FINE AND INDUSTRIAL ARTS IN ELEMENTARY SCHOOLS

SARGENT

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PREFACE

During the past few years the amount of new subject matter relating to the fine and industrial arts in elementary schools has rapidly increased. The organization of this material into a form involving definite progression and reasonable standards of attainment at various stages has not wholly kept pace with its introduction.

The considerations here presented regarding a scheme for such organization have taken shape in the course of numerous conferences with those interested in the subject, and as a result of investigations which were suggested by these discussions.

I wish to make acknowledgment of my immediate indebtedness in this endeavor to Professor Charles Hubbard Judd of The University of Chicago, who urged the importance of some attempt to present a survey of the subject.

I am under obligation also to Professor Frank M. Leavitt of The University of Chicago, Mr. James Hall, formerly of the Ethical Culture School of New York City, Mr. Charles F. Whitney of the Normal School of Salem, Massachusetts, Mr. Fred H. Daniels of Newton, Massachusetts, and Mr. John C. Brodhead of Boston, for valuable suggestions; and to Miss Helen E. Cleaves, Miss Lucy D. Taylor, and Miss Amy Rachel Whittier for their help in carrying on observations for two years in the public schools of Boston.

I also take this occasion to recognize a debt of long standing to Mr. Henry Turner Bailey, editor of the *School Arts Book*, who first directed my attention to the educational importance of the arts.

W. S.

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CHAPTER I

EDUCATIONAL AND PRACTICAL VALUES OF THE FINE AND INDUSTRIAL ARTS

Since 1870 drawing, constructive work, and design as common-school studies have been subjects of general discussion. The Centennial Exposition in Philadelphia in 1876 exerted a strong influence in favor of public education in the industrial and fine arts. The educational exhibitions were a revelation to the American people of the possibilities along these lines, and of their own shortcomings. Since then drawing, constructive work, and design have received steadily increasing recognition in elementary education so far as provision for instruction and equipment has been concerned.

Until recently, however, these subjects have been left largely in the hands of specialists. Boards of education, superintendents, and principals have often hesitated to make suggestions because they felt that they had not received the sort of training which would fit them to judge methods and results in these subjects. This feeling has been reënforced by the influence of the tradition that even

ordinary ability in the arts comes more as the result of intuitive appreciation than of well-directed effort.

The present wide acceptance of the manual arts as an important part of general education is rapidly removing them from the class of special subjects, and both educators and the general public are now taking an active interest in them. The educator recognizes that the manual arts constitute a unique type of analysis of the objective world. Each science deals with material from a particular standpoint, and each different kind of analysis adds greater significance and wider range to experience. The contribution which the manual arts make toward a more comprehensive basis for mental activity is to a great degree inaccessible by other methods of approach. He finds in the manual arts a line of activity the results of which are concrete and furnish a visible record of good or poor work, which the child interprets into rational terms of cause and effect more easily than is possible in the case of subjects which deal mainly with language. He sees in them an opportunity for obtaining experience with concrete material and with some of the processes by which it is shaped to human needs. He uses the arts as a method of developing and mastering certain ideas by working them out in visible products, so that materials become a means of expressing and of stimulating thought. He finds also that these arts sometimes furnish a point of contact with the interests of many children who apparently are not reached by more formal studies, and that these interests when once awakened are likely to extend to other lines of school work.

The general public more frequently expresses its convictions in terms of the advantages resulting in later life from the training in manual arts which was received in school,

or the disadvantages experienced from the lack of such training. The attainments commonly described as most useful and desirable by these people who view the subject from the standpoint of industrial and professional occupations may be generalized as follows:

Ability to sketch with pencil or brush so as to show how an object appears or how it is constructed, or to illustrate one's ideas or record one's observations.

Skill in the use of common tools and materials, and ability to plan and work out problems involving ordinary constructive processes — such knowledge and ability as every householder needs.

An appreciation of what is in good taste æsthetically, especially as regards the things which constitute one's immediate environment, and sufficient knowledge of such matters to justify one's taste.

Some acquaintance with excellent examples of art in architecture, painting, sculpture, and the crafts, and a discriminating capacity for enjoyment of beauty of form and color in nature and art.

These advantages thus stated by people outside the schools, in terms of definite attainment which results in increased efficiency and enjoyment, do not conflict with the idea of the educator. If accepted, these standards constitute a basis for estimating the success of manual arts in school courses. When children leave the high school their abilities in this field may be measured about as definitely as in any other.

The purpose of this book is to present some considerations on the following questions, which arise from the present situation:

What are the distinctive functions of the various subjects taught under the head of manual arts in elementary

education? How shall instruction be organized so that progress in attainment shall be evident from year to year? What are reasonable standards of attainment at any given stage?

The general statements that learning to draw is learning to see, that drawing is a valuable language, that constructive work produces accuracy and efficiency in dealing with raw materials, that design develops taste and awakens appreciation of beauty, are not now considered as final or as sufficiently definite to justify the community in leaving the matter wholly with the specialist. Further questions arise, such as: How does the seeing which results from drawing differ from that which exists where drawing is not taught? Are children who complete the elementary-school courses able to use this language of drawing freely as a common, convenient means of expression? Does constructive work as taught produce accuracy, efficiency, the pleasure of intelligent mastery of material, and an appreciation of things in terms of the skill and effort required to produce them? Does it arouse industrial interests and a desire to be of service in the world? What definite signs of better taste are evident in children who complete an elementary-school course which includes design, when compared with children who have had no training in that line? Are there objects of fine art which awaken more enjoyment, and phases of beauty in nature which give more pleasure on account of the instruction which has been given? What steps have led to this appreciation? There is need of detailed testing of methods and examination of results in terms of such questions as these.

In elementary schools only rudiments of the arts can be taught, such as the beginnings of free-hand drawing; simple

forms of constructive work and problems in design, especially as related to common things; and an awakening of some response to beauty in nature and art. Work in these lines, however, has proved to be of genuine value, even when instruction ends in the elementary schools. It deals with factors which have a close, permanent relationship to the life and work of people at large, and presents a type of training which the child has a right to expect from the community.

The various phases of manual expression are not marked off by sharply defined limits. It is impossible to construct an object well without exercising some judgment in design, or to design an object satisfactorily without some knowledge of construction and some ability in representation. The school activities continually call for simultaneous work along all three of these lines. They differ sufficiently, however, to allow of separate discussion. The following paragraphs consider more in detail the values attributed by both educators and the general public to these three lines of study in the public school.

Representation. Drawing is a language, a mode of reproducing ideas, and as such is a means of forming and developing these ideas. A child who draws does not set forth ideas already perfectly formed, but perfects them in part by the very act of setting them forth. Drawing thus becomes a tool with which to think.

Little children draw almost wholly from imagination, and find in drawing a means of exercising their mental imagery by putting it into some sort of visible form. This process appears to stimulate mental activity, and at first produces a degree of satisfaction, however crude the results may be, because the child recognizes his ideas in the drawings, although the marks may be unintelligible to others.

Later comes a desire that drawing shall be more than a motor outlet for imagination, and that the result shall represent the idea well enough not only to recall the thought to the one who made it, but also to express that thought intelligibly to others. Thus begins an appreciation of the importance of art as a means of social communication. This leads to a more careful contemplation of objects for the sake of obtaining data for more satisfactory representation, and a corresponding increase in knowledge of form and in trustworthiness of the testimony of the senses is developed.

Children trained to express themselves by drawing learn to analyze and to interpret their visual impressions. Drawing from objects requires a selection of the characteristic features. After the early period of satisfaction with crude symbols has passed, and children reach the stage when they desire to represent appearances truthfully, they must learn to recognize, among the bewildering complexity of details which nature presents, those which are significant — which, if reproduced, will represent the object. Hand, eyes, and mind are busy trying to interpret what is seen into terms of lines or shapes. Drawing thus develops a specific kind of analysis which is impossible when the terms employed are the more general and less objective verbal descriptions.

Drawing partakes more of the nature of a convention than is generally supposed. An oriental or an occidental draws each in the way he regards as best, yet the results differ remarkably. Each is expressing himself in his own graphic dialect. For example, western art makes general use of effects of illumination, shade, and shadow as prominent pictorial features, while in oriental pictures such effects are largely ignored. The objects depicted seldom cast shades or shadows, and variations of light and dark are

usually due to actual differences in local color. In these pictures, however, elements appear, the beauty and effectiveness of which many western artists never appreciated till they studied oriental art. The appreciation of another people's method of drawing is akin to an appreciation of another language, in the revelations it gives of different ways of seeing and thinking.

Drawing, as it exists at present, is the result of an evolution. Its vocabulary has been added to by each generation, and embodies the accumulated results of human observations. One imagines that he is expressing himself in terms suggested directly by the object, but this is only partly true. Drawing an object means translating one's perceptions into terms which have been evolved by the race, and which demand careful selection. It means organizing one's sensations so as to determine what produces the impression, and the modes in which that impression can be interpreted. To draw an object requires a mental activity comparable to that which occurs when a thought is translated from one language into another.

In addition to these general educational values, elementary representation is of direct industrial, scientific, and æsthetic importance.

To the man engaged in constructive work, drawing offers a means of endless experimentation. Workers in metal or wood, when discussing a mechanical or constructive problem, often can present its different possibilities and define the results almost as well by the use of the pencil as by manipulating the actual material. Constructive sketching is also a great stimulus to invention. The more finished working drawings afford a means of recording all necessary data regarding form and construction.

A manufacturer with unusually wide experience thus refers to the value of ability to sketch and draw:

I wish to emphasize the importance of industrial drawing for the mass of trade workers in those lines of manufacturing where the artistic or æsthetic sense is not supposed to hold a prominent place. For example, in the line of machine building the art of drawing has a very important relation to our industrial future. To this particular class of mechanics drawing has a broad field of usefulness: first, because it is a valuable means of expression, since the mechanic who is able to express himself by a rapidly made drawing is inspired thereby to more and better thought; second, because it opens up for him especially a broad field for experimentation and choice.

When by a sketch the manufacturer or mechanic can place before himself and others many ways of doing a thing, he at once makes comparisons, and immediately chooses what he deems the best, the fittest, or the most beautiful. He hits the mark after such a comparison, because with his sketches he has tried many schemes and compared them.

Experimentation, comparison, and choice mark the way of advancement. But life is too short to try many experiments, unless the methods of trying them are very simple. To build things of wood and stone and metal in order to test them and to prove which one is best and fittest requires too much waste of time and material. But the realm of experimentation that is possible with a pencil is wonderful and fascinating; it is almost as unlimited as thought itself.

I have asked myself from whence comes this fascination as we find it in the shops; and I think it is because through the art of drawing, by delineating and by designing, the mechanic himself becomes the creator of things. He not only learns to see clearly things emanating from others, but, behold, he finds he can express his own ideas to himself and to others, and above all he recognizes that they are his own evolution.

For mechanics of all grades and ranks the habit of sketching and drawing becomes a great developing force. For a mechanic drawing becomes the avenue out of himself into the universe. He is not only learning about other people and other things, as we do in the study

of history and geography, but he is revealing himself to himself and to others; and the things revealed are new — new to him and new to the world. This to him is the inspiring quality of his work.[1]

In scientific studies, drawing focuses attention upon, and quickens observation of, facts of forms and structure, rendering the senses more accurate in their testimony and furnishing a means of making definite records.

Representation is also the language of the fine arts of painting and sculpture. The regular work in drawing in elementary schools, involving, as it does, continued use of lines, light and dark, and of color, is giving children constant practice in expressing their ideas and observations by means of the same vocabulary which the artist himself employs. These attempts to use, even though crudely, the terms by which art is expressed are necessary to that kind of artistic appreciation which yields the fullest pleasure. The relation of drawing to art resembles that of language to literature.

Instructors in drawing should regard the elementary phases of the subject as a science and not as something acquired by intuition. They must choose between a course planned for the few in every school who have what is commonly called "talent," and a course planned for the majority of the children and within easy reach of those of no special ability. While any public-school system should take account of special talent and encourage and conserve it, yet in the elementary grades such work should be planned as will justify itself on general grounds and be valuable for all, whatever their future occupations are to be. The work outlined should be such as can be taught in large

[1] From an address by Mr. Milton P. Higgins, president of the Norton Emery Wheel Co., Worcester, Massachusetts, printed in the sixty-eighth *Annual Report of the Massachusetts State Board of Education*, 1904.

part by the regular grade teacher and be well done by as large a proportion of the children as can accomplish the work given in other subjects.

In order to carry out such a plan it is necessary to teach drawing in the most direct and simple way possible, testing methods by the resulting increase in ability to draw on the part of the majority of the children. A lack of such improvement in the many should be interpreted as a fault of the method rather than of the children. Results have already shown that the majority of children can learn to draw sufficiently well for purposes of ordinary practical expression with pencil or brush, and can be led to appreciate what is in good taste, as readily and generally as they can progress in other studies of the school curriculum. Special talent is a factor to be reckoned with in elementary drawing on the same basis as in elementary language or mathematics.

Construction. Constructive work provides an objective, permanent type of expression which appears to command the keen interest of all children. It brings experience in shaping raw material till that material embodies the worker's ideas in concrete form. The worker is thus brought into experimental contact with the great range of constructive activities which constitute a world never fully opened up by words. His own experience is illuminated by a sort of appreciation otherwise inaccessible. All this results in building up a type of thinking and planning which should accompany other forms of education and make its contribution before habits of thinking and planning have become fixed along more abstract lines.

Constructive work gives practical familiarity with common tools, processes, and materials, and develops a comprehension of problems of ordinary construction which every

one should possess. It brings the invigoration of dealing with the unvarying, impartial laws of matter, and of being compelled to face the obvious fitness or unfitness of visible results. It awakens pleasure in shaping material to a predetermined form by patience, foresight, and skill. It brings a healthy realization of the gap which exists between an idea and its finished embodiment in concrete form, and of the persistence necessary when one deals with the slowly yielding conditions of stubborn material. This realization develops a seriousness in undertaking problems, because of the knowledge gained by experience as to the amount of time and effort involved in carrying them to completion, but it is accompanied by the pleasure of a consciousness of skill and of increasing mastery over raw material.

School authorities sometimes discuss the question as to whether any time in the burdened school program can be spared for occupations involving muscular activity, and presume to settle the matter by official action. The nature of children has already settled that question in the affirmative. Motor activity will be an important part of any school program. Probably the only jurisdiction which the authorities actually exercise in the matter is in deciding whether these activities shall hinder or help school work; whether they shall appear as mischief-making or as manual arts.

Constructive work is not only an essential element in general education, valuable alike to the scholar and the artisan; it is also a factor in awakening vocational interests and promoting vocational efficiency. The fact that a large proportion of the school population, variously estimated from one half to two thirds, drops out during or at the end of the elementary-school course to go to work, should be considered in its full significance by educators. These

children never enter a high school. They are too young to go into skilled industries. A few rise through any circumstances, but the majority drift from one to another unskilled occupation, taking whatever pays best. They spend two important years in employments which present no industrial interest and offer no vocational outlook. Such work is usually monotonous drudgery, which develops an unfortunate attitude of mind toward work and compels the child to seek all his pleasure outside of his occupation.

It has been shown that certain kinds of industrial education can come into elementary schools without interfering with the quality of the academic work, and that such education serves to keep children in school and to awaken occupational interests which serve as a reënforcement of general educational interests.

Certain dangers attending the introduction of industrial education into elementary schools readily suggest themselves, but they can scarcely exceed the dangers arising from a lack of any suitable provision for properly satisfying the desire which manifests itself at about the sixth year of school, namely to come into touch with the activities of the world and to join with others in making a contribution to the general welfare. Schools should be equipped to offer such training as will promote the ultimate interests of the children, and, on the other hand, to combat effectively any attempt to exploit the children commercially by fitting them in school to perform particular, unskilled processes to be immediately utilized in local industries.

From an educational standpoint the value of a vocational interest is not primarily economic, but relates to the fact that when such an interest is awakened it is likely soon to become dominant and form a center around which other

interests cluster. A dominating interest tends to collect and organize varying and many-sided interests. The different studies of the school curriculum offer a large body

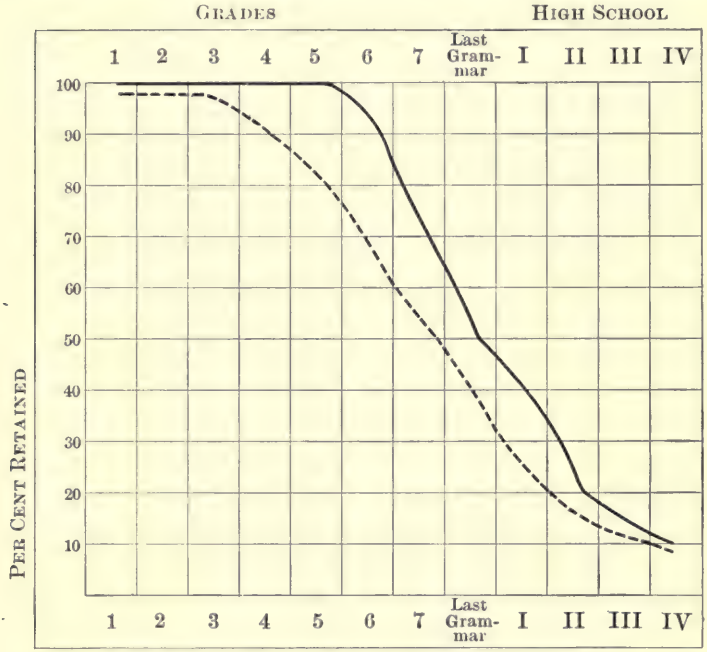

FIG. 1. Diagram showing grades at which children leave school. Results presented by Dr. Thorndike are indicated by dotted line; those by Dr. Ayers, by solid line

From Dr. Leonard P. Ayers's "Laggards in Our Schools," p. 71

of information and many divergent interests. These are important to education but are not its end. The ultimate purpose of education is the development of an individual whose mental interests, although varied, are well organized. The chief factor in mental organization is a strong, central

selective interest which brings scattered things into place. The occupational interest appears to be the natural center toward which others readily converge.

Design. The study of design in elementary schools furnishes a means of exercising and thus developing good taste in connection with the things which make up the environment of everyday life, and of awakening appreciation of beauty in nature and in art. Good taste implies more than information regarding what is good. It means that the right sort of things awaken pleasure, and that a desire is aroused which demands excellence for its satisfaction. The power to discern between the merely pretty, with attractiveness which is superficial and transitory, and that which is permanently and universally beautiful, gives capacity for an enjoyment the possibilities of which are unlimited.

Adequate appreciation of beauty seldom comes without definite training. It depends largely upon established habits of seeing. As one finds the objective world assuming a certain order pleasing to his intellect after he knows the scientific categories and can rearrange facts in terms of them, so he finds that after he knows the best types of artistic interpretation, which have selected from the mass those elements which are æsthetically pleasing and have portrayed them, he tends to recast his own perceptions in those terms.

The study of design in public schools should contribute directly to an appreciation of the beauty of the landscape and of plant and animal forms, and also of the artistic possibilities of the community in its natural and architectural features and in its local industries.

Unless the problems of design relate to familiar surroundings, pupils are likely to consider the term "artistic" as one which applies only to unusual things; whereas it

does not describe the class to which an object belongs, but means that the object, because of its adequacy, and the refinement of its essential parts and proportions, and the grace and fitness of its decoration, if it possesses any, is unusually excellent of its kind. A kitchen chair or utensil may be artistic and thus in its sphere prove a source of continual pleasure as truly as may a vase or a picture. The general appearance of written school work, arrangement of plants and flowers, framing and hanging of pictures, choice of wall papers, rugs, furniture, etc., are among the opportunities of exercising that appreciation of order and fitness which is an important part of artistic taste.

By collections of photographs or other representations, children may become acquainted with the best designs for bridges, water fronts, public buildings and private houses of all classes, park furnishings, sculpture, fountains, and other things which may contribute to beauty in modern communities, and thus become interested in the ways in which towns and cities are solving the problems of civic beauty.

Schools should give pupils some acquaintance with good examples of drawing, painting, and sculpture. Even where collections of originals are not available, abundant material is at hand in the shape of photographs, illustrations, and the best of modern color prints.

Pictures which appear in schools may be divided into two general classes: those which are of use mainly as sources of information — historical, geographical, scientific, etc.; and those which are for the purpose of awakening æsthetic enjoyment. The former should usually be regarded as a portfolio collection, to be brought out and used when occasion demands and then put away. The latter justify a more permanent place upon the walls.

