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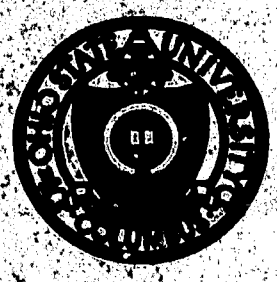

The Ohio State University
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U. S. DEPARTMENT OF
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PREFACE

This is to acknowledge the kindness of the United States Office of Education in providing the financial support which made this study possible; Professors Jerome Hausman and Manuel Barkan of The Ohio State University, School of Art for their support and interest; the teachers of the East Linden and Sunbury Road Elementary Schools; and research assistants, Mrs. Mary Dimmitt, Mr. James Hogg, Miss Patricia Renick, and Miss Carol Davis.

H. J. McWhinnie
December, 1968

SUMMARY

The purpose of this study was to investigate the effects of a specific type of perceptual training upon the aesthetic preference for complexity-asymmetry, ability to handle visual information, select variables of perceptual field-independence, and selected variables of creative thinking. Another purpose was to investigate certain inter-relationships among these variables in order to be able to identify specific behavioral referents for human behavior in art.

A total of 300 fourth, fifth, and sixth grade children in an elementary school near Columbus, Ohio, were selected to participate in 10 weeks of art instruction and/or perceptual training activities. They were divided into three groups and tested before and after the experimental period. An analysis of variance was used to test for significant differences on the specific variables under study. The null hypotheses were tested at the 0.05 level.

Significant treatment effects were achieved on variables of creativity, and aesthetic preference for complexity-asymmetry.

Significant correlations were achieved on a number of variables studied.

The results are discussed with reference to art education, curriculum, theory, and research as well as in relation to general psychological theory.

CHAPTER I. INTRODUCTION

A. THE PROBLEM AND ITS RELEVANCE FOR ART EDUCATION

1. General Theory

The field of art education has been severely handicapped by an inability to identify the basic structure of its discipline. Efland, in a recent article, has criticized some of these efforts. 1 The results of this study, with reference to the Efland critique, will be discussed in our conclusions. Curricular advances in the fields of mathematics and science, together with the inability of the art educator to make similar curricular innovations, has placed many art programs in serious trouble when competing for the student's time and the school's dollar. Art educators have claimed the development of perceptual awareness and creative thinking as a result of art activities but they have failed to identify the specific behavioral referents for such behavior changes.

This study will test a specific method of instruction in art within the area of perceptual training. This training is designed to increase the individual's ability to handle visual complexity and detail?

The specific problem which this study seeks to attack is to unify various methods of teaching drawing, that were explored in separate dissertation studies (the so-called Stanford Studies in Perceptual Training), into a more cohesive curriculum and to test the effects of that curriculum upon certain major variables. 3-6 An identification of the behavioral referents for the development of perceptual awareness may make it feasible for the art educator to be more specific in his measurements of the results of learning in art.

The emerging interest within the field of art education for what is being described as aesthetic education makes the identification of behavioral referents for aesthetic perception, aesthetic preference, and aesthetic choice even more imperative. In order to be able to identify and specify goals for aesthetic education in the visual arts in clear behavioral terms, it would seem necessary to identify the components of aesthetic perception.

The idea of perceptual training as a basic part of education in art was first advanced by McFee. 7 In her P-D (Perception-Delineation) theory she identified specific behavioral variables which seemed to be related to human behavior in art. In 1962 McFee 8 began the extension of her P-D theory to account for aesthetic perception. Efland 9 in 1967 further extended the McFee P-D theory to account for talking about art "as well as making art."

This present study attempted the exploration in an experimental

setting of variables of perception and aesthetic perception in an attempt to fuse elements of perceptual learning in art with elements of aesthetic education. The current status of art education in this country, as well as the diverse currents of thought in the field, seem to indicate that such an interpretation is both desirable and necessary. There seems to be an unfortunate dichotomy developing within the field of art education between "looking at art" and "making art." Such a division seems to be unfortunate and unwise. McFee 8 indicated a direction which, in this writer's judgment, can avoid such a division.

