes a good educational test, the purposes and values in educational tests as such are readily seen. They provide means for diagnosing the strengths as well as the weaknesses of individual pupils, classes, schools, and even of school systems. Hence they indicate to the teacher what improvement of the child is the most needed, and where the least effort needs to be directed. The teacher has

for his guidance a mathematical index of the achievement in his class or of individual pupils by means of which he can compare their attainments with those of others of the same age or grade in the subject measured. He is also able to determine how much more stress, or less, needs to be placed on this particular subject. Therefore, the educational tests are valuable in determining scientifically (1) the readiness of pupils for promotion, (2) the classification of children into comparable groups of achievement in each specific subject, and (3) the additional achievement these groups need to make.

The third question involving the relation of a child's achievement to his ability has been receiving attention only in the last few years. The most valuable scientific progress in this field has been made possible by the work of Franzen. By determining the mentality of the child and his achievement in a specific subject, Professor Franzen has obtained a quotient which he has called the accomplishment quotient of a child with respect to the educational subject in which he was tested. For example, if a boy in the fifth grade was found to have a mental age of 10 years and a spelling age of 9 years on the Ayres Spelling List, his spelling accomplishment quotient was 90. Hence he was only attaining 90 per cent of what it would seem reasonable to expect or demand of him.

Two additional cases will illustrate how valuable this type of scientific measurement can be to the teacher. In a fifth grade in a certain school Pupil X who was 12 years of age was found to have the mentality of a 10-year-old. In the Thorndike-McCall Test for silent reading a score indicated that he had the reading ability of a child 9½ years old. The quotient of his mental age and chronological age indicated that he had an intelligence quotient of 83. The

quotient of his reading age and chronological age indicated a reading quotient of 79. Therefore, when these two quotients were related, Pupil X was found to have a reading accomplishment of 95 per cent of what might be expected of him. Hence he was practically reading up to his ability and though over age could not be pressed to improve any faster than he was progressing.

On the other hand, Pupil Y in the same room was 10 years of age and on an intelligence test was found to have the mentality equivalent to a 13-year-old child, and on the reading test established a reading age of 11 years. His intelligence quotient was therefore 130, and his reading quotient 110. But his reading accomplishment quotient was not 85. Hence, Pupil Y though doing much better than Pupil X or even what his own chronological age seemed to indicate as possible, was in reality achieving only 85 per cent of what his ability or general intelligence disclosed him capable of doing.

All these examples serve to illustrate how the individual differences of children may be accurately determined by an expert in educational research and the information be made available so that teachers can cope with the individual differences found. The following table has been included to indicate how mental and educational tests aid in classifying the children into groups of comparable mental units. Group I constituted the highest division which a teacher of the low fifth grade determined upon as testing and for which he felt justified in planning a rapid progress program. Group II constituted the weakest section of the same class, for which he had to provide a suitable program.

In using scientific measurements in an actual classroom situation the teacher should take advantage of every factor that he can bring to bear on his problem. In addition to

relying upon mental and educational tests he should determine the progress of the individual members of his class, the age for the grade, health conditions, and home environment. These modify occasionally the decision which a teacher will make or the procedure he will follow. The most important values which a teacher can obtain from the use of scientific tests, therefore, consist in their contribution of serviceable materials toward the solution of the problems involved in the diagnosis of children's needs, their classification, and their promotion.

The examples just cited are indicative of how intelligence and educational tests assist in determining the promotion of pupils according to individual natural rates of progress. Having determined the general intelligence and present achievements of any individual or group of mentally comparable individuals, it becomes a relatively easy matter for the teacher to determine the next steps which provide adequate opportunity for progress. Similarly, having determined by scientific means which pupils in a class have approximately the same mentality and achievement in most subjects, the teacher has little to worry about with respect to how well he is classifying his children into comparable groups. Also the same data afford a means of checking up the strengths and weaknesses of each child or of each group and therefore make possible provision to take care of scientifically determined needs.

Groups I and II in the table illustrate a situation in which the teacher has faced all three of these problems. A comparison of the two groups will disclose how well the children had been classified into comparable units. Within the possible limits of the class each group consisted of children of comparable mentality and comparable achievement. The two groups present a marked contrast, the first being

marked by high mentality and superior achievement and the second by low mentality and inferior achievement.

Having classified the pupils the teacher's next problem was to determine promotional possibilities. The program

THE STRONGEST AND WEAKEST SECTIONS OF A LOW FIFTH GRADE IN JUNE

Pupil	Sex	Progress in School	Chronological Age, yr., mo.	National Score Intelligence Test	Mental Age, yr., mo.	Thorndike Visual Vocabulary	Thorndike-McCall Reading	Woody-McCall Arithmetic Fundamentals	Starch Arithmetic Reasoning	Ayres Spelling (Age)	Ayres Hand-writing Speed Quality
GROUP I											
1	B	Rap.	10– 0	119	14– 1	80	58	18	10	11.8	53 –32.5
2	G	Norm.	10– 9	116	13–10	83	53	21	11	11.6	90½–35
3	G	Rap.	9–11	116	13–10	91	51	22	9	10.59	93 –30
4	G	Norm.	10–11	113	13– 7	95	58	15	8	10.8	62 –42.5
5	G	Rap.	9– 9	110	13– 4	93	55	20	9	11.3	72 –35
6	B	Rap.	9–10	104	12– 9	84	48	22	9	10.	49 –27.5
GROUP II											
1	B	Slow	10 –5	89	11– 6	76	41	13	6	9.29	52 –37.5
2	B	Slow	13– 3	85	11– 2	81	48	20	8	9.79	71 –32.5
3	G	Rap.	10– 5	82	11– 0	56	44	18	4	10.8	62 –30
4	B	Rap.	9–10	72	10– 4	47	41	14	6	10.	57 –30
5	B	Slow	12– 1	71	10– 3	54	41	16	7	9.29	43 –27.5
6	G	Norm.	11– 7	59	9– 6	32	34	20	6	8.66	59 –40
Finishing fourth grade standards....						53	41.8	18.5	6.2	9.96	44 –46
Finishing fifth grade standards.....						62	48	24	7.8	11.05	55 –50
Finishing sixth grade standards.....						69	53.7	28.5	9.4	12.09	64 –54
Finishing seventh grade standards...						75	58.3	.....	11.0	.....	.....

for Group I became one of providing for progress more rapid than normal. That for Group II was one of bringing it up to a place where normal promotion was possible and also justifiable in the interest of the normal group.

Pupil 4 in Group I and Pupil 6 in Group II illustrate cases in which diagnosis was applied. In the first case the pupil was evidently ahead of her group in reading but behind in arithmetic. An examination of her arithmetic tests disclosed that the low score in arithmetical reasoning as well as in the mixed fundamentals was due to inaccuracies. A careful study of the inaccuracies revealed by the use of the Woody-McCall Arithmetic Test disclosed that this particular pupil was not sure of her multiplication combinations. Hence the teacher had at hand the information he needed in order to provide for correction; and it was easy to see where the time could be obtained from the pupil's program so that this correction could be economically and effectively provided. In the case of Pupil 6 the reverse situation was encountered. This pupil was doing good work in arithmetic fundamentals but in arithmetical reasoning and reading she had fallen far below her group. A study of the results obtained by the use of the Thorndike Vocabulary Test indicated that the source of her trouble was a limited knowledge of words, and the necessary corrective measures were accordingly applied. A later series of tests disclosed a great improvement in achievement both in arithmetical reasoning and in reading.

The above examples are illustrative of many common classroom problems in promotion, classification, and diagnosis which teachers have been able to solve by utilizing the results obtained from the employment of scientific tests.

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