The main question is not how many pictures can be brought within the child's range of vision, but on how many can his imagination be awakened to lay hold. In the days when pictures were fewer, a child would often pore for a long time over some poor print till his imagination wandered far into its perspective and lived with its characters. Such a print sometimes grew to be so full of suggestion that in later years the grown man hesitated to throw it away even after he had come to see its artistic worthlessness. Even the wayward cracks in the walls of old bare schoolrooms became interesting to the imaginations of children who pictured scenes among them, as one sees constellations in the stars. When imagination can be set at play under the stimulus and direction of a good picture, feelings may be awakened that later will develop into æsthetic enjoyment.

Many small pictures distract the attention of the pupils. A few excellent pictures in a classroom, appropriately chosen and carefully hung, usually have a finer influence and give more enduring memories than a large number scattered about the walls.

CHAPTER II

A SURVEY OF THE PROGRESSION OF WORK THROUGH THE GRADES

The following survey of the progression of work in the arts through the elementary grades forms the basis for the suggestions offered in more detailed form in the following chapters regarding work particularly appropriate for various stages of maturity. The material was obtained in part by presenting similar topics to pupils of different ages in many schools, to discover where the subjects were assimilated most readily and processes mastered with greatest ease.

Teachers of the manual arts will recognize the fact that types of interest and ability here recommended to special consideration in certain grades usually manifest themselves to a greater or less degree throughout all grades. For instance, children in Grades I and II are often interested in representing proportions and shapes truthfully, and in handling such advanced implements as woodworking tools, while in these pages emphasis upon those phases of drawing and construction is deferred until a more mature age. This survey of work is not meant to imply that capabilities do not appear earlier than here recognized, or cannot be incidentally encouraged to a considerable extent with advantage. It seeks merely to suggest the periods when results seem to indicate that particular phases can be most readily assimilated and certain processes be mastered with greatest economy of time and effort and become a trustworthy basis

for later work. Children often spend much time in primary grades over what could be grasped with far less effort a few years later; and continue in grammar grades to be handicapped by lack of knowledge and skill which might have been gained easily in lower grades by special emphasis and drill at the right time.

Representation. General use of drawing as a common means of expression and description is of first importance throughout all the grades. The results of this practical use of drawing should be studied at each stage, and the evident deficiencies in knowledge and skill should be remedied by intensive study. Under the present arrangement of the school program the best opportunity for offering this intensive study appears to occur during the time devoted to special lessons in drawing.

There are, then, two phases of the work: namely, the general practical use of drawing, and the continuous contribution of knowledge and skill gained by concentrating for a time upon intensive study of particular aspects of the subject. In order to plan this intensive study most economically it becomes necessary to find out what phases should receive emphasis in different grades, and for what deficiencies in skill immediate instruction is the best remedy, and what may be left to disappear naturally as maturity increases.

The first stages in representation appear to be dominated by an interest in narrative, with a readiness to use drawing rather than writing as a means of expressing ideas. Small children abstract from the object or situation only those characteristic features which will serve them as symbols. These symbols appear to be satisfactory to the children if they support the thought of the story.

At first children willingly use drawing for general expression of ideas. Later, when their acquaintance with written language becomes better developed, drawing is used more specifically for such descriptions and illustrations as cannot be so well expressed by language. These specific uses require differentiation in style. Thus the drawing may be for diagrams, for detailed record of facts of structure, for illustration of general characteristics, for pictorial effects, etc., as the purpose in hand may demand.

In Grades I, II, and III there appears to be little justification for making much differentiation between the general and the special work. Technical deficiencies and lack of knowledge are evident, but a purpose other than the correction of these is more important during these years, namely, to develop a readiness to illustrate ideas, however crudely, and a habit of using drawing commonly as a language. At this time objects placed before the children serve as a means of suggesting ideas, rather than as forms which are to be correctly delineated.

Toward the end of this period some emphasis may profitably be laid upon a more detailed study, by frequent drawing, modeling, observation of pictures, etc., of a few objects selected with a view to increasing the graphic vocabulary of the children, so that there may be some well-understood material for use in illustrative sketching.

Children in Grade III appreciate and may easily be taught to use the simple geometric relations of vertical, horizontal, and parallel, when these are involved in drawings; for example, in picturing houses as standing vertically, etc.

In Grades III, IV, and V children show a definite desire to know how to represent objects more truthfully and to picture different effects; as, for example, of things lying flat

or placed one beyond another. They ask to be shown how to produce these effects, and readily learn from seeing some one else represent them, and from pictures. They gradually become able to interpret effects from their own observations. During the fourth and fifth years it appears to be of especial importance that children be trained to judge general proportions by visual impressions, as to whether the drawing is too long or too short, too wide or too narrow, in order that they may represent the general proportions truthfully by the judgment of the eye as to the effect of the whole, and not by devices for measuring. In addition to objects, such arbitrary forms as maps and diagrams offer excellent material for some formal drill in relative proportions.

In Grades VI, VII, and VIII the following are prominent among the lines of definite study which profitably supplement a general practical use of drawing:

1. Representation of objects by means of rapid sketches, made as simply as possible, and yet showing the general characteristics, proportions, and position.

2. Careful drawings to represent details of form and structure with some degree of accuracy and to convey correct information.

3. Representation of solid objects so that they appear to exist in three dimensions and in given positions. This latter appears to be accomplished most surely and rapidly not by a study of formal perspective but by supplementing the drawing from actual objects, with much experimentation in building up solid shapes pictorially, changing their form and working out various problems of structure and position till objects based on the ordinary types of solidity — rectangular, cylindrical, spherical, etc. — can be sketched in any position, added to, or cut into any desired form, from

imagination. These are problems which can be mastered only by persistent and systematic application. Without such mastery no great practical ability in drawing can be developed.

4. Sufficient acquaintance with water colors to use them with some freedom, to lay flat washes, and to match the colors of nature.

Construction. In constructive work the first activities appear to arise from a desire to play with constructive material. Small children seem to have no clearly defined ends in view, but work chiefly for the sake of having a concrete accompaniment for their thought, and for the pleasure of being the cause of changes and modifications in materials. From this stage, progress in constructive work should be along the line of developing the child's ability to work with increasing manual skill, toward definite ends, and to define those ends and the processes necessary for reaching them, by plans which forecast results more and more completely.

At first he can gain some familiarity with simple means of predetermining results accurately, for example, by measurements and patterns. Later can be developed increasing ability to perform preliminary thinking by means of plans, and to realize these plans through mastery of implements, processes, and materials. Ultimately the growing ability to deal with materials should be so directed as to awaken a desire to produce results which contribute to social welfare.

In Grades I and II the most valuable constructive work appears to consist in the free use of material so easily manipulated that it gives immediate results without demanding elaborate tools or technical skill. Sand, clay, building blocks, etc., fulfill the important function of furnishing

mediums through which a child's constructive imagination, which at this age is satisfied with results which serve to suggest the original ideas, can express itself in concrete form. At the same time children gain some realization of the inert qualities of matter and of the necessity of effort to shape it into desired form, and their thinking is modified thereby. However, such mediums as are here suggested are so easily handled that they do not compel the imagination to wait upon the slow processes by which more stubborn material is shaped, nor to have its own creative vitality interfered with by elaborate perfection of detail.

The question is sometimes raised as to whether the interest of the children will be increased and the things which they construct will be given broader significance and become a means of wider interpretation of the activities of life, if they are given all materials and processes relating to the idea which they are working out; for example, if children in the lowest grades cook the food they serve, and use woodworking tools to make the furniture of the doll house, etc. One who watches the results of such experiments is impressed by the eager interest of the children. The question arises, however, as to whether children associate these diverse processes as an adult does. For instance, if a child in Grade I, in modeling a river on the sand table, finds need of a bridge, he may be given strips of wood, hammer, and nails with which to construct a bridge, or he may simply lay a strip of wood across, adding building blocks if he wishes a more ornate structure. Observation of small children under these circumstances leads to the inference that the use of saw and hammer and nails distracts the constructive imagination which was directing the molding of the river. Again, if

cooking is introduced to give more meaning to the play of housekeeping, it is a question whether at this age an occupation which must be closely supervised by adults does not dissociate rather than aid in organizing the mental processes. To the adult mind these activities are in closely related sequence. To the child it is probable that they are kaleidoscopic and distracting. The material becomes too definitive in its character and forces him to think along prescribed lines in a field where he cannot be allowed free scope to experiment by himself outside of school hours in a way that is at all helpful socially. The child who makes believe can serve any food he chooses. The imagination receives hints and intimations and follows their lead.

If the appropriate time educationally for introducing given activities may be judged by their social helpfulness, they are appropriate when the use of the knowledge gained would be at all helpful in a household where each member was given a share in the home activities at as early a date as he could contribute helpfully, or when it can be used in play which does not require close supervision. This relation to the social scheme appears to offer a reasonable criterion for determining the place of most manual activities in schools.

In later years, when the mind demands for its satisfaction that the product of its activity attain some degree of perfection and serve an objective purpose, struggle with the difficulties of tools and processes necessary to shape wood and metal into predetermined form becomes a factor in developing intelligent consideration of conditions and encouraging persistent effort with confidence in the outcome. On the other hand, at that early age when the mind is busied chiefly with its own activities and investigations,

and when it can regard materials as invested with qualities largely of its own creation, so that they serve perfectly well to support and stimulate the current of thought even when they embody none of its terms, as when chairs serve as a train of cars, elaborate processes and paraphernalia appear to interrupt what continuity such thinking might develop and rob it of much of its vitality. Too early access to abundant paraphernalia limits the scope of imagination and lessens ability to receive satisfactory pleasure from moderate stimulation. To a degree, limitation of material appears to increase the activity of the imagination.

In Grades III, IV, and V children show a desire to be able so to handle material that it shall not only furnish a concrete accompaniment to the activities of their thought, but shall be itself shaped to express that thought with increasing completeness. This appears to be the appropriate time for beginning a definite study of technical processes and of the use of simple instruments of precision, such as the rule and later the compass, to shape material according to a predetermined form. This stage is significant in that it marks the first steps toward relinquishment of the primitive method of arriving at results by mere experimental handling of material, and the beginning of mastery of matter by mathematics and in terms of patterns and plans which constitute a language of construction.

Grades VI, VII, and VIII appear to be the most appropriate period for undertaking projects involving more complicated processes with tools and materials, which require some maturity of judgment and satisfy the desire which generally appears at this age to undertake something evidently related to the industrial activities of the home and the community. Among the projects suitable to

this age are those necessitating construction in wood and the handling of materials used in domestic science and domestic art. All these demand careful planning and the exercise of skill and good taste acquired under careful instruction.

These materials, because of their nature, make it necessary that a large part of the preliminary planning and experimentation be done in terms of sketches and patterns and other forms of description. One of the important attitudes toward work which these undertakings should develop in the minds of the children is that it is possible and wholly desirable that processes and results shall be pretty definitely considered and determined in graphic or verbal terms before any direct attack is made upon difficult or valuable material.

Design. The progression along the line of æsthetic appreciation to be gained from the study of design appears to have the following general tendency: namely, from juvenile pleasure in obvious repetitions of commonplace relations of measures, to a response to the beauty of consistent but subtle interrelations of fine proportions and of beautiful outlines; and from the temporary stimulation of the senses by gaudy enrichment and by mere collections of material regardless of any worthy principles of selection, to a response to the appeal of things which are excellent and which give lasting satisfaction.

Two aspects of design become evident in any detailed study of the subject — the element of utility and that of formal beauty.

When one attempts to design a wall paper or book cover or utensil, there are conditions to be observed peculiar to each subject. The wall paper should have the qualities of

a background, and its pattern should be adapted to a flat, vertical surface; the book cover should display its title clearly, and its color and ornamentation should be in harmony with its content; the utensil must possess the practical elements which make it serve its purpose. Broadly speaking, anything which is to serve a purpose is not good in design unless it is well fitted in every possible way to serve that purpose, and any ornament which obscures or hinders that purpose is in bad taste, however perfect it may be technically. The values of fitness to purpose and of structural integrity are obvious from the point of view of utility, but they must also receive consideration from the æsthetic standpoint. The satisfaction which arises from contemplating a well-constructed object which perfectly fulfills its purpose is largely an æsthetic one.

The value of utilitarian considerations is readily perceived. On the other hand, the student of design is soon made aware that in dealing with constructed objects, human demands other than those of utility become immediately evident. He finds inherent in human nature certain elemental principles of choice in matters of form and color which appear to be based on consistencies of proportional relations in areas, curvatures, or tones. These demands seem to appear as early in human history and to be as insistent as those of utility.

The wall paper may be perfectly suited in color and pattern to its position as a vertical background, but the interrelation of those colors and the final distribution of pattern are matters of æsthetic preference rather than of utilitarian necessity. The title may be equally plain in any one of a number of positions on the cover, but equally pleasing in only a few. It is usually possible to modify

the proportions and outlines of the utensil or of any other constructed object so that a slight variation of the relations, or a modification of structural elements, makes of its design a harmonious and satisfying whole instead of a commonplace collection of parts.

These illustrations suggest two lines of procedure in a course in design. The first is largely one of training the pupil to reason out the most adequate fulfillment of conditions; the second is to develop his elemental æsthetic preferences, refining them by exercise and by the influence of excellent examples till they become definite and discriminating in their choices, and intelligent regarding the possible sources of satisfaction. These two lines are evident in all stages of progress, with the minimum of emphasis at the beginning upon that requiring judgment of conditions.

Throughout the grades the instructor should see that there is continual exercise of taste in matters of school and home work and general surroundings. The special time devoted to design should aim at a development which will tend ultimately to correct whatever bad taste is noticeable in actual choices which the children make. The problem is necessarily slow of accomplishment, for it consists in producing changes of mental attitudes, not in obedience to statements of opinion by the teacher, but as a result of the development of right choices on grounds of genuine preference. Æsthetic appreciation is a slowly acquired type of mental behavior. The outcome, however, is not a matter of theory, for actual experience has shown that where the instructor understands the conditions, the beginnings of good taste in matters of design and of appreciation of beautiful things may be very definitely developed in elementary schools.

In Grades I, II, and III children have a feeling for rhythmic arrangement in repeating single forms indefinitely, as in borders and surface patterns, and show considerable ingenuity in making new combinations of given elements. During the latter part of this period, and especially in Grades IV and V, some appreciation of more complicated relations of spaces than those involved in mere repetition is evident; for example, the pleasing arrangement of elements within a given area, such as the placing of a title, decoration, and monogram in consistent relations on the same page, or in the choosing of border spaces. This last problem involves such designs as stripes in weaving, margins in written or printed pages, widths of frames or mats for pictures, etc. It offers opportunity for endless invention in relating single and multiple stripes of varying widths and spacings, and in introducing modifications, accents, and interlacings at corners and elsewhere. It presents principles which may be developed and applied indefinitely.

Children in these grades also appreciate the various effects of bilateral symmetry, which owe their interest to the duplication of given elements in reverse form.

In Grades VI, VII, and VIII the scope for general exercise of taste is much greater than in the grades which precede, and includes, in addition to general school work, constructive problems, the fields of the domestic arts and social and industrial community interests. Because of the increased maturity of the children and the previous practice, a far more definite appeal can appropriately be made to individual judgment in matters of design which demand consideration of purpose and specific conditions, and also in those which involve the more formal problems of fine spacing and beautiful outline.

Appreciation seems to be better developed and originality enabled the sooner to exercise itself if children are acquainted with good types from the first. These types are the result of long experimentation by skilled designers. In actual practice the greatest stimulus to originality appears to be present not when a mind is left to work alone but when it is brought into contact with the best which other minds have produced.

With the advancing maturity of pupils increasing attention should be paid to choosing the best things from available sources, which usually present both good and bad examples. Even though one may have designed a good vase or wall paper, certain different kinds of mental behavior are called forth when instead of beginning with raw materials he must choose from a multitude of finished products. In the first case there is a slow working toward the realization of an idea with materials which are under one's control. In the second there is more or less rapid choice among different ideas as expressed by others, and definite comparison of these with one's own ideals. Original designing is an excellent experience and should certainly form part of the training of every pupil, but it is only one of the factors which go to form good taste. Thoughtful selection from available material and familiarity with excellent examples are also effective influences. In actual life, for every designer there are a thousand people who will only select designs.

Color. The study of color is associated with both representation and design, and the progress in color work through the grades is closely related to the progress in these two lines of work. A child's first use of color appears to be somewhat arbitrary. He is interested in making

patches of different tones for the purpose of making shapes more distinct, and for the sake of the resulting color sensations. The ultimate aims held in view by the instructor are generally the ability to use color truthfully when employed in scientific and other informational drawing, to use it with good taste in matters relating to the arts, and to appreciate good color effects in nature and in art. Color appreciation develops rapidly under wise direction in choosing and combining tones and in actual manipulation of pigments. Progress is usually from general consciousness of color sensations, pleasurable or otherwise, to keen discrimination of fine color qualities, as, for example, when certain tones of a color give greater satisfaction than other tones of the same color, which would not have appealed as essentially different if no special study had been given them; to pleasure in harmoniously related tones and ability to harmonize given colors; and also to the enjoyment of beautiful color effects in nature and art, not simply in the first impressions of strong coloring, as in brilliant sunsets or autumn hues, but in those qualities which constitute beauty of color, whether the tones are intense or subdued.

In Grades I, II, and III the children readily gain acquaintance with the more prominent color tones, as red, orange, yellow, green, blue, and violet. They are interested in collecting samples or in separating into color groups samples already gathered, they learn to compare samples so as to match colors as nearly as possible, and later can sort out material with considerable discrimination; for example, in placing two given colors, as yellow and green or green and blue, at a little distance apart and arranging samples so as to form a graded series of intermediate tones between the two, or in making series of lighter and darker

tones of single colors by means of samples. A limited use of color in drawing is also of value.

In Grades IV, V, and VI one of the most valuable factors in developing knowledge and appreciation of color is the use of water colors in representation, with special practice in carefully matching different colors of objects. Experimentation with pigments, in producing tones of colors that shall differ from given colors in being more or less intense or in being lighter and darker, or in forming a series between one color and another, as was suggested with samples, also develops discrimination.

In Grades VII and VIII the use of color in description and truthful representation is increasingly valuable. The children are readily interested in learning something of suitable and harmonious relations of colors as used in industries and in home surroundings. They should be helped in making collections of good examples of color in textiles, color prints such as occur in magazines, miscellaneous color designs, etc. They should be interested in the color effects in nature, in landscape and in plant and animal forms, and should be given some practice in making good color combinations for use. At this age elaborate verbal discussions of color theories seem to be of little value to the children.

CHAPTER III

GRADE I

The most valuable outcome of the work of the first year in school appears to be the formation of a habit of drawing things uppermost in the interests of the children, and of shaping easily handled material till manual expression becomes a matter of course.

This is accomplished most satisfactorily when there is little criticism of results and when technical instruction is only incidental. The greatest progress appears to come when the instructor works at times with and for the children, in order that they may see better ways of obtaining results.

The function of manual work at this time is to furnish the children with a means of expressing their constructive and imitative tendencies in concrete form. When children shape clay or mold sand or draw, they find their ideas are assuming visible shape. This discovery stimulates still further the mental imagery and the desire to express it. Little technical skill is acquired, but a coördination is developed between ideas and muscular reactions and the children become aware of certain inherent qualities and laws of inert material.

The following paragraphs present more detailed considerations regarding those phases of representation, construction, and design which seem to be of greatest value during the first year in school.

Representation. This should consist in general pictorial expression of things of interest to the children, with much encouragement and little criticism from the teacher. Their other lessons, their toys and games, incidents of their experience, — in fact, all those things which are most vividly in mind and which form the topics of their conversation, — are appropriate subjects for drawing. Their pictorial expression is so symbolic and arbitrary in its shorthand conventions that it lends itself to free, rapid expression as later and more elaborated drawing cannot.

The first interest children show in using a pencil seems to be awakened by the pleasure of making marks with it, regardless of any significance in the marks themselves. They will cover one sheet of paper after another with meaningless scrawls and be delighted apparently by the fact that movements of the pencil over the paper leave visible marks in their path. This period has been termed the "scribble stage."

By degrees the marks take on significance. Interest in representing things is added to the interest in mere scribbling. When children enter school they are usually just emerging from the scribbling stage and are beginning the use of forms, somewhat as hieroglyphics in a sort of picture writing. Fig. 2 shows early interpretations of the human figure, a house, a tree, and an animal.