2. Relationship of This Study to Curriculum Theory in Art Education

Writers in art education, such as David Ecker and Manuel Barkan, have made it clear that psychological studies such as this will not provide us with what one "ought" to include in art curricula. The proper function of psychological studies in the arts has often been confused. While these studies will not give us the "oughts," they can provide us with knowledge of how to achieve our "oughts." We need to identify those psychological behaviors which are related to our "oughts," employ insights from learning theory and teaching theory to achieve our goals, and use psychological methods to evaluate our results. This would seem to this writer the proper relationship between psychological studies and curriculum theory.

B. RESEARCH BACKGROUND FOR THE THEORY

This study included manipulation and measurement of selected variables which from theory and a review of the literature in art education, empirical aesthetics, and perception, were identified as being relevant to human behavior in art.

A second problem was to continue the exploration of the general notion that there may be a relationship between an individual's perceptual style as a learned behavior and certain variables of creative or divergent thinking. 10,11 Research indicated the possible interrelation of the following four variables:

(1). the individual's ability to handle greater visual complexity,

(2). the degree of field-independence or field-dependence of an individual's perceptual style,

(3). the individual's perceptual style as learned behavior, and

(4). the individual's preparatory set to respond to perceptual stimuli.

The work of H. A. Witkin 12 indicated that the individual's perceptual style—the characteristic manner in which he will come to differentiate his environment—is a learned behavior. Witkin established two major modes of differentiation which he described as field-dependent or as field-independent. As Witkin described it, field independence seems to require the individual to be able to handle visual complexity and perceptual detail.

The hypothesized relationship of field-independence to the preference for figural complexity and asymmetry is based on the work of Bieri, Bradburn, and Galinsky. 13 They found that those individuals who were assessed as being field-independent on the dimensions tested by Witkin preferred the complex-asymmetrical figures on the Welsh Figure Preference Test. This finding gives us one possible link between perceptual style and variables of creativity.

A study by Rosen 14 indicated that training in art is related to preference for complexity and asymmetry. In his study he found those with some art training differed significantly from those without training in figure preferences. He showed that a preference for complexity and asymmetry seems to be learned early in professional art training. The problem with this and other studies reporting the figure preferences of artists as compared with non-artists is that the studies do not specify the nature of the art training.

A study by Woods and Boudreau 15 has given additional insights into the perceptual behavior of artists and non-artists. It demonstrated that the initial patterns of visual fixation of artists and non-artists are significantly different. The artists in their sample gave greater attention to the complex areas in the visual stimuli.

Frank Barron's work 16 provides another relation between perceptual functioning and creativity. He found that the figure preferences of artists and highly creative individuals from fields other than art differ significantly from non-artists and less creative individuals from other fields. The artists and the highly creative subjects preferred greater complexity and asymmetry.

A recent study by Brown 17 provides data which seem to indicate that figure preference for complexity and asymmetry operates as a set. Brown showed that by developing a set for either being creative or being non-creative he could achieve significant changes in figure preference.

These studies, briefly cited in the foregoing discussion, constituted the basic frame of reference which we used in the formulation of our hypotheses and in our extensive review of recent literature from the fields of

(1). creativity,
(2). aesthetic preference,

(3). perceptual field-independence, and
(4). information handling in visual perception.

The rather lengthy review of literature to be presented in Chapter II was felt to be necessary since the literature for the field of art education comes from widely scattered sources. Research in the field of the psychology of art is handicapped by the fact that the published literature is very widely scattered among numerous journals.