At this time children show little interest in representing accurately a particular object placed before them. Passy thus describes the attitude of a primary child toward a model given him to draw:

> He does not hesitate, but seizes his pencil and draws rapidly in an automatic manner. It is impossible to make him look at this model with any attention. If any one commands him to look at it, he

hurriedly casts upon it a distracted and disdainful glance and continues without concerning himself with that which he sees. The moment he has finished he shows it to you with a triumphant air.[1]

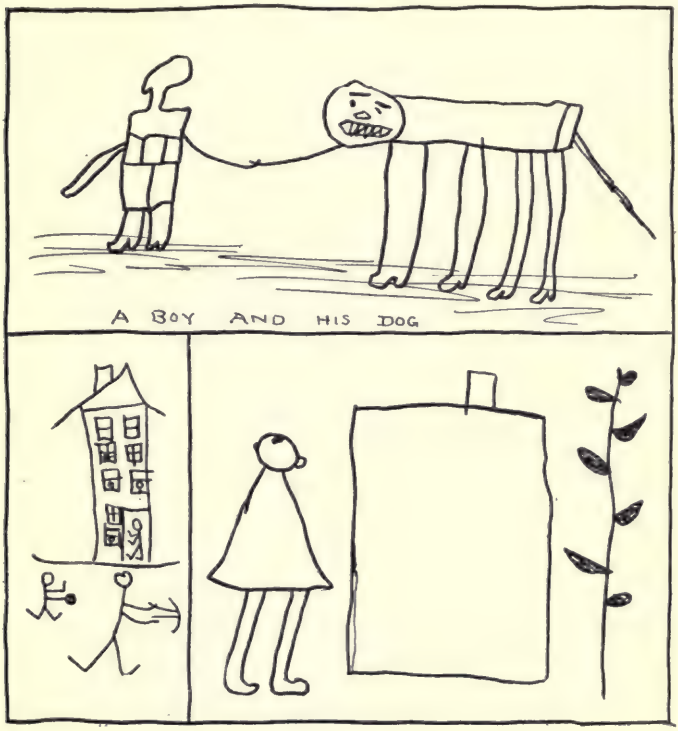

FIG. 2. Early drawings by children

During this period when the children are interested in representing by crude pictographs the ideas which things suggest, rather than the correct appearance of the things themselves, almost any result satisfies them. The drawing,

[1] Quoted by Frederick Burk in "The Genetic vs. the Logical Order in Drawing," *Pedagogical Seminary* (1902), p. 296.

although it may be meaningless to others, is for the child who made it a sufficient suggestion of the idea that inspired it. He has a reason for every mark.

These symbols once used are likely to be repeated unmodified by reference to the object. For example, Fig. 3 shows symbols which different children drew to represent

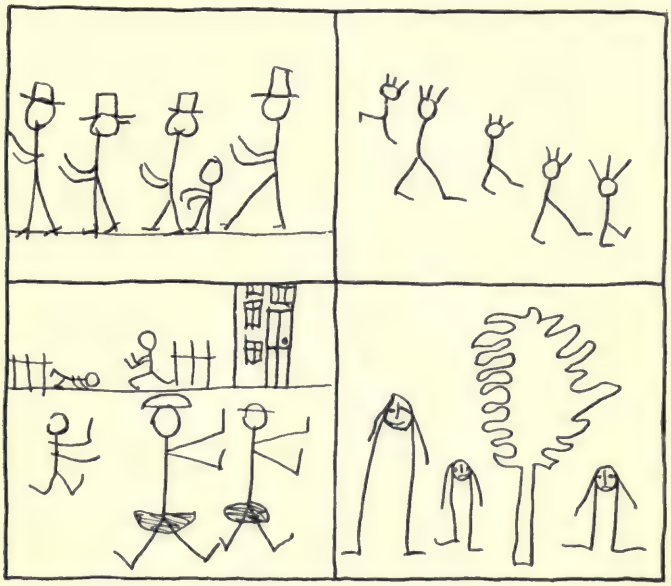

FIG. 3. Symbols used by different children to represent the human figure

the human figure. In each the particular sort of line chosen by each child to represent arms and legs is repeated in all the figures by that child. The same recurrence of the symbol first used is to be seen in drawings of most other objects, as trees, houses, etc. These symbols are often strikingly similar to those used by ancient and primitive peoples whose drawings are highly conventionalized.

Young children draw what they know about the objects, rather than what their eyes see at any given moment. For example, they will show both ends of a house in the same drawing, and will sketch not only the exterior, but, if allowed time, will add the furniture and people inside, as if the walls were transparent (Fig. 4). The attitude of mind which leads the children to do this is not a fault to be overcome by instruction, but a stage to be lived through and

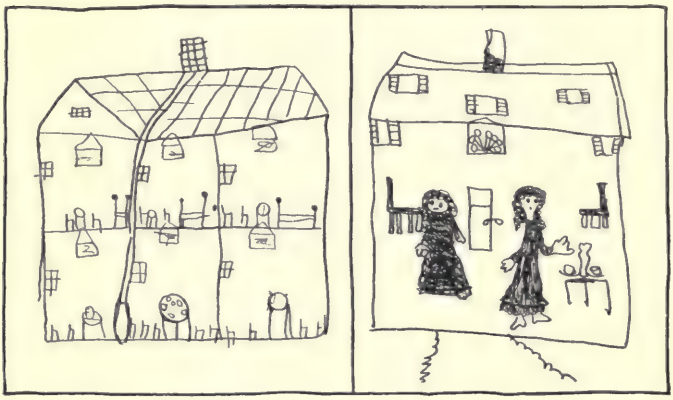

FIG. 4. Children's attempts to show what they know rather than what they can see at the time the drawing is made

one which contributes directly to further development. The fact that children often make little progress at first toward what adults consider to be good drawing, and that they frequently revert to scribbling, should not be a cause for discouragement on the part of the teacher in these grades.

After children have obtained a little familiarity with the pencil their drawings frequently become surprisingly expressive of character, as, for example, the group of sketches shown in Fig. 5.

Incidentally, with this general use of illustrative drawing a definite beginning may be made in developing ability to draw more truthfully by devoting a number of lessons to the same subject, with new suggestions regarding it at each lesson. For example, in Fig. 6 the child who has made crude representations of houses, as in *A*, tries in another lesson to draw a house and fence which shall stand upright,

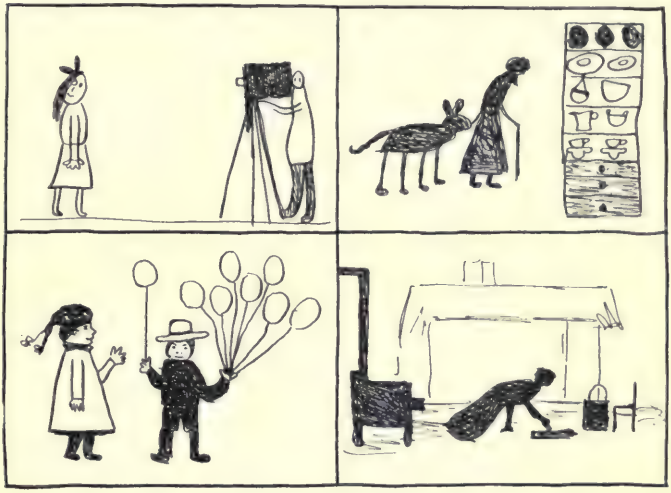

Fig. 5. Illustrative sketches by children

with the result shown in *B*; and later draws *C* and *D*, which, while far from perfect, indicate a distinct advance in ability to represent structure. Fig. 7 shows sketches involving a snow shovel.

The results of careful and repeated study of a few topics will be discussed in fuller detail in Chapter II, p. 49. In general, however, it may be said that ability to record observations correctly can be developed when the children are older, with much less expenditure of time and

FIG. 6. Sketches showing children's progress in drawing houses

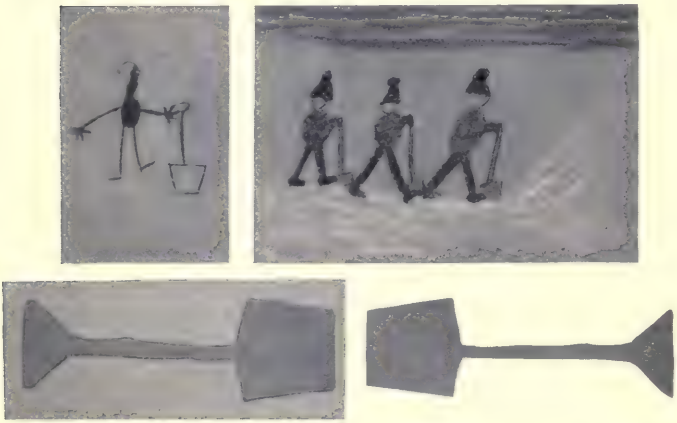

FIG. 7. Sketches involving a study of the shape of a snow shovel

effort; but facility of graphic expression comes most readily during these early years and is difficult to obtain later. During the first year or two of school life, the technical acquisition in drawing which is of greatest advantage to the next stage of the work is this facility which a child gains by drawing in his own way, with the aid of encouragement and good example. He needs continual use of this primitive picture language in describing things associated with home, out-of-door, and school life. Thus the children become accustomed to express their ideas by drawing before the age of self-consciousness and hesitation is reached.

Perhaps the best service a teacher of drawing can render in Grade I is to draw a great deal for the children on the board or elsewhere, not for the sake of setting them a copy, but of furnishing to them the unequaled stimulus of seeing some one do easily and well what they are attempting. Elaborate systems and courses can accomplish little without the encouragement and suggestions of example. Instruction in the language of drawing, as in the German or French language, should make use of the conversational method. At this age the tendency to imitate is an important factor in development in all lines, including the arts. In fact, the matter of drawing in early grades might almost be summed up as follows: Children who are with an instructor who draws well and uses his drawing as a common means of expression will learn to draw. Any other circumstances are less promising.

Construction. The value of constructive work in this grade consists mainly in the fact that it furnishes another medium for expressing ideas in visible form. As in drawing, the material serves to support and reflect the train of ideas, and this mental activity is in great danger of being checked

if any emphasis is placed at first upon technical accuracy in processes. The problems therefore should not entail complicated planning nor prolonged processes, and the material should not be too definitive, but be adapted to general expression and invite the children to endless amplification of their ideas. The construction in this grade might be termed free representation in three dimensions.

The sand table offers a wide range of possibilities for such work. The sand is readily shaped to represent various configurations of land, and on these, with supplementary material, different localities may be represented and scenes enacted.

Modeling in clay or other plastic material is a means of expression which awakens strong and long-sustained interest. In using sand or clay both hands are required to shape the responsive material into the desired form, and every touch makes an evident modification. Modeling has not been so universally adopted as its value would seem to justify, largely on account of the difficulty in caring for the materials. It is, however, one of the important modes of manual expression in primary grades.

Cutting given pictures and other shapes from paper gives valuable training in gaining control over a tool as a means of shaping material to a predetermined form, and is an important form of manual work in primary grades. Practice in paper cutting of given forms results in marked progress in ability to control the hand so as to follow an outline. In addition to the technical control, children gain new suggestions of form from the pictures they cut out, and these are likely to appear in later drawings. Free-hand paper cutting is also of great use as a means of interpreting objects in terms of silhouette (Fig. 8).

Accuracy in measurement should not be expected from small children, but first steps in handling a rule may be taken by using it as a means of drawing straight lines

Fig. 8. Free-hand paper cutting

between given points. Toward the end of the year some simple measurements which do not involve fractions of inches may be undertaken with profit.

Building with blocks is a type of constructive work which is of importance for small children. By matching

the blocks together and selecting those which fit they learn to estimate form with some degree of precision. By placing one block upon another so that the structure stands firmly they gain a sense of horizontal and vertical relations.

Objects so shaped as to offer hints to the imagination without embodying more than a suggestion often invite mental activity when more definitely elaborated forms fail. For example, children who have learned the names of chessmen will often carry on lengthy plays full of incident and dialogue, using the pieces as actors. The children appear to clothe the king and queen with more personality than would be the case if the pieces were realistic in appearance; and the knights seem to awaken greater interest than a complete representation of a horse. Experimentation with suggestive toys and figures promises to yield some answer to the question as to whether within reasonable limits, the sustained vigor of constructive imagination is not in inverse ratio to the specific elaboration of the material furnished.

Design and color. Small children appear to have little judgment regarding fitness of designs for any given purpose. They are not mature enough to undertake, unaided, problems which require tasteful distribution of different elements within a given area. In designs involving such arrangements, as, for example, Thanksgiving souvenirs, Christmas cards, valentines, etc., progress in genuine appreciation seems most certain when the teacher works out with the children designs which are simple and yet excellent, and thus accustoms them to examples of good arrangement which will influence their choices when later they plan their own scheme of spacing.

To recommend, as the writer unhesitatingly does, that these first arrangements should be made under the more or

less immediate influence of excellent examples, is to precipitate at once the general discussion of the place of originality in design. In recognition of the importance of this question, but without entering upon any full discussion, it may be suggested that good design is not the chance output of an uninformed mind. A young child may produce something original in the sense that it is a fortuitous arrangement of shapes that never existed before. Such a result, however, is not necessarily a design because it is original; nor is there any value merely in the fact that it did not exist before, if it is not good enough to be in itself a reason why it should exist at all, or if the experience involved leads to no better production in the future. It is probable that children who at this age, with no example or suggestion, have made an original arrangement, generally like it because it is their own production. Unless there is opportunity to compare it with something better, a commonplace arrangement becomes fixed in mind and its influence persists and is evident in subsequent efforts.

On the other hand, children at this age readily develop considerable proficiency in producing the simpler forms of decorative arrangement, which consist in the repetition of a single shape to form a border or surface pattern. Such patterns occur automatically in certain forms of weaving, and children often show much ingenuity in working out the possible variations.

A sense of rhythmic arrangement can be directly developed by repeating a simple unit, with pencil or brush, free-hand, so as to form a border or a surface pattern. The feeling of rhythm appears to be increased when this repetition is done in part to a time count, which at first is led by the teacher. This count may be vocal or indicated

upon the piano. This practice in repeating a series of forms to a corresponding movement of time gives a sense of rhythm which is not developed by drawing borders in which the spacing of the units is indicated either by dictated points or with the aid of measurements before the units are drawn (Fig. 9).

Exercises with these simple borders are the first steps toward more complicated problems in upper grades, such as surface designs, bilateral forms, and balanced designs of abstract shapes, or conventionalized flower forms produced with a few pencil or brush strokes. In this practice, as in penmanship, beautiful form and style are gained, not by pausing over one unit to perfect it, but by repeating the shape till the hand has mastered it and can use it with facility.

During the first year in school children should become familiar with the colors most easily recognized, such as red, orange, yellow, green, blue, and violet. This may be done by placing before the children a fairly large sample of one after another of these colors and having them collect objects of a similar color. In bits of cloth and paper, and in flowers and leaves, the color under consideration will be discovered and its sensation perceived more clearly than by chance observation. The use of colored crayons for drawing is also an important means of training recognition and discrimination of color.

A reasonable standard of accomplishment has been reached if, at the end of the first year in school, the children have developed a habit of expressing their ideas with pencil so that drawing seems to them a matter of course; if they have gained ability to handle simple material such as paper, clay, sand, and blocks, so that such materials assume desired

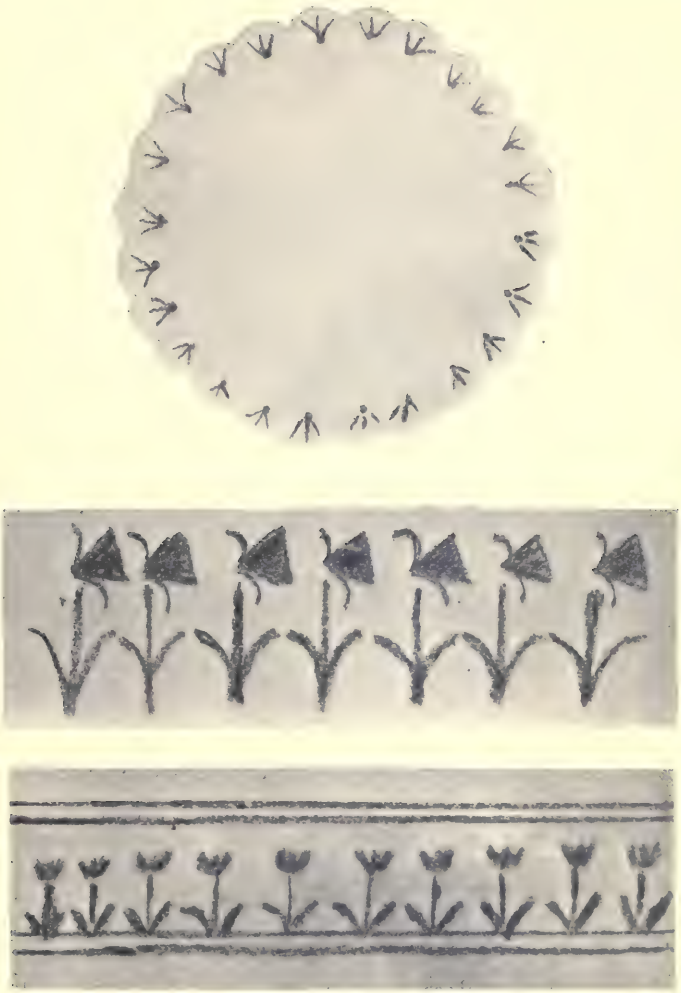

Fig. 9. Borders drawn free-hand

shapes; and if they have gained some ideas of good spacing and arrangement under guidance of the teacher, and have begun to enjoy the rhythmic spacing of forms and to discover the general distinctions of color.

That their graphic expressions during this first year are crude and their constructions inaccurate when judged by adult ideas, and that their standards of good design are gained from their instructors, are not causes for apprehension. Detailed instruction as to methods of holding pencils, or the quality of line to be obtained, or attempts to teach such items of the technical grammar of drawing as foreshortening or convergence almost invariably do much harm and no good at this age.

The primary instructor who draws with and for the children, and who constructs objects with them, is furnishing the most potent stimulus and inspiration for progress toward individual ability. Compared with the effect of this, methods and courses without such example are of secondary value.

CHAPTER IV

GRADES II AND III

Children who attend schools where instructors encourage drawing and constructive work as an everyday means of expression usually gain remarkable facility during the first year in setting forth their ideas by these means. Through their own invention and the suggestions of the teacher and of their fellow pupils they gain command of a wide variety of graphic symbols and simple constructive processes. Expression by means of illustration and construction, although crude and archaic, becomes a matter of course and is carried on with apparent pleasure and satisfaction.

A change in attitude toward the results is apparent, however, as the children grow older. They soon cease to be wholly satisfied with manual expression as a mere activity without regard to the quality of the product. When during the first year in school the child's impulse to produce something had found an outlet in lines or shapes, the crudity of the result seldom interfered with his exultation as he displayed his production, or caused him to pause for improvements or corrections before he proceeded to his next attempt. In Grades II and III the product as a product seems to make an impression on the children and gain importance in their estimation. They show indications of caring for the truth of the representation and the quality of the construction, and wish greater knowledge and more adequate means for carrying out their ideas. This newly awakened desire is

illustrated by such an instance as the announcement of a child attempting to represent a ship at sea, that he was going to find some pictures of ships in order that he might know more definitely how the prow of a ship was shaped so he could draw his as it should be. Children who were making nature drawings inquired how to make the bulbs "look round," how to make some leaves look as if they were behind others, how to paint a white narcissus on white paper, etc.

This realization of the need of data in order to represent adequately, and of knowledge as to how to put material together if the product is to be satisfactory, offers opportunity to give instruction which the children can put to immediate use, and which at the same time enriches their ideas and extends their knowledge of shapes, materials, and processes.

Based largely on this fact, work of the following general character along the lines of representation, construction, and design is recommended as appropriate for children during the second and third years in school.

Representation. General use of drawing and modeling as means of expression and description should continue through these grades. The freedom and facility gained during the first year enable the children to represent the salient features of scenes and incidents with considerable effect (Fig. 10).

The growing interest of the children in the quality of results makes worth while a more careful and detailed study of objects than was advisable during the first year; and the chief additional contribution in the way of special technical instruction which these grades can make, appears to be a somewhat intensive study of a few typical things conducted

by devoting a series of lessons to each, for the purpose of enabling the children to draw these particular things well. Such study frees the drawing from some of its crudity and directs the beginnings of the kind of observation which should result later in correct impressions and the ability to record them with some degree of accuracy. Children of this age progress rapidly when they work for several consecutive

FIG. 10. Illustrative sketches

lessons upon the same topic, expressing it each time in a different way.

For example, if the subject under consideration is a house, after the children have done their best in representing it, attention may be called to particular and significant points; for instance, the desirability that the sides of a house stand vertically. They should examine the houses they are drawing to see if any of them lean. They readily become interested in this geometric relation, and for a time will work earnestly over houses on paper and

blackboard, in the endeavor to make the sides, doors, windows, and chimneys exactly vertical. They are then eager to draw villages in which every house stands upright and where fences, poles, etc., are in proper position.