C. DEFINITION OF TERMS USED

1. Perceptual Style

In the present study perceptual style was interpreted as meaning the characteristic way in which an individual relates himself to his environment. Perceptual style referred to the well-established preferred ways of perceiving, attributable in part to variations in individual psychological organizations which make for individual differences in perception under essentially the same conditions of stimulation. According to Witkin these preferred ways of perceiving are an ever-present part of the individual's psychological make-up. This concept was based in part on the postulate of Witkin that the way in which we perceive or differentiate our environment is related to what we are like as people. 18 Witkin argued that in the general population, perceptual preference may reflect the extent of field-dependence or field-independence which are ranged on a continuum. Within Witkin's frame of reference, field-independence was defined as the capacity to differentiate objects from their background; whereas, field-dependence was defined as the inability of the individual to be able to separate an item from its surroundings with the visual field.

2. Asymmetry-Complexity

In this study asymmetrical balance was defined as the unity which is achieved in a visual configuration without the repetition of the left-to-right or the top-to-bottom patterns. Asymmetry was conceived of as the opposite of symmetry. In this study symmetry was defined as follows:

(a). the correspondence in size, form, arrangement, of parts on opposite sides of a plane, line or point; regularity of form or arrangement with reference to corresponding parts; and

(b). the proper or due proportion of the parts of a body or whole to one another with regard to size and form.

Complexity was defined as an intricacy or multiplicity of parts in a configuration.

3. Preparatory Set

For the purpose of this study, set was defined as a cognitive process activated by a stimulus or stimuli in the individual's environment. A set determines how one is predisposed to respond to a given situation.

4. Perception as an Information-Handling Process

For the purpose of this study, perception was conceptualized as an information-handling process. 19 McFee defines visual perception as the process of selecting, sorting, and categorizing visual information. 8 Visual information was defined as the cues received through the eye. Attneave identified three main processes by which, he postulates, we sort out, repeat, or make use of the vast amount of visual information we receive. 20 These three major processes are

(a). we classify similar things as units,
(b). we classify the random by averages, and
(c). we classify according to wholes.

5. Postural Cues

Postural cues refer to the ability identified by Witkin whereby the individual is able to use the pull or the feel of gravity upon his body in order to be able to identify an upright element in a visual field under various conditions of bodily tilt.

CHAPTER II. REVIEW OF THE LITERATURE

A. VARIABLES OF FIELD-INDEPENDENCE

The work of H. A. Witkin and his associates 2 would seem to indicate that the individual's perceptual style (i.e., the characteristic manner in which he will differentiate his environment) is a learned behavior. Witkin sought to establish the nature and the basis of the relationship between the personality organization of the individual and the extent of his dependence upon the prevailing visual field. Witkin investigated the relationship between the individual's personality and his perceptual style and found that he was able to identify two distinct types of perceptual functioning.

1. Those individuals who were dependent upon the use of visual cues in various tasks of space orientation were described as field-dependent.

2. Those individuals who could use postural cues in those tasks were described as field-independent.

Witkin found that the field-independent individual could more easily separate the figure from the ground on perceptual tasks such as the Embedded Figures Test. Witkin argued that the ability to be able to overcome an embedding context is central to the field-dependence dimension.

Extensive research has been done in psychology on the field-dependence, field-independence dimensions since Witkin first identified the basic variables. McFee, in her P-D theory, 7 early identified the relevance of the psychological construct of field-independence for problems in art education. Any extensive review of this literature is outside of the scope of this report but we do wish to discuss a few of the more recent studies.

A problem for the field of art education has been the relationship between verbal and non-verbal abilities in school subjects and in school tests. Elkind 21 found that field-independence is an asset on tests that require perceptual concept formation (the abstraction of elements and relations from things rather than from words) but not on tests of verbal concept formation. This study established two modes of orientation, verbal and perceptual.

Vaught 22 has investigated the relationships between field-independence and form discrimination in a three-dimensional task. He found that the field-independent individual has a higher degree of accuracy on the discrimination task. Such findings indicate relationships in the several perceptual modalities of the field-independent individuals.

Witkin identified clear sex differences in perceptual behavior and in functioning on the EFT. Stuart et al. 23 contradicted previous findings that there are significant sex differences in dependence upon the perceptual field. Stuart found significant genetic influences upon the mode of perception as measured by the EFT. The question of sex differences in perceptual behavior is important for art education in questions of curriculum differentiation. Based on the Witkin findings of 1962 we will analyze our data for sex differences.