Later they may add to their fund of definite knowledge by a study of houses and pictures of houses, to see how gables are shaped, how doors and windows are placed, how chimneys join roofs, etc. They may cut pictures of houses from paper or trace them, and by actual muscular movements over the shapes gain a clearer perception of them. They may make patterns for the construction of houses in paper or cardboard and build houses in the sandbox, which shall embody the ideas thus far gained.

If the material out of which the house is constructed is of particular interest, as in the case of a log house, the problem of learning how to represent this becomes a topic for study. Fig. 11 shows studies of houses by children in these grades. The result of practice in vertical and horizontal relations is observable in the sketch of the fire, where, notwithstanding the interest in depicting exciting details, the geometric relations of the structural lines have been fairly well represented.

Again, if the subject for illustration is a bird, the first drawing may be followed by a study of the shape of the bird's head, the way his feet are placed upon the ground, the angle at which he stands. The bird may be drawn on paper, modeled in clay, cut from paper, painted or drawn in color. Pictures may be collected illustrating the bird in various positions and activities, and some of these may be traced and cut out. After a child has gained what he can from observation, and his progress in representing a given object seems to have reached its limit for the time, his powers

of expression receive a fresh impulse if he can see some one draw skillfully the things he is trying to represent. To furnish such an impulse by drawing with facility before the children is one of the most valuable contributions a special teacher of drawing can make during these two years.

After a few lessons the children master the general shape and characteristics of the bird so that they can illustrate

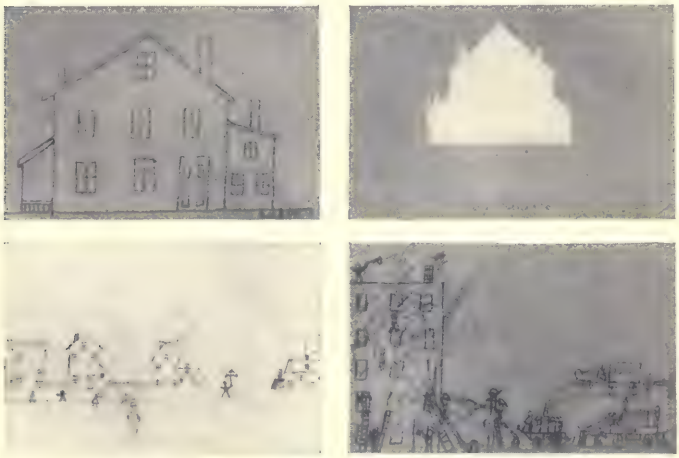

Fig. 11. Drawings of houses

any story which admits of interpretation in terms of that bird and its activities, and the drawings are informed with all the details and data gained in the several steps.

The interest of the children increases with successive lessons if each presents some new phase. There is a familiar background to which to refer new elements. At first the children are likely to make their drawings much alike. After absorbing items of detail from pictures and objects, their productions show great variety and a marked advance

in definiteness of shape, correctness of general proportions, and expressiveness of character.

The important advantage of the cumulative effect of a number of carefully planned consecutive lessons on the same topic is often overlooked, and as a result drawing frequently fails to show definite progress, and either ceases to interest or becomes so much a matter of superficial facility that children miss the stimulation that comes with a measurably thorough mastery of a subject. Advancement in ability to draw seems to become evident, not at first in gradual increase of power to draw anything that may be presented, but in learning how to draw one thing after another and thus accumulating a graphic vocabulary. The facts that children have to be taught how to draw each new object, and that the true scope for originality at this age is not so much in attempting to learn by unaided efforts how to draw an object as in using it expressively after it is learned, should be taken into account in planning work for primary children.

The interest that is evident when a group of children work together on a single topic, developing the description as they proceed, is a factor that may be utilized. For example, when the beginning of an illustration of some topic in which the children are interested is made on the board, all are generally enthusiastic in contributing a share to the result. Topics suggested by the school work or outside interests, such, for example, as a farm, a city street, a wharf, a market, a harvest field, etc., are excellent. The children show great resourcefulness in composing the scene and offering additional material, and after the first rapid sketching is done they are ready to collect data for correction and improvement of the results. Fig. 12 shows

an arrangement of paper cuttings by a class which was making a study of frogs.

The results of the special instruction should continually be absorbed into the general descriptive drawing and become apparent there. Otherwise little improvement will be evident in the general drawing, and not much that is of permanent value will come from the technical instruction.

FIG. 12. Paper cuttings made by a primary class after studying frogs

Constructive work. Part of the constructive work may with advantage parallel the work in drawing, so that the same things which are being represented in two dimensions may also be constructed in three. That such a relation enriches the value of both means of expression is shown by the increased understanding of form reflected by the drawings, when the same objects are being constructed, and by the amount of data and suggestion which is secured first

by drawing and then embodied in the construction. Such problems as houses, furniture, and the various articles related to studies, games, and occupations, are continually presenting themselves and offer an abundant list of topics. In most primary manual problems drawing and construction are both involved in the final result.

In addition to free, illustrative construction, these grades should also present the first steps in well-planned work which requires careful measurements and exact delineation of patterns. This means the beginning of working drawings. During the first year most of the paper cutting that necessitated following a predetermined shape was based upon outlines furnished to the children, such as pictures and patterns. In addition to this the children should now begin to make their own patterns, and should come to appreciate the value of the rule as an instrument for determining measurements and straight lines with precision. It is not difficult to awaken and maintain interest in the accurate use of the rule, if the problems presented involve at first only a few lines and measurements of even inches and later half and quarter inches. The rule used by the children for constructive work during these years should not contain smaller divisions than quarter inches. The children should be shown how to manipulate it, and should be interested in maintaining a relatively high standard of accuracy whenever the work departs from free-hand expression and requires an instrument of accuracy. The rules provided for children are often confusing because of the method used in many cases for indicating dimensions. The figures are frequently placed beside instead of over the line. So many mistakes in measurements made by young children are directly traceable to this cause that it

seems worth while to select a rule which, as in Fig. 13, eliminates this confusion.

Bookmarks, tags, weather signals, flags, pinwheels, valentines, covers, envelopes and folders for school work, illustrative diagrams such as plans for school gardens and other projects of this sort will give opportunity for planning objects by simple patterns in the flat.

It is important that during these two years a few fundamental geometric relations should be thoroughly apprehended by repeated use. The relations of vertical, horizontal,

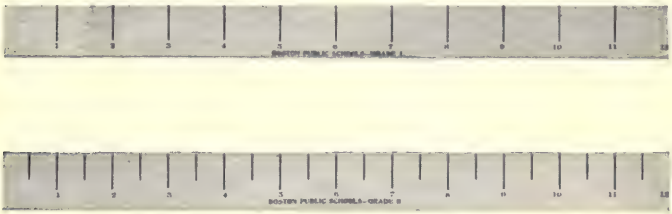

Fig. 13. Foot rules properly marked for primary children

and parallel occur in such drawing and construction as are called for by the house already suggested.

In addition to the subjects involving these relations some drill work repeated at frequent intervals is necessary to insure the complete mastery of such relations, and ease and confidence in using them. In the third grade this drill may be undertaken with good results. For example, when lines are drawn on the board at various angles children are interested in trying to draw other lines parallel to the given ones and testing their equidistance. They also like to accompany their free-hand drawing and construction with occasional drawings of vertical lines on the board, holding the chalk at arm's length and producing the line slowly and steadily to a

length of two or three feet and then testing it with a plumb line. Horizontal lines and lines to represent given slants should also receive attention. It is of great importance that these geometric relations should be thoroughly mastered so that they may be used with facility. The mind has then a developed appreciation of fundamental relations, and a standard for estimating and comparing variations from these.

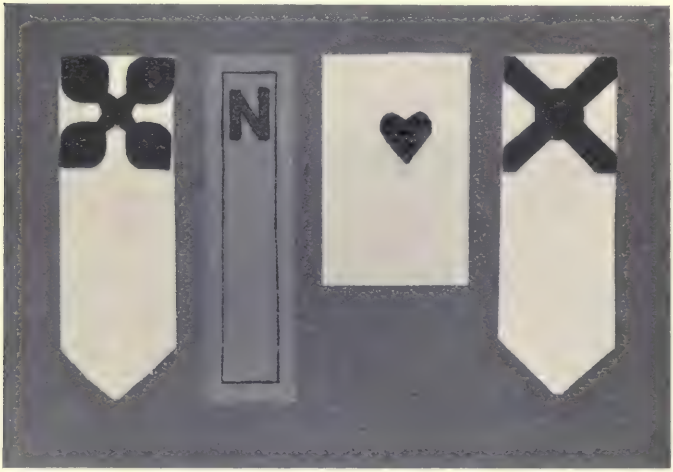

Fig. 14. Designs for bookmarks and valentine

Design. The general lines of work suggested for Grade I continue through Grades II and III with higher standards of accomplishment. The problems involve planning simple forms to be constructed and decorating them with suitable ornamentation — such objects as holiday greetings and souvenirs, bookmarks, valentines, covers for school papers, etc. Fig. 14 shows bookmarks and a valentine. The decorations may consist of units and borders, which the children readily invent by placing pegs and lentils,

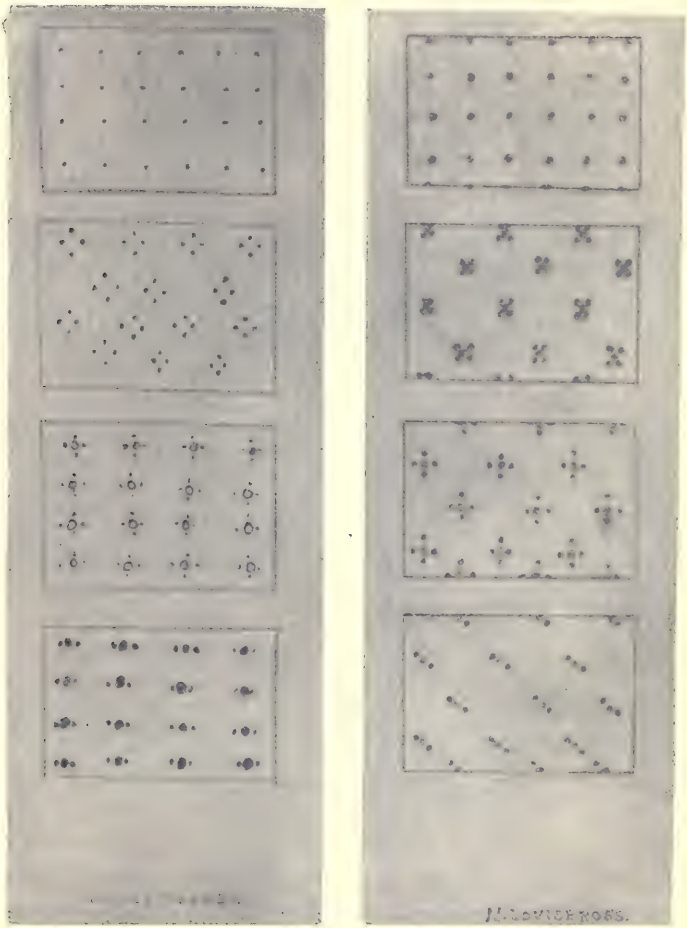

FIG. 15. Surface patterns made of different arrangements of spots

afterwards selecting and drawing the best of these arrangements (Fig. 15). The invention of the children at this age can very easily be directed along the lines of good types of

design by the example of the teacher. Leadership which, by example, directs inventive activities along right lines at first, obviates the necessity of much of that correction and verbal instruction which are sometimes necessary when poor arrangements have become fixed in the mind.

The children should continue the rhythmic drawing of borders by repeating units to a time count corresponding somewhat to that of music. After the experience of the first year they are usually able to use more difficult units, to draw them with excellent spacing, and to apply them in making decorative borders and simple surface patterns upon the forms they have constructed, employing no other measurements than those rapidly estimated by the eye as the drawing proceeds. Fig. 16 shows the bowls of the Three Bears, a parrot which had been a subject for form study, and a flower, used as units.

During the second year the children learn readily to discriminate hues of color more exactly than in the first year, and to bring in samples or to pick out objects, the colors of which are like the samples shown by the teacher. In the third year they may with advantage learn to distinguish several steps in the different values of a given color. The word "value" is used here to denote the relation of a color to light and dark. In this significance of the term the value of a color changes as the color grows lighter or darker. For example, if white is mixed with green the resulting lighter green is higher in value. If black instead of white is mixed with it, the resulting darker color is lower in value than the original green. Children may collect or be furnished with an abundance of color samples, and after selecting those of one color hue, — for example, blue, — arrange these so as to form a series of different

values, ranging from light blues which are almost white to those which approach black. In a similar manner they may arrange value scales of other colors. Any great degree of accuracy in these arrangements should not be demanded, nor should the number of steps between the lightest and darkest be so many that the children cannot readily

FIG. 16. Borders of units suggested by topics in different school studies

perceive the change from one step to another. Five steps between lightest and darkest are sufficient to illustrate well the effects of various values, while seven are as many as can be appreciated by most children in these grades.

Many of the designs made by children call for color combinations and give opportunity to use the effects of different steps of value in pleasing combinations.

Young children can use water color to excellent advantage for the occasional experience of color effects, but they are too young for any very intelligent handling of a medium so capricious. During the first three years about all the color expression that is valuable can be secured by collections of samples and by the use of colored crayons. The disadvantages of postponing the regular use of water color till the fourth year are probably more than compensated for by the fresh stimulation from the introduction of a new medium at that time, and by the fact that the results obtained by primary children in water color, which are admired by adults, are almost always chance effects caused by the fluid character of the medium and were unforeseen by the child. Experimentation with accidental color effects has a definite value, but this value is perhaps greater when the experimenter is somewhat more mature and less likely to gain the idea that careless ventures which may turn out to be pleasing are more worth while and likely to receive greater recognition than purposeful effort.

A reasonable standard of accomplishment has been reached if, at the end of the third year in school, the children, in addition to increased facility in drawing, have also added to their resources of expression a somewhat definite knowledge of a few typical objects, gained by successive lessons on the same topic, and have fixed in mind certain fundamental geometric relations, such as vertical, perpendicular, horizontal, and parallel, not as definitions but as means of comprehending and expressing form; if they have developed their ability to embody ideas in materials, not only as a result of increased skill of hand but also because of the added power given by some command over such an aid to accuracy, foresight, and economy as a foot rule; if

they have better ideas of good spacing and proportions, and an increased pleasure in ability to distribute forms over a surface in consistently related measures, and to discriminate qualities of color.

The stimulation of leadership and example of the teacher continues to be a factor of the first importance in securing these results.

CHAPTER V

GRADES IV AND V

When children reach the fourth year in school the period of satisfaction in the mere spontaneous play with drawing and with constructive materials regardless of the quality of the product is usually over. Ability in spoken and written language has grown, and expression by drawing and construction is resorted to less frequently except in cases where language is not adequate. Children who at an earlier period have been delighted in shaping lines and forms which were a running accompaniment of their trains of ideas now see things more objectively and are conscious of the technical shortcomings of their work to a degree that robs it of its spontaneity.

The visitor to exhibitions of public-school work in manual arts is usually impressed by the vigor and expressiveness of the productions of small children, and often looks in vain in the work of upper grades for any adequate fulfillment of the early promise. Indeed it is doubtful if drawing and construction as means of general narrative expression will ever again be of as great value as in primary grades. The function of manual arts becomes increasingly specific as the school age advances and language assumes its proper place as the most appropriate medium of general expression.

Manual arts in these grades should awaken a pleasure in the sort of work which requires sustained effort directed

toward a definite end. A well-organized course presents problems to the children which are as specific as those in mathematics. The solution of each of these problems means a step toward some mastery of materials or methods, and this mastery should be insured by work involving repeated concentration upon the same problem in various forms till the fundamental processes become matters of habit.

Interest in new projects is easily awakened, but that interest which is aroused by carrying a project through to completion after the first enthusiasm has passed is of much slower growth, but is more trustworthy, and when systematically developed becomes a motive that can be relied upon. The attitude of mind towards the arts which is awakened in the children in these grades seems largely to determine the development of ability during the remainder of the school course.

The following suggestions for work in representation, construction, and design emphasize the points in technical development which the abilities of children seem to indicate as particularly appropriate to these grades, and which are factors necessary to freedom of expression.

Representation. One of the most important technical contributions which Grades IV and V can make to a child's skill in drawing appears to be ability to represent general proportions correctly. This more than anything else helps him to realize his wish at this age, to make things "look right." Children readily discern whether a drawing is "too tall" or "too short" as compared with the object, and they develop ability to estimate relative lengths of parts with some degree of precision.

One of the most common methods of obtaining correct proportions is to hold the pencil at arm's length so that it

appears to cover lines of the object to be drawn. Thus one is enabled to use it as a measure of relative dimensions. Aside from the fact that it is practically impossible to teach young children to use this method with any trustworthy results, the assistance obtained by such measurements, even when they are skillfully taken, is of extremely doubtful value. Progress in ability to draw correctly depends largely upon the power to compare visual images and discern their likenesses and differences. Pencil

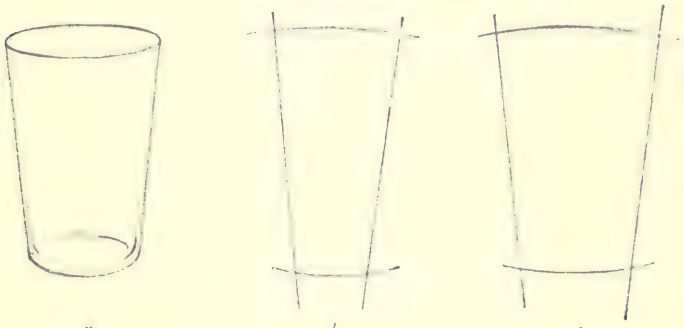

FIG. 17. Relative proportions of width and height

measurements substitute a mathematical computation for this visual perception.

For example, in Fig. 17 the pupil can measure and ascertain that the width of the top of the tumbler is two thirds of the apparent height, and with this information can plan his drawing correctly. On the other hand, if he will indicate the top and bottom of his tumbler by lines of indeterminate length, and place two splints to represent the sides, moving them until the included shape satisfies his eye, he will discover that he can thus determine the proportions with great accuracy. If one looks at *a*, which

is the shape to be represented, and then at *b*, he sees immediately that *b* is too narrow, while the image of *a* fits that of *c*, and the similarity of proportions satisfies the eye. The source of this satisfaction is not due to any confirmation from a mathematical estimation that the proportions of width and height are related as 2 to 3, but to an immediate perception of correspondence of images. Discrimination along this line develops rapidly with exercise. In Grades IV and V much should be done toward training the eye to swift and unerring perception of the agreement or disagreement of the shape of the drawing with that of the object. Unless this is done, drawing will be as halting and uncertain as are mathematical processes when the worker is not sure of the multiplication table.

Pencil measurements might be recommended as a final verification, except for the fact that they are seldom so reliable, even when carefully taken, as the visual perception which has received an amount of training equal to that required in lower elementary grades for the mere process of learning to take pencil measurements.

Occasional representation of objects by splints gives excellent practice in judging proportions. A movement of the splints gives opportunity to experiment with appearances without the necessity of erasing lines. Such representation is often a helpful introduction to drawing the object with pencil.

In the drawing of a toy boat (Fig. 18), a child can be led to take great interest in representing the hull in proper proportions, and in moving the pencil along the drawing till it reaches the exact position where the mast should be placed and then in showing how tall it should be to look like the model. He is thus led to think where his line

should go before he draws it, and the cultivation of this habit of procedure contributes largely to correct drawing. A large part of the poor drawing found in schools is directly

FIG. 18. Child's drawing of a toy boat in correct proportions

traceable to a reversal of this method, namely, to drawing a line thoughtlessly and then looking to see if it is right. Children at this age seldom develop a habit of blocking in the whole shape at first, especially in a group of objects.

That appears to be a method of analysis and synthesis demanding more intellectual maturity than they possess. They add part to part and so build up the result.

Perception of proportions often may be stimulated by having pupils exchange drawings and indicate to each other, by sketches or otherwise, how they think improvements may be made. The child who habitually makes his drawings too broad and heavy may with profit exchange drawings and suggestions with the child who goes to the opposite extreme. The instructor too often monopolizes this valuable experience of correcting the drawings of others.