A study by Immergluck 24 on the resistance to an optical illusion was important for our present study because several of our perceptual training exercises were based upon the Necker Cube. Immergluck found that the more field-independent the individual, the greater his ability to resist an optical illusion. A second study by Immergluck 25 found that the more field-independent individual, the greater the reversal rate on several perceptual tasks.

The question of the effects of practice on EFT behavior and the possibility that training, will alter the perceptual mode of the individual is crucial to our study dealing with the effects of learning on these variables. The effects of training tend to be mixed as we will show when we review our previous research in a future section of this chapter. A study of Goldstein 26 is relevant to this question. He found that practice did in fact improve the ability of both male and female Ss on the EFT. Such a finding of the practice effects of the test needs to be considered in interpreting our data.

B. AESTHETIC RESPONSE IN TERMS OF CONTROLLED VARIABLES

Davis, 27 in an unpublished M.A. thesis, has organized the literature of empirical aesthetics into 10 categories. She writes as follows in her discussion:

> "The variables of empirical aesthetics are diverse and yet a certain order does begin to emerge (with of course those separate factors which fit neatly into no category). To establish a variable one need only look at the factors cited in the inquiry or at whatever it was he set out to measure and the factors he juxtaposed in so doing. Some of the major variables seem to be the following. 28
>
> 1. Art expert or non-art expert (implying specialized training).
>
> 2. Trans-cultural (American, Japanese, French, etc.) differences.
>
> 3. Judgment (evaluation of worth) differences.
>
> 4. Preference (personal liking or disliking) differ-

ences.

5. Perceptual mode (attention/response interaction) differences.

6. Time-bound criterial (objectivity/relativism of aesthetic criteria) differences.

7. Age (maturational) differences.

8. Sex differences

9. Personality characteristic difference.

10. Response differences as influenced by studio production and vice versa."

1. Classifying Aesthetic Response

Davis describes Wilson's work 29 as follows:

"One of the more recent investigations which relates to controlled or selected attention thus defined is that of Wilson. Wilson utilizes a theory model developed and described by Maccia as event inquiry. Wilson defines aspective as . . . 'perception which results in the detection of, or the direction of attention toward, a number of qualities and aspects which characterize a work of art.' Upon this basis, and drawing from other sources, Wilson constructs . . .' a taxonomy of categories to account for verbal responses given to describe perception of paintings.' The categories fall into the following pattern.

I. <u>Individual Response Mode Categories</u>

A. Judgmental Mode Categories

1. Affective Judgment (AJ)
2. Valuation (V)
3. Evaluation (EV)
4. Artist Capability (AC)

B. Descriptive Mode Categories

1. Rejection (R)
2. Anecdote (An)
3. Analogy (A)
4. Qualitative (Q)
5. Relational Analysis (RA)
6. Affective Description (AD)

II. Aspects of Paintings Categories

A. Sensory Qualities

1. Color (C)
2. Line (L)
3. Texture (T)
4. Shape (S)

B. Formal Aspects

1. Value Contrast (VC)
2. Movement-Direction(M-D)

C. Technical Aspects

1. Materials (M)
2. Technique (T)

D. Thingness

1. Literal (lit)
2. Illusion (Ill)
3. Distortion (D)

E. Tertiary

1. Total Character (TC)
2. Symbolic (Sy)
3. Emotion (E)

F. Historical

1. Naming Artist (NA)
2. Naming Painting (NP)
3. Naming Style (NS)
4. Context (Con)"

Wilson tested his categories with 5th, 7th, 9th, and 11th grade children. Davis 27 summarizes and critiques Wilson's work as follows:

> "Wilson's work points to the differences in aspective perception of aesthetic (and other) qualities in paintings among groups of varying ages and degrees of art training. By utilizing a very 'open-ended' free response testing procedure, he was enabled to measure differences in aesthetic perception and response. The chief advantage of this test mode is in its allowance for a very individualized response in a group setting, thereby eliminating the excessive time problems of individual testing. The major importance of