Constructed objects such as toys or implements offer excellent opportunity for practice in representing correct proportions. Nature drawings with pencil or with water color or brush and ink call for careful representation of shapes and of character of growth. Mechanical slowness may be avoided by alternating rapid sketches which express as much as possible by a few lines and brush strokes, with drawings carried to completion by being worked over till they are as correct as the pupil can make them.

A second appropriate topic for these grades is the study of a few simple problems of appearance of objects in different positions, for example, one object beyond another, or the same object turned at different angles. The solution should constitute a definite piece of work for the pupil, and should be sought by observation, by experimental sketches, and by the collection and study of pictures which represent such effects.

A more or less intensive study of a few topics in each grade is necessary to progress in free use of drawing. Abundance of knowledge regarding an object or a pictorial effect tends to produce a willingness to express what is

known. The use of sketchbooks devoted to particular subjects in their various aspects and details is an important method of gaining pictorial data. The knowledge accumulated by intensive study of a topic persists for a long time.

Construction. The most important advance in constructive work which Grades IV and V can make, appears to be along the line of ability and willingness to undertake more careful preparation in the way of plans and patterns before shaping the material for final construction. In addition an increase of skill in handling new implements and more refractory materials, and a greater satisfaction in good workmanship, should be evident.

Problems will vary with the conditions of given localities. Some instructors prefer to use constructive work as a center for other subjects. Others plan a course to develop appreciation of industries and occupations, and still others choose as a basis for problems the immediate needs and interests of school and home. Whichever line is emphasized, much of what is valuable in the rest may be included, and in any case opportunity will be offered for experimentation with plans and designs and for increased mastery of tools and materials.

Some of the most valuable projects for these grades are those involving patterns to be cut, folded, and pasted. Continued use of the rule, with the addition of compasses and 45° triangles, and more complete control of scissors give the necessary mechanical ability. The children should be enabled to plan and make picture mounts, lesson covers, envelopes for various specified purposes, etc. With vellum, binding papers, tape, paste, sewing linen, and a punch cardboard work may be extended to include simple forms of bookbinding, such as portfolios, sketchbooks, pocket

memorandum pads, notebooks, needlecases, book covers, clipping files, etc. (Fig. 19).

Weaving is an occupation of universal interest during these grades. It develops some acquaintance with textiles and calls for knowledge of design and color. The looms for small articles may be of the simplest construction, such

FIG. 19. Objects involving simple bookbinding processes, made by children in Grades IV and V. The table was made by a pupil in Grade VIII

as can be made by the pupils themselves. Clay work in tiles and simple pottery shapes is another valuable medium of expression of form.

The sort of working drawing required in making patterns acquaints children with this means of predetermining the shape material shall take, and is the best sort of preparation for later working drawings which represent three dimensions. Some of the patterns should involve drawing to scale.

The great value of a relatively thorough mastery of the type of pattern and construction involved in a given problem should be recognized. For example, to make one or two envelopes is a somewhat formal proceeding and arouses only a passing interest. To understand the constructive problems involved, so one can plan workable patterns and properly construct envelopes to serve various purposes, from those suited to hold street-car tickets to portfolio envelopes for school work, implies much practice. To do this a child must gain ability to see the finished result in terms of patterns, and to know readily whether the pattern will work or not. Incidentally he will have taken to pieces a number of envelopes of different types to see how they are made, and often will have exercised his ingenuity in modifying types to suit his purposes. Familiarity with processes will have done away with distractive technical hindrances and opened the way for a child's powers of invention to have free play under the influence of the stimulating realization that he has skill to put his inventions into concrete form. This result seldom comes when ideas are partially assimilated and processes are uncertainly performed.

Simple forms of woodwork which can be done mostly with the knife are well adapted to these grades, and give some familiarity with the material, which is useful as an introduction to bench work in upper grades. For most of this work, thin wood which can easily be prepared in the rough and does not require bench tools, is sufficient.

Among the projects most frequently suggested by the children are pencil sharpeners, pen and pencil boxes, paper cutters, brush and water-cup holders, string and fishing-line winders, windmills, weather vanes, water wheels, games, models for bridges, derricks, etc., toy carts, sleds, boats of

various kinds, kites, flying machines, tops, pin-hole cameras, toy houses and furnishings, bird houses, etc.

Design. As a contribution toward progress in the two phases of design before described, — first, free practice in decorative arrangements for the sake of appreciation of such elements of formal beauty as pleasingly related spaces and harmonious forms, and secondly, designs for specific purposes involving utilitarian as well as æsthetic considerations, — Grades IV and V can easily develop skill in the following lines.

1. Modification of natural forms for purposes of design. If a child selects a form which he has already learned to represent and draws it rapidly and repeatedly from memory, he will soon reduce it to a symbol by elimination of all but a few selected lines. This symbol will tend to become fixed by repetition and will gain a certain individuality of style as handwriting does. When this form is learned so that it can be drawn easily from memory it can be used as a unit for repetition in borders and also over a surface, as, for example, a wall paper for a doll's house, a book cover, end papers for books, etc. Modification of forms for decorative treatment may also be obtained by repeating them under the limitations imposed by certain materials, for example, by squared paper, the weaves of basketry and fabrics, cross-stitch, etc. (Fig. 20).

2. Planning designs for specific purposes. The most important question in design is not how much can be included in the space but what is the best distribution of appropriate material. This can be emphasized at first by furnishing the elements and leaving to the children only the problem of the disposition of these given elements, which at this age is quite sufficient.

For example, if the object to be ornamented is a rug, a folder, or a box cover, the elements of decoration may well be limited at first to a plain band for a border. The pupils

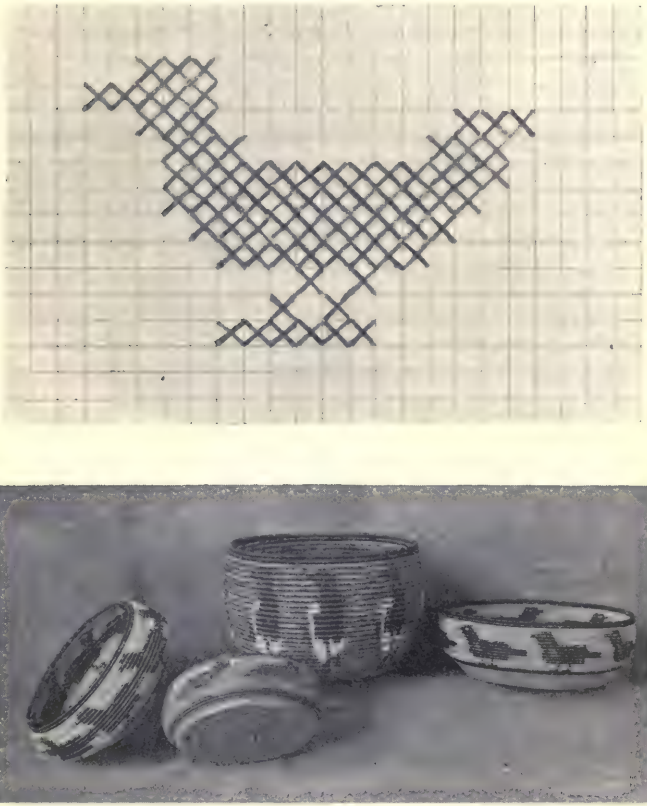

Fig. 20. Bird forms adapted to cross-stitch and to basketry

can experiment by means of splints or other material which will represent bands and can easily be moved to give the effects of different widths of margins and of border lines.

They can thus determine the spacing which produces the most pleasing effect.

Suppose the problem is to choose the spacing for two strips across a rug which is to be woven. If the children cut patterns of the rug and place two splints or pencils or strips of paper across to represent the stripes, and move these back and forth to see the effect of different spacings, experiments have shown that they will generally select as the final choice an arrangement not greatly

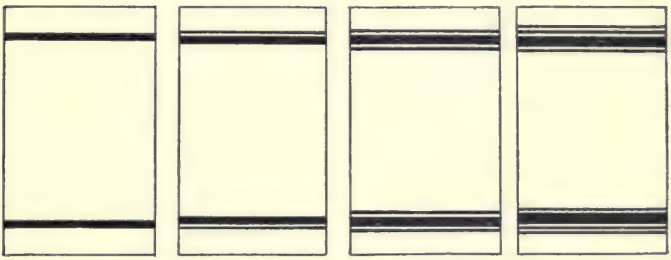

Fig. 21. Border designs for rugs made by different arrangements of lines

different from the proportions shown in Fig. 21, which are pleasing.

After children can space a simple border well, the combinations may be made more varied by a study of the best effects of borders composed of two or three lines of varying widths. Later the children should experiment with the possibilities of modifications of the borders to form decorative corners or accents (Fig. 22).

The simple decoration of constructed forms and the spacing of printing on covers for school work, the planning of margins, titles, etc., so that language, spelling, and arithmetic papers may present a good appearance, furnish appropriate problems. In all these cases the results depend for

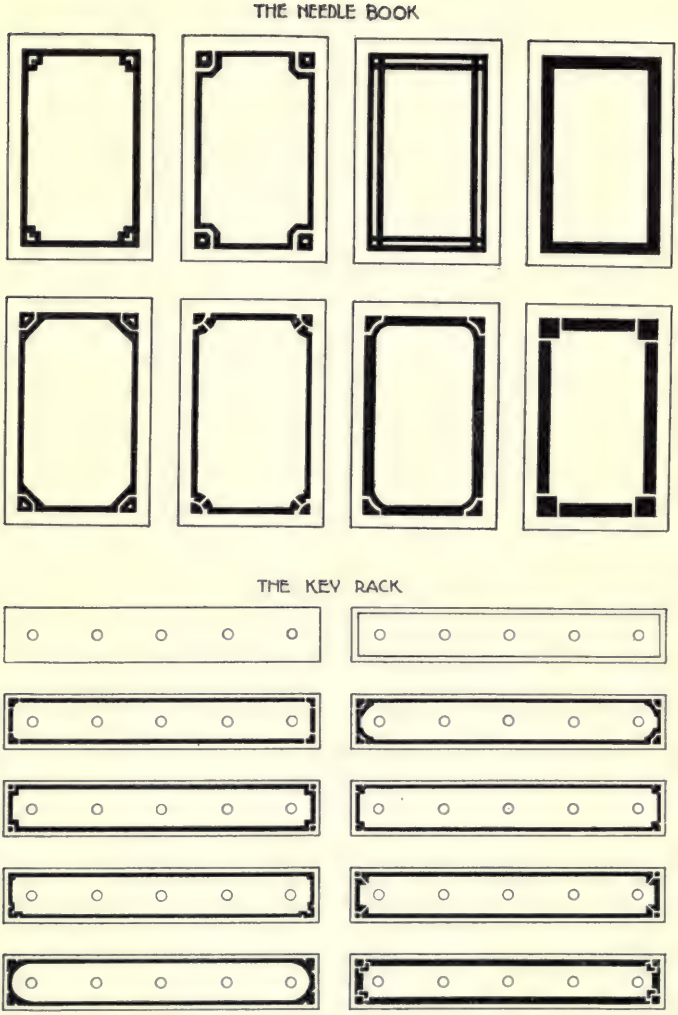

FIG. 22. Border designs with simple modifications for corners

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their effect upon well-related spaces. Fig. 23 shows a design for a match scratcher, involving well-chosen proportions.

By limiting the elements which children are allowed to use, attention is concentrated upon an attempt to make the best possible arrangement of what is given. The ability, which is apparent at about this age, to appreciate good spacing should be developed from year to year till it becomes unerringly discriminating. Thoughtful experimentation with a few elements is an effective method of developing this ability.

Fig. 23. Design for a match scratcher, involving well-chosen proportions of margins

Children are readily interested in the collecting of designs similar to those which they themselves are making. These collections are always valuable in widening the acquaintance of the children with the general use of design and in presenting suggestions for new decorative combinations. Fig. 24 shows a collection of corner modifications of borders, gathered from magazines, advertisements, etc.

In the fourth year in school, children can use water color intelligently for matching the hues of objects, for learning what effects the different pigments produce when mixed, and for representing simple color effects. They should also learn how to make even flat washes of color over given areas. In addition to matching colors, special

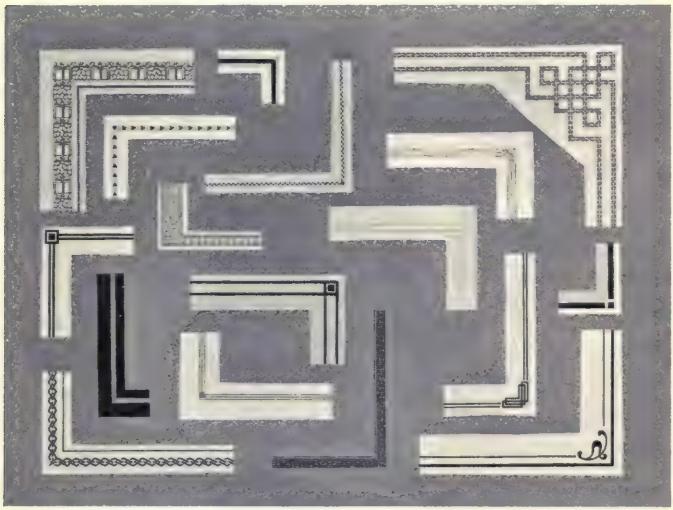

FIG. 24. Border and corner designs collected from magazines and advertisements

training in discriminating color tones may be given by having pupils make, in water color, samples showing several definite steps in values of each color and in hues intermediate between two given colors. For example, by painting a patch of pure blue, and then other patches of blue increasingly diluted, and still others where more and more black is mixed with blue, a number of tones will be obtained showing the range of values of blue from pure blue to

white and also to black through successive gradations. By placing on these patches a small circular or oblong pattern about one and a half inches or two inches across, and tracing around it and cutting out the shapes, a number of colored samples uniform in size will be secured, from which children can select a few, perhaps five, which make equal intervals of value from the lightest to the darkest. These mounted in a row form a scale of values of the given color. Graded steps of hue between any two given colors, for example, yellow and blue, may be made by painting first a patch of pure yellow and then others, each with more blue and less yellow, till pure blue is reached. By such practice children become acquainted with the behavior of colors as they ascend toward white or descend toward black or become modified by other colors. They also develop a discrimination of intervals of color and of light and dark which is of great importance in problems of representation and of design.

A reasonable standard of accomplishment has been reached at the end of the fifth year in school, when to the increased facility in graphic expression, which comes from continued general practice and from intensive study of a few forms, has been added definite training in quick perception of proportions of shapes and slants of lines, so that the mind is able to retain the image of the object and compare it with that of the representation and to discern the correspondences and differences; when children bring to their constructive expression such acquaintance with new tools as gives them new mastery of material, and such knowledge of patterns as enables them to think out processes and forecast results more definitely and intelligently; and when they find increased pleasure in well-related spaces, in the best solution

of simple problems in design, and in the greater familiarity with color that comes from continued study, aided by the addition of a new medium of expression in the form of water color.

CHAPTER VI

GRADE VI

Children in Grade VI have generally reached a stage of maturity where they are able to enjoy working with sustained purpose for a result that requires a considerable length of time for its realization and that demands thoughtful and somewhat complicated planning. They take pride in attaining a good standard of workmanship in what they produce, and find satisfaction in its usefulness, even though that usefulness is for the benefit of society at large and not directly for themselves. An appreciation of the beauty of well-related proportions is increasingly apparent. Children at this age will occupy themselves industriously with problems of design that demand, as a book cover does, the experimental arranging of title, ornament, and other elements until the space relations are most pleasing. In representation the children desire a knowledge of how to picture objects so that they will appear to be real and convincing, or, in the case of diagrams or drawings relating to the sciences, to make such records as will convey trustworthy information.

All these attitudes toward the manual arts are often evident earlier than the sixth year in school, but at this time they furnish sufficiently strong motives to lead the children to sustained effort for the sake of solving a problem in representation or of mastering tools and processes as a means of freedom and sureness in execution.

Perhaps the most significant attitude of mind characteristic of children in Grade VI is the awakening of the desire to be connected with the activities of the outside world and to do something worth while. Life in the country offers abundant occasions for such occupations. Each child as he comes to suitable age can assume some responsibility, the meeting of which contributes directly to the welfare of the family. The garden, the woodpile, the poultry yard, the kitchen, give concrete opportunities in which the relations to family welfare are immediate and evident.

In large towns and cities outlets for activities which make the boy or girl a responsible contributing factor in the social system are not so obvious. Products are bought ready-made. Children come to regard things as the equivalents of money, rather than of labor and skill. Moreover, the providing of all school supplies by the town or city often presents, with its evident advantages, the disadvantage of leading children to feel that the municipality is an impersonal, inexhaustible source of supply. In Grade VI appear also symptoms of that deflection of children from schools into industries which reaches its height at the end of Grade VIII (see Fig. 1, p. 13). The fact confronts us that about two thirds of all children leave school by the end of the eighth grade and go to work. As has been already pointed out, the seriousness of this situation is found in the fact that these children are too young to enter vocations which call for skill or offer opportunity for development. Such occupations as those of errand boys and cash girls are typical of what is open to children in the cities. The majority appear to drift about with no industrial interests or vocational outlook and take whatever pays best. They spend important formative years in employment which offers slight prospects of

advancement. This experience tends to produce an unfortunate attitude toward work as something which contains within itself no interest nor scope for realizing ambitions. A small proportion of the children will rise in spite of these conditions, but not the majority, unless vocational interests and right attitudes toward work are awakened before they leave school.

The educational system, with its high schools and its growing number of technical schools, offers increasingly excellent opportunities for those who will remain. The appallingly large proportion who do not remain makes pertinent the question as to whether schools completely fulfill their function by providing advanced opportunity for those who will take it; or whether, in addition, elementary schools ought not to give a training planned definitely to awaken industrial interests and to promote industrial efficiency and thus satisfy the desire to begin to do something worth while and to have a part in the world's activities. The final form which this training will take must be determined by wide experimentation; but the evident need that children should have a part in some work which develops a realization of the interdependence of individuals in modern civilization and of the responsibility of each, of the fact that what the municipality furnishes is produced or supplied by its individual inhabitants, and of the meaning of industrial life, gives some hints of the lines along which experiments should be tried.

One promising suggestion proposed to meet this problem is that the time allotted to handwork in Grades VI, VII, and VIII should be increased to at least five hours a week, the extra time being taken from the special time given to drawing and arithmetic, these activities being embodied in the

constructive work, and that a part of this time be devoted to making material which the city or town uses in its school-supply department. In this way a utilitarian standard of technical excellence would be furnished and at the same time financial complications would be avoided. Since the city can buy these materials in the market at any time, the projects may be changed frequently enough to escape a too mechanical routine. Such work would frankly undertake the production of articles in quantity, and by such industrial methods as division of labor and organization of a system by which poor work might be traced to its producer.

While such work should never interfere with domestic science and household art for girls, and may not soon supersede what is now known as manual training for boys, it may at least share the time with the latter, and it possesses certain important educational advantages. For example, supposing the project to be the supplying of classes with portfolios or sketchbooks; if each boy in the class completes one, and then the class is divided into groups and each group performs a single operation, the great economy in time and material and the consequent increase in producing power are at once evident. These are important items in industrial education. Moreover, the repetition of a process, if not too long continued, instead of dulling the mind, awakens it to invent devices for performing these processes more rapidly and accurately. All danger of automatic routine may be avoided by the use of good judgment as to when the process shall be changed.

The interest shown by such a class when the school-supply team calls to take the product has proved that the motive of personal ownership is not necessary at this age as

an inducement to do good work.[1] These contributions made by the pupils to the system which is giving so much to them readily awaken a new appreciation of school material in general and of all public property and its relation to individuals. Work such as this may be an important factor in civic education for all, while to the boy who goes early into industrial employment it gives a realization that any process to which he is assigned is part of a whole. This realization is likely to awaken a demand on his part to know and master the whole. It is not unreasonable to hope that such "work teaching," which awakens interest in effective ways of doing things, may bring discontent with unskilled occupations and a desire for more thorough industrial and technical training.

It is not unlikely that future experiments will prove that where a suitable amount of time in elementary schools is devoted to gaining experience with industrial methods applied to appropriate problems which contribute to the good of the commonwealth, the results, in terms of appreciation of the relation of material products to human skill and effort, will not only be of practical value to a part of the population but will be also an element of broad culture for all, whatever their vocations may be.

In connection with the regular school program the following suggestions for work in representation, construction, and design emphasize the phases which the abilities of the children seem to indicate as particularly appropriate to Grade VI.

Representation. The use of drawing as a means of plain description should continue in connection with other school

[1] These considerations are based largely on the results of experiments tried in Boston by Professor Frank M. Leavitt and described in detail by him in the *Manual Training Magazine* for June, 1908.

subjects. On the merely technical side the work of Grades IV and V should have developed a habit of keen observation and correct representation of relative proportions and slants of lines in the objects drawn. That of Grade VI should continue definitely along these lines by developing a habit of thinking out the directions and limits of lines before they are drawn, by carrying the brush or pencil over the paper experimentally in the path the line is to take.

In this grade a greater differentiation in styles of drawing is called for to meet different needs. Each subject will readily suggest the methods of drawing which are most appropriate. For example, maps and routes call for plain explanatory drawing in which correct proportions are a necessary framework with which no freedom can be taken. Children readily appreciate this fact and are interested to draw routes which a stranger might depend upon in finding his way about town. The following quotation from a school paper describes a method of interpreting relative proportions in terms of a diagram (Fig. 25).

> We hope you will be pleased with our plans of Historical Roxbury. We have had great fun making them. We walked to the places and counted our steps and wrote down on a piece of paper how many steps it was to each place. Then Miss —— helped us plan it out on a scale of 270 steps to an inch. All the places are within ten minutes' walk of the school.

Accurate representation of a different sort is called for when drawing is used in connection with nature study. In this case another element enters in, because plant forms involve proportions and shapes which present not only facts of structure but also elements of beauty in the shapes which the structure assumes. Exquisite representations of

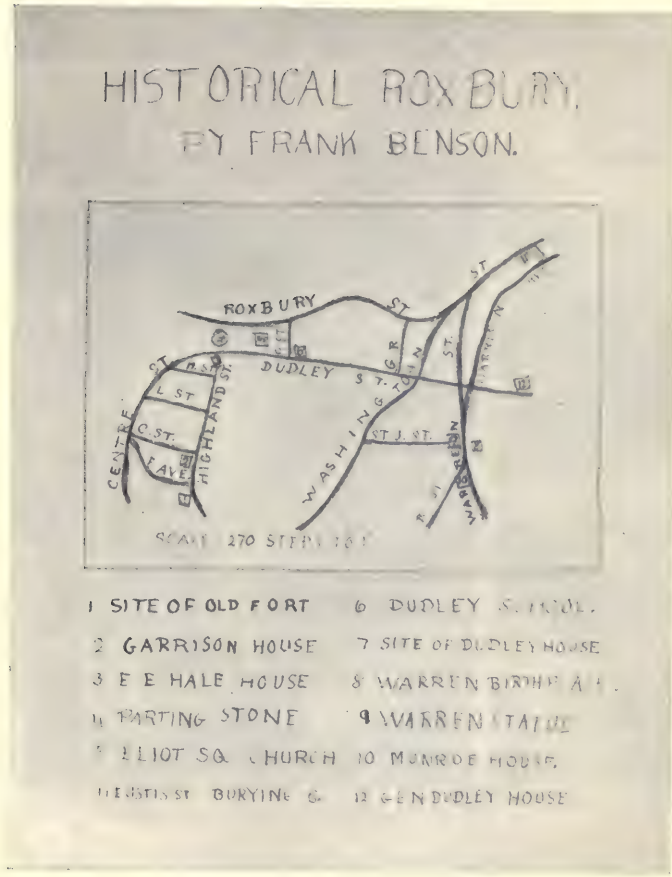

FIG. 25. A child's original map

plant shapes appear when the plant is held in the sunlight so as to throw its shadow on a piece of paper and the child stands where he can see only the shadow. He finds the structure of stems, the shapes of large masses, the foreshortening of leaves and flowers, and the delicacy of

grasses and thistledown translated into terms of black and white. Equally perfect records may be made by placing plant forms upon blue-print paper and exposing them in a printing frame to the sun. The plant prints its shape upon the paper in a few minutes and the image may be

Fig. 26. Prints from plant forms

made permanent by washing in water (Fig. 26). These interpretations are often a greater incentive to representation of beautiful details than the best verbal instruction. Brush and ink give results that look like shadows, and the child is stimulated by this evident similarity in effect to try to equal the perfection of the actual shadow or print of the plant he is studying (Fig. 27).

With water color the children can learn to match the colors of objects and discriminate between tones of color, as, for example, the greens of the upper and the under side of leaves.

Another subject appropriate to Grade VI is the study of a few simple objects to show how each appears in several positions; for example, a leaf or flower held at various angles (Fig. 28), or a toy or implement turned successively

FIG. 27. Brush drawings of plants

in a number of directions. A topic such as this presents a definite problem for solution.

Children of this age usually make small drawings when following their own inclinations, while much time is spent by instructors in the attempt to lead them to draw large. Before regarding as wholly a fault the natural tendency to make somewhat contracted drawings, it is well to consider the small size of a great proportion of the trial sketches by men who drew with much expression, as did J. F. Millet, John La Farge, and many of the early Italian masters. In many cases the final pictures appear to have been enlarged from the first small sketches.

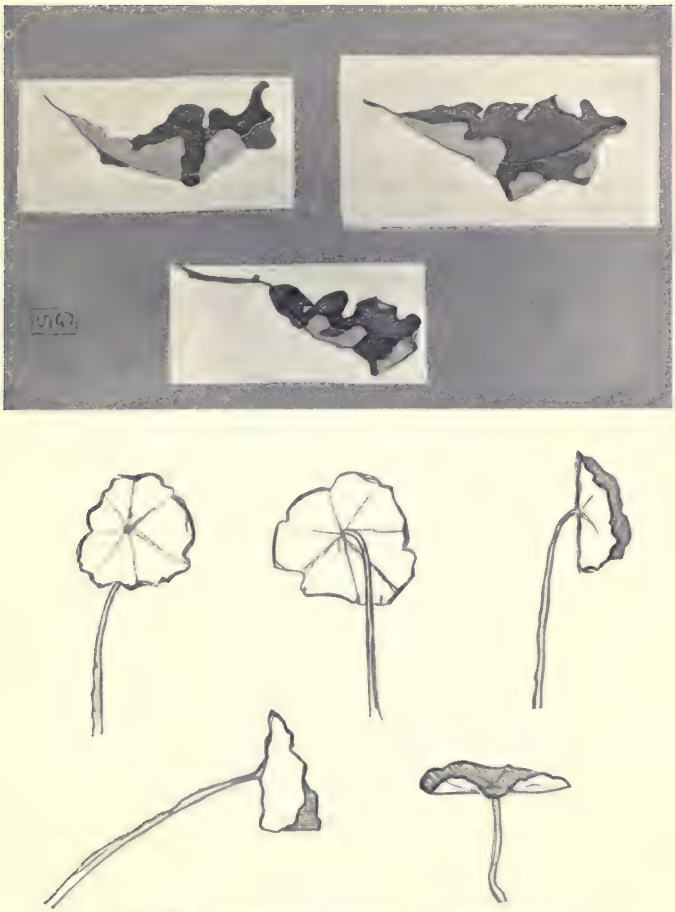

FIG. 28. Drawings of leaves at different angles

The need of mathematical comparison of proportions is greatly increased with the increased size of the drawing. When the drawing is small the eye sees it as a whole and makes comparisons readily. The eye seems to translate

shapes most easily and directly when the size of the drawing approaches that which would result if a transparent plane were held between the eye and the object, at the same distance from the eye as was the paper when the drawing was made, and the object traced upon the plane. Under these circumstances it is not necessary to change the scale of the visual impression.

Much earnest mental effort as well as manual practice is necessary if children learn to draw with any degree of correctness. Careless drawing is easy, but serves no valuable utilitarian or æsthetic end, and, if allowed, begets a certain contempt for the subject. Correct drawing is difficult of attainment and the effort is more than play, but if the work is well organized and undertaken in earnest, truthful delineation grows to be a habit. This habit should be established early. Children who learn to represent things as they are, gain a knowledge of form which enables them to justify their courage when they venture to alter the actual to conform to their ideal. Attempts at poetic expression in half-mastered terms are beset with difficulties.

Construction. A desire to produce things which have a definite use, and a willingness to spend time mastering new tools so that they may be utilized as an added means of dealing with material, are characteristic of this grade. The making of simple mechanical apparatus, such as is involved in the manufacture of certain toys, and the production of things that are of evident use in the school and home are especially appropriate to this grade.

In planning courses in woodworking, Grade VI, in most localities, seems to be the suitable place for introducing children to bench work. This involves the use of tools which demand strength and skill, and should come at a

time when the stimulus of new material and of the means of handling it is especially effective.

Two ways of organizing woodwork have been evident during the history of manual training. One prescribes a series of forms involving constructive elements and processes so arranged that there is a graded progression in difficulty and complexity. In some cases the problems are isolated parts of construction, given for the purpose of developing technique without regard to any use to which the result shall be put, as in the Russian system. In other cases the results are objects which will be of use, but are so chosen as to insure a logical progress in the order of tools and processes involved.

The other method of organizing woodwork is based on the theory that a constructive problem in its entirety involves three steps. First, a choice is made of an object suggested by a need for it, so definite in character that the conditions furnish the worker with a means of reasoning out just what the size, form, and construction of the object should be in order best to fulfill the needs of the case. For example, if the object is a bird house, its shape, the size of the door, and other details will be determined definitely by knowing the habits and size of the bird for which it is to be built and the locality in which it is to be placed. Secondly, after ideas of the object in its completed form are clearly defined, the most fitting method of construction is reasoned out and patterns or working drawings are made which show the number of parts needed and their exact shape and size. In this way the greater part of the constructive thinking is done beforehand in terms of drawings and patterns, so that work in material may be predetermined and not experimental. Thirdly, the tools

needed and the knowledge of how to use them should be provided as necessity arises.

Woodwork with bench tools is in itself so interesting, and at the same time so suggestive of world activities, that however it may be presented, there is seldom any lack of enthusiasm on the part of the children. In fact, every system of woodwork cites as testimony to its suitability the great interest it arouses in the children.

Children trained by the first method are likely to develop a definite consciousness of ability to deal with material and a pride in excellent construction, but tend to be somewhat lacking in power to plan and to design. Generally the majority of a given class produce good work. Those trained by the second method have excellent opportunity to develop judgment and ability to plan how conditions may be met, but often the majority of a given class fail in the technical skill required to put their ideas into creditable material form. In actual experience elementary-school pupils can seldom plan perfectly beforehand, and need some experimentation with material, which often modifies the first plans. Usually only a few produce good results.

In practice a combination of the two methods is generally followed. The children begin with given models by means of which the class can be taught as a whole, and attain a degree of mastery of certain tools. After a year or two those who show sufficient skill to justify undertaking individual projects are allowed to do so. Frequently the technical ability developed, leads the children to undertake projects of their own outside of school hours. By means of class lessons a standard of workmanship is maintained, and the desire to produce an independent piece of work acts as a strong stimulus. A class model, while

requiring the same processes of all pupils, need not result in mechanical uniformity. Fig. 29 shows the variety of design available in so common a stock model as the pen tray.

With the introduction of bench tools it is important to realize that a somewhat complete mastery of one implement and process after another is ultimately necessary to any

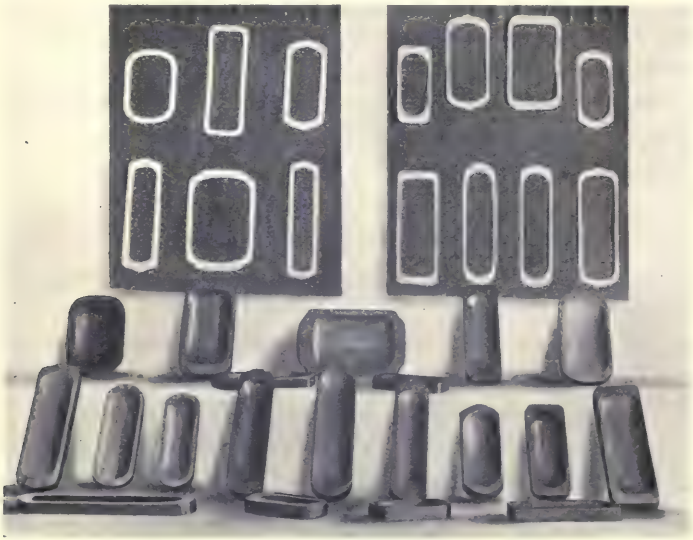

FIG. 29. A set of designs for pen trays

freedom of expression. In his consideration of the interest of children in the practical outcome of their individual projects, the instructor should not forget that other interest which discovers itself to the person who finds his hand adjusting itself to a tool which is becoming increasingly obedient. This new sensation often leads a boy to continue planing a piece of wood till he has forgotten its use and has gone past the line, in the pleasure of feeling the blade

cut with perfect evenness. The contribution to enjoyment and efficiency made by this satisfaction in complete mastery of a process should not be underestimated.

In this grade girls should gain some systematic acquaintance with one or both of the characteristic activities of American households, cooking and sewing. The children are old enough to understand and feel that they are genuinely helpful in some of the simpler forms of cooking, such as the preparation of cereals and certain vegetables, etc.; and in the related household activities, such as the use of the kitchen equipment, the proper setting and clearing of the table, the washing of dishes, and the care of rooms. In sewing they may be taught simple stitches, useful and ornamental, the method of holding the cloth, and the use of measurements, simple patterns, and sketches. Doll's clothes and the simpler processes in garments will offer opportunity to use this knowledge. The constructive work for both boys and girls should bring them into sympathetic contact with industries in the home and neighborhood.

Design. The two phases of design before described, namely, that of free practice with decorative forms and that of planning objects to meet given conditions, should continue. One of the important contributions which free practice may make is the interpretation of forms into arrangements of bilateral symmetry. This is one of the simplest types of balance and one which children readily appreciate.

Children at this age easily develop considerable facility in drawing simple units at the board with both hands at the same time. After a little practice both hands move apparently to one impulse, though the action of the left hand is the reverse of that of the right. When a form has been learned it can be drawn readily in this way, and

occasional practice of this sort gives the children a feeling of bilateral balance more vivid than can be obtained when the drawing of both sides is made with one hand. The possibilities of mechanical duplication in reverse are many. Some of them, if used with a realization of their limitations, serve to stimulate experimentation and to suggest new ideas. For example, the decorative effect of duplicating forms in reverse, even those that are less often studied for decorative possibilities, as handwriting, may be seen by making the form with a soft pencil and then folding the paper over the form and rubbing it. The image will be transferred faintly and needs only the strengthening of the lines to complete the balance. Folding paper over a blot of ink and pressing it will often produce interesting bilateral forms, the suggestions of which may be developed and perfected. In general these fortuitous productions are valuable only as occasional stimulations.

In the second field of design the most valuable opportunities are generally found in connection with the projects of constructive work and of the household arts. As in Grade V, the best results in decoration are usually obtained by limiting a problem to the most pleasing disposition of a few elements. At this age an appeal may be made directly to a feeling of æsthetic pleasure. The question, "Which looks best?" generally calls forth thoughtful replies. Good judgment in the matter of areas and relative proportions appears to be developed most rapidly by much experimentation in placing the elements of design to determine what arrangement produces the greatest satisfaction. For example, in planning the printing on a book cover, such steps as the following make it certain that the child thinks out the problem first in terms of spatial relations.

Place the ruler or pencil across the sheet of paper which is to be the cover and move it up and down to determine where the title will look best (Fig. 30, *A*). Mark the position chosen and place two pencils across this area. Move them toward and away from the center till the inclosed space seems the best length for the title (Fig. 30, *B*). Modify the space so that the letters will be of a suitable height, and print the title to fill the rectangle exactly.[1]

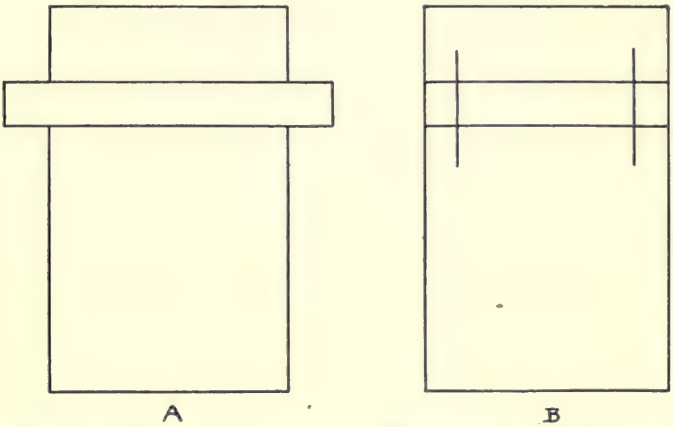

FIG. 30. Method of choosing the most pleasing position for a cover title

Where the design embodies two elements, as a title and monogram, or adds a third, as a border, the experiments may be carried on easily by means of splints and shapes of paper.

The cause of pleasure in those dispositions of the elements which trained judgment calls good appears to lie in the consistent relation of measures. Combinations which are entirely satisfactory can be approximately calculated

[1] For suggestions as to printing within a given space, see Fig. 40, p. 123.

mathematically. The method of calculation, although of much interest to the scientist, appears to be of no value in developing æsthetic appreciation in children. On the other hand, the method which consists in the comparison and contemplation of tentative arrangements usually results in a ready response in terms of pleasure when a fine adjustment of spaces is obtained. The aptitude of the majority of children for immediate perception, of pleasing arrangements, when the terms of the problem are wisely selected and defined, is an encouragement to the teacher who seeks to develop good taste in matters of design.

Continued use of water color should develop ability to discriminate colors more accurately. The children should learn to mix paints so as to match any given sample or produce any desired color. In addition to matching colors, a special study of color intensities will aid discrimination. This may be carried on by having the children select some color, for example, blue, and paint a spot of as intense a blue as the paints will produce, and another spot of gray which is the same value as the blue, that is, neither lighter nor darker, but such a gray as would be obtained by photographing the blue with a plate that rendered the colors in their true relative values. They may then paint other spots, each time mixing an increasing amount of gray with the blue, so that the spots approach gray without becoming lighter or darker. From these spots three may be selected, which, with the blue and gray, form a series of five equally graded steps of intensity. In a similar manner charts of different intensities of other spectrum colors may be made. These charts will aid in discriminating the relative intensity of colors in nature which the children are attempting to match.

A reasonable standard of accomplishment has been reached at the end of the sixth year, if drawing has grown to be more correct and expressive because each line is thoughtfully drawn and form is better understood; if representations of objects show more adequately the characteristics, proportions, and positions of these objects; and if the children have become familiar with the use of the more common industrial tools and have begun to make things which appeal to them as worth while as a contribution to general or individual needs. In design an important end has been achieved if they are able to plan simple constructive problems so that the results are not only adequate to the purpose but pleasing in general proportions, if they have gained an acquaintance with some of the decorative possibilities of bilaterally symmetrical arrangements, and also if ability to match colors and to discriminate between different tones is increased.

CHAPTER VII

GRADES VII AND VIII

Instructors in manual arts during the earlier school years should make certain that the children who reach Grades VII and VIII have already mastered certain fundamental processes and have overcome elementary technical difficulties. The children will then have confidence and skill to undertake projects appropriate to their widening interests, and will possess a stimulating sense of ability to think out the solutions and use materials and implements to work out the results.

In these grades children show an interest in concentrating whatever knowledge they can gather and all the skill they can command upon increasingly specific problems. This leads to a close study of conditions and often to observation of the ways employed by skilled workers, and it results in careful selection from among many possible methods and materials, of those most suitable to the particular end in view. For example, in constructive or diagrammatic drawing, children who have previously learned to sketch patterns and draw to scale are now interested in seeing how such drawings are used in actual industrial processes, and what are the devices and conventions employed to illustrate particular details and characteristics. In representation children are interested in working out the best means for portraying particular effects and in trying the results of different sorts of technique. They will experiment with

a particular topic, for example, rectangular solidity, and learn how to represent rectangular forms in any position and to draw them from imagination so that they appear well constructed. In woodwork, agriculture, sewing, cooking, etc., these pupils show a similar readiness to undertake individual projects which necessitate knowledge, skill, and persistency, and they display enthusiasm in seeking data regarding the work and in perfecting their skill in its processes.

The technical elements of the work in these grades as well as its prevocational aspect render instruction by special teachers more necessary than in previous years.

The following suggestions relate to phases which seem especially worth emphasizing.

Representation. The most valuable work in these grades appears to be a continuation of the common use of drawing as a means of explanation and description, and also a somewhat thorough training in representing the geometric solidity of rectangular and curvilinear objects of three dimensions and the beauty of structure and shape of natural forms.

The descriptive drawing will show the extent to which drawing has become a practical means of expression. Skill in this conversational use of drawing does not come from slowly and carefully finished work. It is gained only by practice in rapid sketching. On the other hand, rapid descriptive drawing tends to become superficial unless supplemented by some serious and painstaking representation. Memory and imaginative drawing should receive consideration, as ability in this line is necessary to ready expression of ideas. In the case of some children, imaginative drawing readily takes the form of pictorial compositions,

while with others it consists in the representation of things they propose to construct.