> Wilson's work is in his construction of a viable taxonomy for classification of verbal response and the subsequently objective scoring procedure thus facilitated. The scoring procedure is highly complex and requires careful scrutiny and training of raters in order for utilization as intended to occur. Nearly any testing procedure has advantages and drawbacks; in order to achieve open-ended response, the concommitant drawback of a highly rigorous scoring procedure is essential for objective results to be realized as far as possible. Validity studies indicated that twenty of the twenty-eight categories were meaningful and useful. In terms of reliability of the instrument, test-retest reliability tended to be lower than split-half reliability estimates to make them meaningful in drawing accurate conclusions about groups. The test-retest reliability estimates were still generally high enough to allow for the drawing of accurate conclusions."

Based on her survey of the literature and on Wilson's work, Davis constructed and standardized a testing instrument for her study called the Davis Aesthetic Attention Test. Davis's test measured the students' controlled attention to aesthetic qualities in works of art and required the subject to compare similar qualities in several examples. This instrument was more structured than other tests of aesthetic response which have been heretofore of the "like," "don't like" type.

2. Some Measures and Studies Relating to Judgment and Preference

One of the most concerted, collective efforts in measuring judgment, preference, "ability" in art, and related factors was a ten-year program undertaken from about 1930 to 1940 by Norman C. Meier and his associates in Iowa. The Meier studies were generated by an attempt to test the theory of aesthetic measure as proposed by Birkhoff. 30 One of the Meier studies in particular, that of Brighouse 31 repudiated earlier findings by C. O. Weber 32,33 relating to preference of artists for simple or complex forms (Weber had established that artists tend to prefer complexity.) However, before examining the Meier Art Test, it may prove useful to survey the earlier work of Birkhoff and Weber.

a. The Work of Birkhoff Relative to Aesthetic Measure

Birkhoff, a Harvard mathematician, postulated that "...a subject's effort of attention to any configuration increases in proportion to the amount of complexity of visual detail in the perceived object." Aesthetic Measure (M) = $\frac{(C)\ \text{complexity}}{(O)\ \text{order}}$. This ratio is then the subject's feeling of value for a particular object based on his effort of attention. This formula has its roots, by Birkhoff's own design, in the theories of Gestalt psychology "...the unity-in-variety concept and the Gestalt idea of a 'good configuration'." The corollary aesthetic characteristic preferences would then of necessity be;order, symmetry,

simplicity, and clarity, an explicit or implicit criteria system common or related to many of the studies of this period. Insofar as any criteria system reflects the preferences of a particular trend in popular or art-oriented taste, the tests and studies predicated on that system may be said to be time-bound. A parallel problem of research into aesthetic perception is that of culture-bound criteria; this will be discussed later.

The results of Birkhoff's studies differentiated between simple and complex forms and indicated that artists expressed preference for simplicity in works of art. Birkhoff attempted a number of empirical tests by using his formula to calculate the aesthetic value of a number of art objects from different historical periods. Birkhoff's work therefore formed the cornerstone for the work done in the 1930's and 1940's in the general area of empirical aesthetics. 34

Birkhoff's theory 30 that the dual elements of simplicity and symmetry characterized all good works of art paralleled similar notions of the artist and teacher, Jay Hambridge. 35 In the late 1920's Hambridge formulated his concept of dynamic symmetry both as an instructional system and as a method of aesthetic analysis. Both Birkhoff and Hambridge attempted a mathematical analysis of the great art of the past in an attempt to prescribe aesthetic and educational criteria.

N. C. Meier's 36 work in the 1930's at the University of Iowa attempted the measurement of the aesthetic preferences of artists and non-artists. He found that artists tended to prefer the elements of simplicity and symmetry. His findings seemed to validate the theories of Birkhoff and Hambridge. As this writer has pointed out, Birkhoff, Hambridge, and Meier paralleled current fashions in art of the period, however they attempted to rationalize their findings as organic rather than assessments of current artistic fashions. 34

b. The Work of C. O. Weber Relative to Complexity and Asymmetry

Birkhoff's work (1932) was only slightly antecedent to the studies of C. O. Weber 32,33 who found that complexity and asymmetry were the preferred properties of visual forms selected by artists. Here again, the conceptual basis for aesthetic criteria or standard of value employed by Weber and his definitions of complexity and asymmetry play a vital role for interpretation of his findings. His work may measure aesthetic tastes and fashions coming from the cubistic period (1910-1920). It seems from a review of the history of aesthetic preference studies, that the data relative to preferences of artists is a few years behind the change of fashions in art. Weber's work is important because it formed the basis for later work which disproved the dominant position of Birkhoff, Hambridge and Meier.

C. VARIABLES OF AESTHETIC PREFERENCE

1. Preferences of Artists and Non-Artists

Frank Barron 37 has investigated the individual's figural preference for complexity-asymmetry versus simplicity-symmetry as a personality characteristic. He found that the more creative subjects from his larger study on creativity (creativity in this case was assessed by proven professional performance) had a distinct preference for the complex-asymmetrical figures on the WFPT. Barron discovered that the artists prefer the complex-asymmetrical figures and dislike the simple-symmetrical ones. These preferences were distinct differences, yielding two groups 20 points apart on a 65 point scale. (The mean for artists was 40.25 and the mean for non-artists was 16.9, with re-test means of 39.27 and 18.37, respectively.) The higher mean score indicated a preference for complexity-asymmetry. The difference between means was reported significant at the 0.001 level. Reliability with another sample of 80 non-artists was reported at 0.98. In his original sample only 4 out of 37 artists scored below the mean, whereas 4 out of 150 non-artists scored above the mean. Barron hypothesized that these observed differences in figural preference are related to the personality structure of the individual. It is the present writer's argument that these observed differences in figural preference are also related to the capacity of the individual to be able to process more visual information.

There is no evidence as yet that the preferences of artists are changing toward simplicity-symmetry and the Barron data are proving reliable on current replications; however, the current changes in the art of the 1960's towards hard-edge, pop, and op would cause one to hypothesize that once again we may be in a period of shift in the artist's preference. This constant change in the world of art causes problems when one employs the professional artist as a normative group for a test of aesthetic preference.

2. Preference of Naive Subjects for Simplicity

Helson 38 and Koffka 39 hypothesized that the elements of simplicity, symmetry, and closure characterize all "good configurations." In order to test this hypothesis, Mowatt 40 investigated the configurational properties which were considered "good" by naive subjects. "Good configuration" was construed within the Wertheimer frame of reference as a descriptive term to indicate the tendency of certain types of grouping to appear more spontaneously than other types.

Mowatt found that her subjects made more changes in the configurations as the stimulus figures changed from the closed and symmetrical to the more open and asymmetrical. Her study would tend to indicate that (as measured by the percentage of changes made by her subjects) symmetry, simplicity, and closure were the preferred properties of the stimulus figures as used in her study.

In Mowatt's study the greatest percentage of change was in the direction of closure. Closure was increased in 87% of the open, symmetrical figures and in 76% of the open, asymmetrical figures. Out of a pool of 2,000 figures, 1,560 (or 78%) were changed in some way. Twice as many changes were made in the direction of increased symmetry (38%) as in the direction of decreased symmetry (17%).

Some explanation of the variance between the Mowatt study and the work of Barron would seem to be in order. The preference of the artists for complexity-asymmetry noted by Barron may be explained as a result of training in art. This writer hypothesized that the preferences measured by Mowatt may not only be a function of the configurational properties of the stimulus figures themselves (as Gestalt theory would hold) but may also be a function of the individual's set to respond and may be a function of the individual's previous learning and his ability to handle visual information.

It may also be our "set to respond" that is the variable most sensitive to changes in the world of art. Mowatt's work was based on Gestalt psychology which was in turn, as this writer has pointed out, 41 influenced by current ideas in the world of art, notably the Bauhaus in Germany. So the Gestalt principles of visual organization, which, according to their theory, were organic principles, may also be reflections of current developments within the art world of the 1930's.