Children in these grades should have opportunity for much use of these three modes of representation, especially in connection with subjects which call definitely for one or another of these means of interpretation. For example, incidental blackboard descriptions or sketch notes in connection with arithmetic, geography, or history are often of little value unless they can be made quickly and with a few strokes. Children frequently lack power to make such sketches because it is sometimes mistakenly supposed that practice in slowly finished work will give this ability. Facility with this sort of graphic expression should not be left to chance, but should constitute a definite aim. Nature study, physics, and constructive work, on the other hand, demand a closer adherence to certain facts of form, a clear understanding of details of structure, and accurate records of observation which cannot be hastily sketched or adequately shown by a few strokes of the pencil. The children appreciate the needs of the case in hand and can be led readily to adopt the style of drawing which suits the occasion. Rapid sketching is learned only by sketching rapidly; ability in exact delineation comes only by making exact representations; and facility in expressing ideas is developed only through drawing from memory and imagination. The sort of undifferentiated drawing from objects, which so often constitutes the larger part of the special work in drawing, will not produce that facility in all three lines which is so valuable an asset.

When interest in any topic is awakened, the appropriate method of drawing is brought into use naturally. The children make rapid notes for general suggestions

and careful studies for data. The habit of using sketchbooks should be definitely established. Such books become valued possessions, full of material which contributes to the subject in hand. Usually the children can be led to add to their own sketches a collection of pictures from magazines, papers, and other sources, related to the subject. Fig. 31 shows cover and pages from a boy's sketchbook.

Fig. 31. Pages from a boy's sketchbook

The cumulative results of a series of efforts to understand and represent a simple object or effect will be evident after a succession of lessons where attention at each step is concentrated upon a single definite aspect of the thing under consideration. The problems of each lesson are thus made clear for both instructor and pupil and furnish, what is greatly needed in courses in drawing, a well-understood goal of effort and standard of accomplishment.

For example, in nature drawing the following steps illustrate successive phases which might be considered in different lessons.

1. Free drawings with brush and ink to represent with a few strokes the growth and general character. Here the whole attention is focused upon salient characteristics (Fig. 32, *A*).

2. Representation of a flower and a leaf turned at different angles (Fig. 32, *B*).

3. Careful drawings of details of structure, such as the exact shape of a petal, the construction and outline of a flower or leaf, and the fine curvature of a stem. These should be drawn with a pencil which is hard and sharp enough to record facts. The purpose here is not a picturesque result but an accurate record of such facts as would be used for a science notebook or for material for design (Fig. 32, *C*).

4. Matching in color the exact hue of petals, stem, upper and under sides of leaves, etc.

5. Use of the forms as elements in design, as in a border for embroidery or a unit for decoration of a cover for nature-study papers, etc.

A similar opportunity for concentration upon a single topic for a considerable period of time is found in landscape drawing in connection with geography. Suppose the country under consideration is Holland. A large drawing may be begun upon the board and this may be modified or added to from time to time as the children obtain additional data or more definite knowledge of the subject matter. Meanwhile each child may start a drawing of his own on a sheet of paper. At first perhaps the results may be meager and include only a few suggestions of the country, such as a horizontal

line to represent its level character and crude suggestions of canals and windmills. Collections of pictures and the hints gathered from descriptions will immediately furnish new material. One group of pupils may be assigned to gather pictures of canals and learn how to represent them so they appear to stretch away into the distance. Another group may collect data regarding the appearance of windmills, and still others may study canal boats, houses, and other items relating to Holland. Day by day the picture on

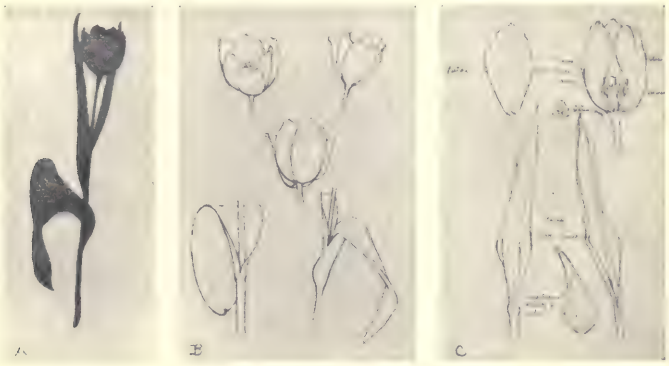

FIG. 32. Different kinds of plant drawing

the board will evolve and old drawings be replaced by new ones which are more adequate. The individual sketches will give opportunity for original compositions. Children will be encouraged to practice on particular effects till they have mastered them.

Moods of nature furnish equally interesting subjects; for example, autumn, twilight, storm, sunshine, etc. In the case of poetical effects such as these, the children should supplement their own attempts with collections of illustrations of the topic in hand, made from all available sources, and

they should at the same time become acquainted with some related literary descriptions. Æsthetic appreciation is more likely to be developed by interpreting familiar subjects than by searching for the traditionally picturesque.

The representation of geometric solidity is of especial importance to the student of constructive work, and is one which appeals to children at an early age. One favorite juvenile method is to draw two rectangles which partly overlap and connect the corners. The result appears like a transparent solid (Fig. 33, *A*). Children soon discover what lines to erase in such a figure so that one appears to be looking down upon it or up at it (Fig. 33, *B*). They readily learn that three lines furnish a key to the structure and position of the box and that the other lines follow respectively the general directions of these (Fig. 33, *C*). Their first attempts at completing the box are frequently like Fig. 33, *D*, but practice in treating this figure as a problem in construction, by trimming down the top and sides till these are satisfactory representations of rectangular faces, soon results in a convincing picture of a rectangular solid. The children are then ready to experiment with different slants of the first three key lines to see the effect in changing the apparent position of the solid (Fig. 33, *E* and *F*). Nothing seems so readily to develop ability to represent rectangular solidity and to draw from actual objects as progressive work in this constructive drawing from imagination. Any elaborate study of the principles of formal perspective, such as the convergence of retreating lines or the relation of the object to the level of the eye, does not seem to be necessary or helpful at this time.

The children learn later to discover in more complex constructed objects the few lines which show the position

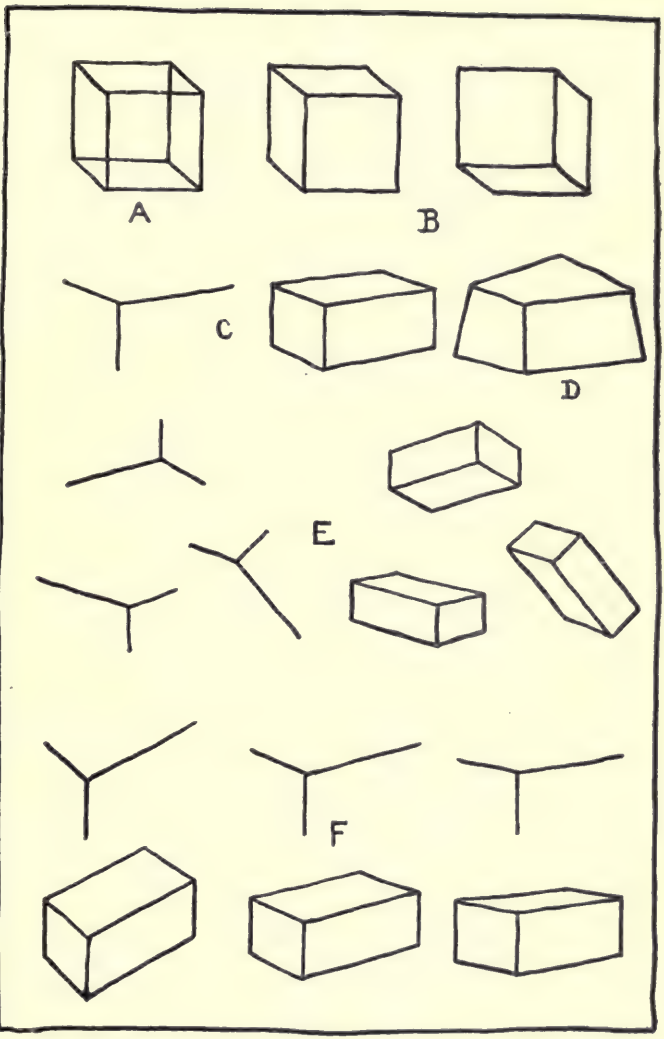

FIG. 33. Studies in the representation of rectangular solidity

and structure, and by means of these to determine the directions of others, and thus find the solution of somewhat complicated problems of representation. They proceed with their drawing of objects as if they were actually constructing them. For example, in drawing a chair, the same series of structural lines suggested in the drawing of a box gives a means of reducing to system the more numerous lines of the chair, which if unrelated would prove confusing. In Fig. 34

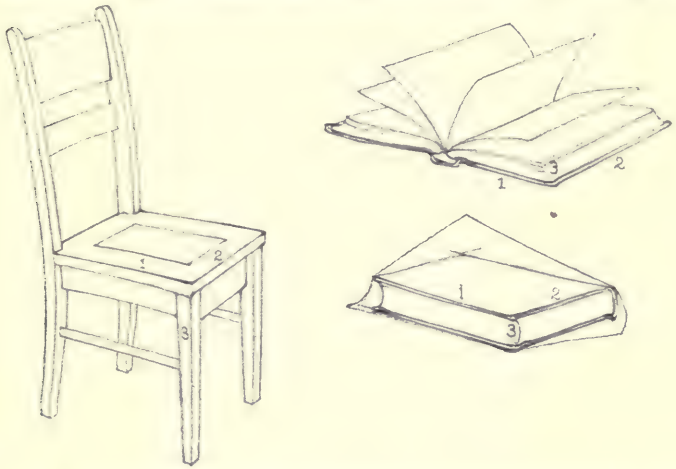

Fig. 34. The relation of the lines of rectangular objects to three key lines

the lines marked 1, 2, and 3 furnish the key to the direction of most of the others. If these are determined in the right proportion and at the right angles, the general structure may easily be completed. All slants extending upward to the left are determined by 1, and all to the right by 2.

The closed book in Fig. 34 represents a distorted outline frequently drawn by children, and within this outline the correct appearance arrived at by drawing lines to correspond with the key lines, 1, 2, and 3.

This does not mean that all the slants are parallel to 1 or 2. In fact the lines appear to converge as they extend away from the observer, but when some facility in representing rectangular objects in different positions has been gained and the eye grows accustomed to interpreting drawings, it will be found that the attempt to make the shapes look right results in an approximation to the proper convergence. This method of approach to perspective differs from that which begins with discussions of the relations of the object to data external to itself, such as the level of the eye and the vanishing points of retreating lines, in that it aims to develop the trustworthiness of the testimony of the eye concerning actual appearances before attempting to make deductions regarding these appearances from a theory based upon external and usually invisible data. The making of such deductions is valuable as a means of checking up results after the visual perceptions can be depended upon, but it is doubtful if these conditions can be fully attained before children arrive at the high-school age.

The same general principles hold regarding the representation of curvilinear objects, such as a glass or a bowl. The question most full of descriptive suggestion is not, "How far below the level of the eye is this glass?" but "How far can one see into it?" The line answering this question establishes the curve which determines all related circles (Fig. 35, *A* and *B*).

By means of sketches each child should construct such forms on paper with the pencil, comparing and modifying them until their appearance satisfies his eye. He should do this till he forgets that he is working in two dimensions and feels instead that he is shaping these forms in all three. He should not think of his foreshortened circle as an ellipse,

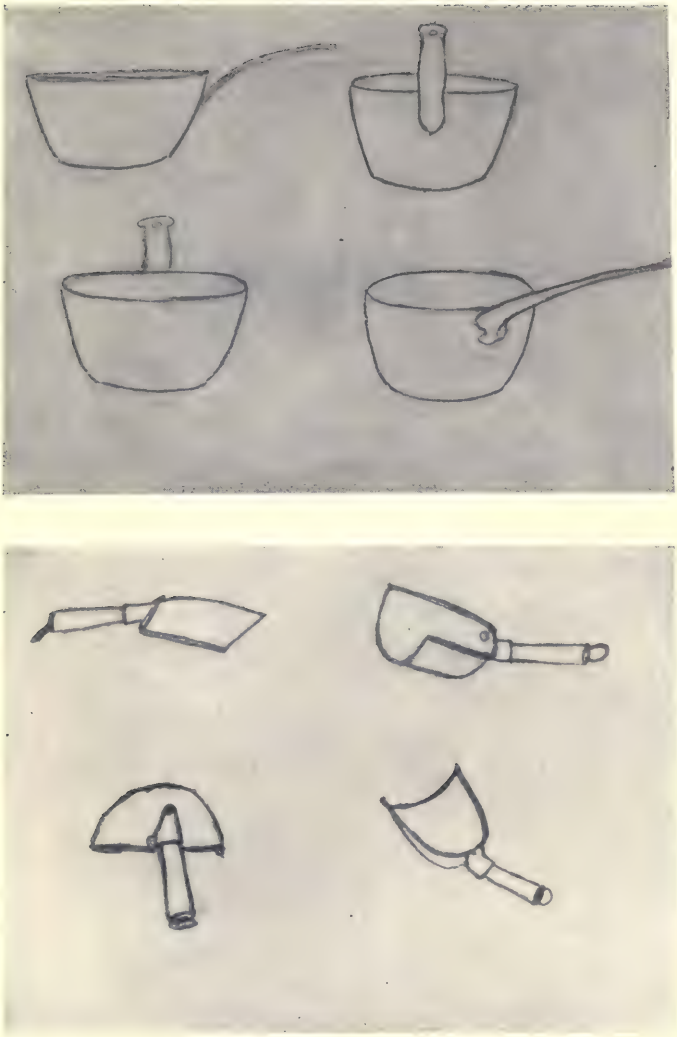

FIG. 35, *A*

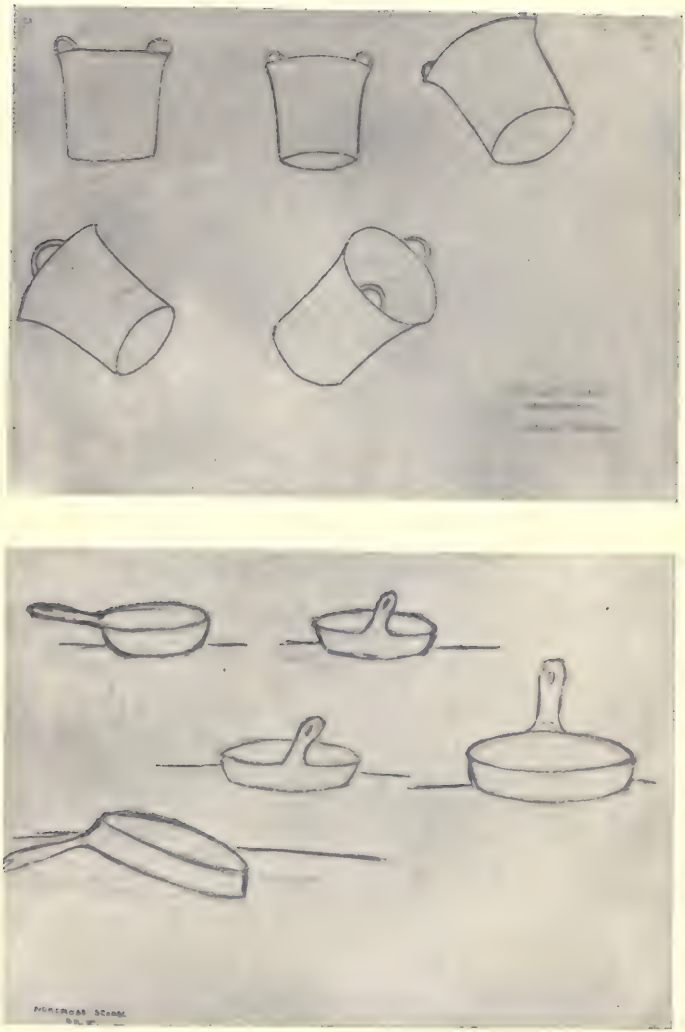

FIG. 35, *B*

but as a circle which extends back into the picture, and which he shapes until it is a satisfactory picture of a circle lying flat. He should build up representations of solids from imagination till his eye can detect any false construction or any shape that does not carry the impression of curvilinear or of rectangular solidity. He should play with these figures till he can place them in whatever position he chooses, and build on additions, or modify by cutting into different shapes. He will thus develop definite concepts of types of solidity. The fact is sometimes overlooked that one can seldom draw an object well, the general type of which he has not mastered and made his own so that he can draw it readily from imagination (Fig. 36, *A* and *B*).

Interest in searching for pictorial expression for one's ideas helps to develop artistic appreciation. When pupils have become interested in trying to interpret into lines and colors their impressions of a scene, for example, of autumn, and have selected from among autumn pictures those which are most in harmony with their own feelings, they are gaining experience which will help them enter into the spirit of a work of art which is an artist's interpretation of this topic, with much more sympathy and responsiveness than if they had made no effort to express it or to select good interpretations of it. The search among many sources in nature, literature, and art, for the embodiment of a particular idea or the expression of a mood should be an important element in all picture study.

In each grade the pictures studied should be such as embody objects and interests which touch somewhere the experiences of the children. The first pleasure, which later may develop into æsthetic appreciation, may be awakened

by well-drawn, vigorously colored pictures designed for children, as well as by famous masterpieces.

The following description of an experiment in picture study in upper grades is reprinted by courtesy of *The School Arts Book*.[1]

The topic, "Picture Study," which occurs in most courses in drawing, deserves all the prominence that is now given to it. The majority of people want to be able to appreciate and enjoy works of art. Intelligent enjoyment of art is seldom gained except through special study definitely planned to accomplish that end. To determine what lines that study should follow has been the purpose of much discussion and experimentation.

One method, perhaps the method of least value in elementary schools, is to analyze pictures in order to discover centers of interest, balance of masses, leading lines, etc. This is helpful to adults as a study of one phase of the painter's way of doing things, but unless presented with clear understanding of its relative value it is likely to fail to develop a sincere enjoyment of pictures.

Another method is to show pictures to the children and encourage them to talk about what they see and enjoy. Incidentally, stories of the artist, the times in which he lived, and the things he chose to paint are presented to add historical interests and associations to the pictures. This gives a pleasant acquaintance with works of art and awakens oftentimes a sincere liking for them.

If one allowed his judgment to be based upon the written papers which are sometimes asked for after lessons in picture study, he might be led to doubt some aspects of this method; but perhaps the fault is not in the method, but in asking too soon that children make a statement, in definite terms of language, regarding matters of feeling.

Instructors who wish to awaken in their pupils true enjoyment of pictures, an enjoyment that is not a passing preference but an abiding pleasure, might find helpful suggestions from considering carefully the familiar statement that one gets from a picture only what he brings to it. It follows that preparation for seeing a picture should be made before the picture is presented, in order that

[1] "An Experiment in Picture Study," *The School Arts Book*, October, 1909.

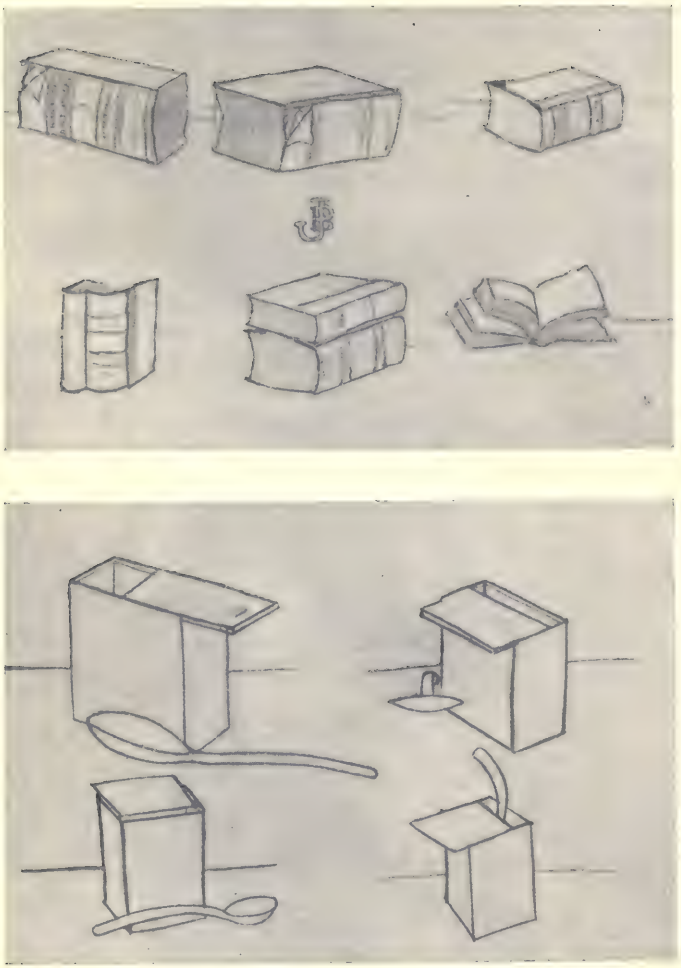

FIG. 36, *A*

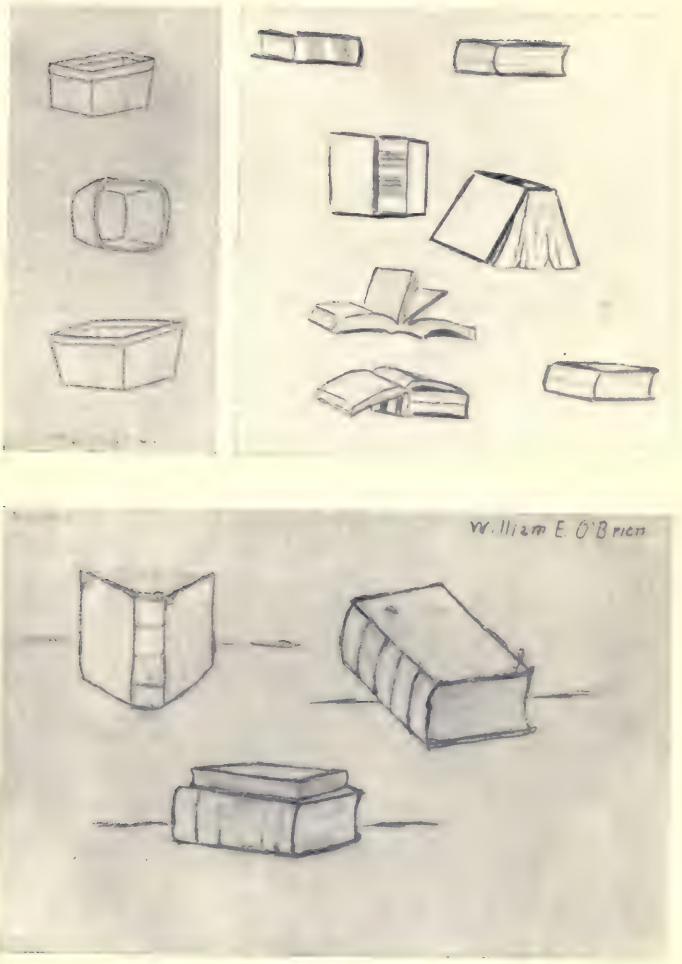

FIG. 36, *B*

the children may have some directly related experiences to bring to it, and that the teacher's explanations may be unnecessary at the time. It is probable that such enjoyment of art as we wish our pupils to possess can come only when they have been previously interested by observations of their own in the subject which the artist portrays, so when they come to it they come to something which they themselves have tried to express, even though crudely, and which they rejoice to see set forth skillfully.

The following experiment was tried with a large number of children in Boston in the sixth, seventh, and eighth years of school, in order to observe the results of giving the children experiences which should prepare them to see the pictures which were to be studied.

Twilight was selected as a topic for special observation. The children were encouraged to gather pictures of twilight from magazine illustrations, photographs, and other sources. They were led to observe twilight effects out of doors. The results of these observations were rendered definite by means of notes made with water color. The colors of the sky, clouds, trees, and buildings on different evenings were recorded. The children noted whether the buildings seen against the sunset sky appeared in their local color, or were flooded with the golden glow, or contrasted with it by appearing to be complementary in hue. Many children were enthusiastic in their descriptions of twilight effects and made sketches, some of which were crude in color while others were soft and delicate.

The next steps in the experiment were made possible by the cordial coöperation of the Museum of Fine Arts, which reproduced in half tone several of its pictures representing twilight, and made these reproductions available for the schools at cost. About sixteen hundred of these were bought by the teachers and distributed to the pupils. Each child made two or three simple copies in pencil of the Museum picture given him, reproducing the effect as well as possible by this means. He then experimented by painting over these pencil sketches with water color the different schemes of twilight color which he had recorded. He thus gained intimate acquaintance with an excellent black-and-white composition, and added to this the color, an element which was the result of his own observation.

After this many of the children wished to visit the Museum in order that they might see the original picture. Those who had opportunity to do so, when they saw for the first time the painting with the composition of which they were already familiar, viewed it

with particular attention to see what colors had been used by the artist and how his scheme compared with their own. Usually an art museum appears to a child somewhat like a panorama. The previous study of a particular topic, however, served to isolate a few pictures from the mass and make them objects of special attraction. The children felt a fellowship of interest and effort between themselves and the artist.

Even those who did not visit the Museum gained much enjoyment of twilight effects in nature and of descriptions of them in literature.

One principal wrote as follows:

"You will be as pleased as I was myself when I tell you that two of my boys, evidently inspired by our collection of twilight pictures and without any suggestion on my part, brought me two poems bearing upon the theme we were studying in our drawing. One brought in a clipping from a newspaper, which told of the ending of the day with the fading of the sunset colors, the night, and the dawning of another day, making application to the closing of a human life in this world and its subsequent awakening in eternity. The other, with the air of a discoverer, laid upon my desk Tennyson's 'Sweet and Low, Wind of the Western Sea.'

"I read these to the class with simply an acknowledgment of the sources from which I had obtained them. I was not surprised when boy No. 3 laid Gray's 'Elegy' before me a day later. I plan to have the class learn this while the strong side light of their picture study is still shining upon it, and I see the possibility of other work within the outline for reading, in correlation with drawing."

The possibility of developing other topics in a similar manner is evident. To each great artist some phase of the world has made a particular appeal and it becomes his field for study and interpretation. The best way to develop the fullest enjoyment and appreciation of his work appears to lie in awakening interests similar to those which inspired his art, and in encouraging efforts at expression, however crude, of the same thing. Artistic pictorial material of fine quality is now everywhere available. An instructor who culls from the best of the monthly magazines can soon form a collection of pictures excellent not only in composition

but in color. Public-spirited citizens are always ready to contribute magazines a month old, and thus interpretations of the different subjects of study can gradually be collected.

Construction. In these grades the problems dealing with concrete materials have a wide range of application, for example, in agriculture, woodworking, household science, household art, and various prevocational activities. These are influenced strongly by local conditions. The work is also largely in the hands of special teachers, and the opportunities for excellent training for such teachers are continually improving. The suggestions here given are therefore general.

The character of the work should be such as to satisfy the rapidly awakening economic instinct, and to develop a technique sufficiently excellent to command respect. It should be noted, however, that skill of hand, although necessary, is not the only important outcome of constructive work in these grades.

A fault of former education was that it furnished little opportunity for anything but specified lines of intellectual activity. Constructive work in modern education may err in failing to associate itself as definitely as it might with intellectual activity. Each line of work should involve, in connection with its immediate technical processes, its wider social, æsthetic, and industrial relations. In addition the instructor should never lose sight of the importance of steadily increasing a student's ability to forecast processes and results, as far as possible, in definite terms.

Oftentimes the constructive enthusiasm is so great, and the realization of the value of preliminary planning so slight, that a child needs the experience of discovering in a

practical way the waste of time and energy resulting from a direct, thoughtless attack upon material. However, after the first practical acquaintance with the tools and processes of a problem has been gained, the handling or cutting of material should be made to wait till the results have been thought out and, as far as possible, foretold in terms of verbal descriptions, sketches, plans, estimates, and measurements. Mere technical excellence can carry one but a short way in larger constructive problems.

During these grades a recognition of social relations becomes evident, and the desire to contribute something to the world's work usually grows keen. Nature study appropriately takes the form of agriculture. Children are interested in attempting to raise the best products and to try for prizes for the best ear of corn, etc. They like to be able to modify natural conditions for the sake of better results, as by grafting trees or making hotbeds.

In woodworking, if the training in previous grades has been thorough and progressive, pupils can undertake individual projects of some importance, such as chairs, desks, tables, cabinets, bookracks, etc., which can be put to actual use in the school or at home, and they enjoy the effort and exercise of skill required to carry them to completion. Under special conditions skill may be acquired by means of individual projects from the first, but the practical outcome of an attempt to do this with woodworking classes of reasonable size is that the instructor is unable to give the attention to each pupil which is necessary to the formation of desirable habits of work. A small proportion of the whole number produce excellent results, but the majority make relatively little progress and do not acquire freedom from technical difficulties soon enough to

enjoy the results of skill. Figs. 37 and 38 show samples of woodwork by boys of Grade VIII in a public school.

Industrial work which contributes to some actual needs of the school system is an important factor. There is opportunity for many activities, such as making furniture,

FIG. 37. Woodwork by boys in Grade VIII

picture frames, window boxes, sketchbooks, card-catalogue boxes, portfolios, apparatus, printing and binding, etc.

Household science and household art may be so presented as to awaken a sense of the dignity of the housekeeping problem and of the possibilities of accomplishment that result from intelligent skill. The children should learn to handle materials economically, according to plans held clearly in mind. In household science suitable problems are

abundant. Among these are the care of rooms, the serving of meals, the preparation of vegetables, meats, breads, and puddings, the care of foods, simple problems in marketing and in keeping accounts. In household arts, mending and darning, basting and sewing, simple sewing by machine, the

FIG. 38. Woodwork by boys in Grade VIII

making of underwear and of simple dresses, and some ideas relating to the care of fabrics and the hygiene of clothes are within the scope of elementary-school work. Experience in classification of textiles and knowledge of methods of manufacture and of costs and uses should develop practical judgment of quality and of appropriate price.

Design. In Grades VII and VIII those phases of design which call for judgment regarding the fitness of things,

the beauty of proportions and of outlines, and the suitability of ornament and harmony of color are of increasing importance. The pupils are sufficiently mature to appreciate to some extent fine forms and harmonious colors; to realize the difference between excellence of design which renders an object beautiful and permanently satisfactory, and that sensational or commonplace modification of form and addition of unrelated ornament which contribute nothing toward the graceful setting forth of the idea involved in the object.

Free decorative practice may be gained in large part in connection with the experimental sketches for designs. Children in these grades who are making a design for a constructive shape which involves beauty of outline, or for an interlacing of lines as in a monogram or in patterns of embroidery, develop a feeling for fine curves by gradually modifying the shapes till the lines flow pleasingly and consistently.

Development of appreciation of beauty of form may come in part from the careful detailed drawing of fine forms in nature, but such appreciation may be greatly reënforced by practice in making many free sketches of plant forms with a brush. The plant should be interpreted into as few lines as possible and this convention repeated till, like penmanship, it gains a swing and flow of line that is not labored. The best of these results may be worked over and perfected by the use of tracing paper.

The children should be impressed by example as well as precept, with the idea that the possibilities for beauty lie mostly in the planning and proportioning of essential parts of objects, and not in added ornament. The finest beauty of a boat is its shape and not its decoration; of a chair, its proportions and not its ornamental carving. No element

can contribute more to the beauty of the outside appearance of a house than the fine proportioning and spacing of doors and windows. Walter Crane states this principle well when he says:

> Nothing has degraded the form of common things so much as a mistaken love of ornament. . . . Decoration or ornament we have been too much accustomed to consider as an accidental and unrelated addition to an object, not as an essential expression and organic part of it; not as a beauty which may satisfy us in simple line, form, or proportion combined with fitness to purpose, even without any surface ornament at all.[1]

Children are readily interested in making designs where the solution lies in the best possible disposition of necessary constructive elements with little or no ornamentation, and soon appear to enjoy such a problem, partly because of the definiteness produced by its limitations. The lesson covers in Fig. 39 illustrate the different results obtained when the possibilities for good design in fine arrangement of parts are realized and when they are not. Fig. 39, *A*, is typical of what a child is likely to produce when, without any foundation of previous training, he is left free to make his design as he pleases. He has not responded to the vertical and horizontal suggestions of the inclosing space, but has violated these with his diagonal printing. He finds no pleasure in experimenting with the architectural effects of fine spacing and well-arranged margins. His primary interest is the barbaric one of collection and display, with only secondary regard for arrangement. There is no lasting satisfaction and no clearly defined goal for this interest. It is a matter of mere sensation. It demands ever brighter colors and more profuse ornamentation.

[1] Walter Crane, "The Bases of Design," p. 90.

Such a design as Fig. 39, *B*, results from long experience in placing words where they divide the space most pleasingly, and in spacing letters in the words till satisfaction is awakened more by the harmonious distribution of the words on the page and the letters within the words, than by profuse ornamentation.

In such a design as this, the exact areas which the printing is to occupy are first chosen by such experimentation

Fig. 39, *A*

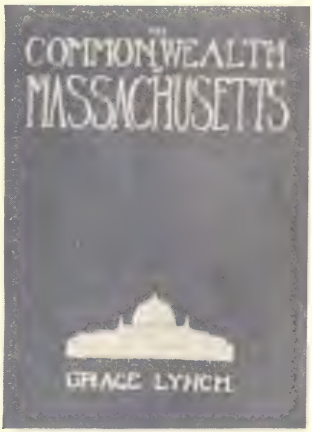

Fig. 39, *B*

as is described on page 95, Fig. 30, and the letters made to conform to these. Children show much interest in working out this problem. They like to experiment by printing the same word in rectangles differing entirely as to proportions, so that in each case the word shall exactly fill the given form (Fig. 40). Such printing should be done free-hand and the spaces determined not by measurement but by tentative indications made at first by very light lines and gradually defined as the letters become

equably distributed. Fig. 41 shows a page of carefully planned covers.

Design which consists in the best possible arrangement of given elements, so that they fulfill their purpose adequately and gracefully without recourse to sensational or incongruous interests, gives permanent satisfaction in a definite end attained and a single idea perfectly realized.

The constructive work and household science and art afford some of the most important opportunities for design

FIG. 40. Words fitted to different spaces

because they furnish a reason for shapes and materials and an incentive to experiment with them (Fig. 42).

Putting into book form the work upon other school topics is a feature of design which is of increasing value each year. It involves the cover design, the title-page, margins, arrangement of text, illustrations, tailpieces, etc. It is not necessary to artistic progress that the children make all their illustrations. The search for and choice of pictures which best embody the idea one wishes illustrated is an excellent means of developing appreciation of art.

One of the most important purposes of design is to develop good æsthetic judgment regarding the things

with which one comes into daily contact. Such judgment can be cultivated by choosing the best from among many examples, good and bad, as well as by making original

Fig. 41. Covers for lesson papers

designs. For one who will design a vase or a wall paper, many thousands will buy the article. It is therefore important to know how to choose well, and making designs

is not the only nor always the surest way of developing discrimination in selection.

This choosing should be from collections similar to those from which the pupil will be obliged to make his choice when he comes to buy for himself, as well as from examples which will always be beyond his reach. For

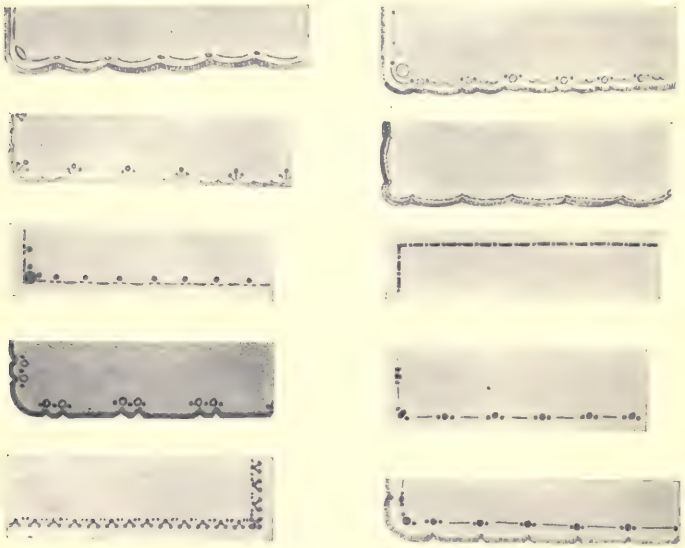

FIG. 42. Designs for embroidered borders by girls in Grade VIII

instance, if one wishes to cultivate good taste regarding vases, it is well worth while to study those in fine collections; but such study will lose nothing of practical value if it is supplemented by a choice, from among the material available in a local store, of the vase best suited to show the beauty of a particular style of bouquet, such as a few sprays of tall, slender flowers or a round bunch of short-stemmed blossoms.

Practically all the objects of home furnishings are the results of long evolution, and the different styles have successively reached high levels of artistic excellence. Furniture and lamps, for example, are interesting subjects for study, historically and artistically, but added to knowledge of and interest in the finest known examples should be some exercise of judgment in choosing the best possible from available sources, and this necessitates some concrete acquaintance with these sources. The present generation may thus be led to patronize the best at hand and to create a demand for what is still better.

Children should also make or have access to collections of pictures of well-designed dwellings of all classes, and public buildings for towns similar in size and means to their own locality, and be led to choose wisely among these. They should be encouraged to report on the most beautiful views in town. Where cameras are owned by pupils a collection of local pictures should be made. A study of one place under various aspects gives results full of interest and artistic suggestion; as, for example, a street scene, or a landscape, at various hours of day and night, and in different seasons. This encourages the sort of study which the artist gives to his chosen subject.

Sometimes children may be led to think about the æsthetic possibilities of their home surroundings by describing favorite places indoors and out, under such topics as My Favorite View, The Room I like best, What a Window adds to a House, etc.

An example of sensible teaching of design is that of a country teacher who found her one-room schoolhouse poorly furnished, with no pictures, an unpleasant wall color, and with papers in the windows instead of curtains. She

undertook to change one item after another. The children discussed the best color for the wall. A tone was decided upon and presented to the committee, who agreed to retint the room. Curtains were then considered. Samples were obtained and the best color and material decided upon. The children not only were allowed to have a part in the selection but were represented at the purchasing. Chairs, pictures, and frames were later discussed and choices made with the aid of catalogues and visits to stores. The making of the changes occupied two or three years, and the money was obtained in part from entertainments given by the children. The artistic training was such that it developed much practical acquaintance with ways of selecting furnishings, and incidentally the children developed a sense of ownership in the school. They sometimes inquired of the teacher, after a visitor had gone, whether any remarks had been made regarding the excellent appearance of the room.

Progress in æsthetic appreciation is not by way of a general advance in discrimination as a result of theoretical statements, but by definite study of individual things which are beautiful.

Continued use of water color should develop ability to match colors more exactly, to discriminate and record somewhat subtle distinctions in color tones, and to harmonize colors. One can usually secure excellent color harmonies by choosing with some care among color prints, fabrics, etc., and from nature. The groups of colors occurring in flowers, lichens, faded leaves, etc., furnish excellent material. By matching these colors the children can secure beautiful combinations for use in design.

Together with a growing acquaintance with good examples, simple experiments in harmonizing given colors may

be tried, by introducing a common element into each of a group of two or three colors to bring them into closer relation. For example, two colors like red and blue, which in full intensity are not usually pleasing, can be made more agreeable in combination by mixing a little gray with each. Mixing a little of each with the other or some of a third color with each produces a similar result. The red still counts as red and the blue as blue, unless too much has been added in the mixing, but the common element has made them less antagonistic. Children should try such experiments with a number of colors and choose for use in their designs the tones where the proportion of mixture gives the best effect.

By the end of the eighth year children should have gained ability to use drawing as a common means of expression, and to make rapid descriptive sketches, careful, well-constructed drawings, or truthful records of observations, as occasion may require. They should be able to undertake common constructive problems with knowledge of tools and processes, and should have acquired some ability to convert raw materials into a finished product according to a predetermined plan. They should have the beginnings of good taste in choosing what is excellent among things relating to the home and community, and should enjoy beauty of form and harmony of color in nature and in art. They should have enough acquaintance with what artists have produced to lead them to find some favorites among objects of fine art, as they have among books, so that they will desire to possess reproductions of these, and they should have developed a general sympathetic attitude toward art. They should also have gained an interest in productive labor sufficient to interpret things in terms of the effort

and skill required to produce them, and should have developed a healthful enjoyment in the exercise of their abilities which will lead them to be dissatisfied with any occupation which does not add to the well-being of the community.

Whether the aims and the methods considered in these pages meet with general acceptance or not, the fact remains that the formulation of some fairly definite standard of attainment based on the relative value of the different activities involved and on the tested capacity of the children, and some specific progression from grade to grade toward this standard are necessary to the highest effectiveness of work in manual arts in elementary schools.

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