3. Preference for Complexity-Asymmetry as a Function of Information Handling

The learning strategy that was used in this experiment was designed to attempt to increase the subject's ability to handle more visual information. The assumption was made that a preference for complexity-asymmetry involved the capacity to be able to handle more visual information. This assumption was based in part on the work of Hochberg, 42,43.

Hochberg determined empirically the stimulus dimensions upon which "information" may be measured. In a manner congruent with Gestalt theory, Hochberg assumed that those shapes which had more "figural goodness" would be preferred and perceived since the subject was required to handle less visual information in so perceiving them.

Hochberg's concept of "information" refers to the number of different items an individual must be given in order to specify or reproduce a given pattern or figure along one or more dimensions. Hochberg isolated the following visual elements as being critical to this information-handling process:

(a). the number of different angles, and

(b). the number of different line segments of unequal length.

4. Training in Art and the Preference for Complexity-Asymmetry

Bieri, Bradburn, and Galinsky 44 found a significant correlation between EFT performance and scores on the WFPT. Those subjects who were found to be independent-of-the-field by their low EFT score, showed a preference for complexity-asymmetry on the WFPT.

The experimental evidence would seem to indicate that perceptual training in the ability to handle visual detail and complexity somehow results from training in art. A study by Silverman 45 indicated that perceptual learning is not increased by participation in general art activities to any significant degree. He concluded that perceptual learning does not seem to occur as a by-product of art activities. A reasonable hypothesis is that training for specific perceptual learning must also be highly specific in nature.

It would seem that these visual habits are learned early in art training. Rosen, 46 in a replication of the Barron study, obtained findings which would tend to support Barron's original thesis. Rosen asked the question as to whether or not the observed differences in figural preference reflected ability in art or the effects of art training. He tested 44 art students, 8 art faculty members, and a group of non-art students. Rosen divided his art sample into two groups: 22 beginning art students and 22 advanced art students. The differences in the reported means between these two groups of art students on the WFPT were not significant; whereas, the differences in means between art and non-art students were significant and in the direction of the original Barron data.

5. The Visual Fixations of Artists and Non-Artists

A study by Woods and Boudreau 47 provided some insights into the visual habits of artists and non-artists. The experimenters employed a bi-dimensional camera to study the individual's fixations on complex and simple patterns. They found that artists tend to make their initial fixations on the more complex patterns. This finding may indicate that these initial fixations are a result of a preparatory set to perceive visual complexity.

6. The Work of Brighouse Relative to Preference for Simple Forms

By 1939, Brighouse, 48 working within the Meier program at Iowa, had developed measures which found that preference for simple, symmetrical forms increased with training in art. Again, one must go to the criterial system basis (implicit or explicit) and to the definitions of complexity-simplicity and symmetry-asymmetry employed by Brighouse in order to free interpretation of his findings from time-bound criteria.

7. The Meier Art Judgment Test and "one-way-bestism"

The Meier-Seashore Art Judgment tests consist of pairs of drawings from "masterworks" of art, the one reproduced (we use the term loosely) in accordance with the original composition and its counterpart distorted or altered in some fashion. The subject's task is to make a judgment about which is the better work, a variety of what Shaw 49 calls one-way-bestism, as reported by Child 50 who defines the term as the view that a good painting has every detail just right, so that even an inexperienced observer would see that an alteration would detract from its perfection. Pronko et al. 51 sought to test this position with pairs of original and altered works presented to college students. They found the position untenable in light of empirical data. Hussain 52 sought to discover if an object must be recognized as intrinsically embody-ing the spirit of a human maker in order for subjects to consider it a work of art. He presented the paintings of a child, two professional artists, and a chimpanzee to adults of English, French, and Indian nationalities without mention of the origin of the works. In each nationality group the average preference was higher for the chimpanzee's paintings than for those of at least one of the professional artists; one group preferred his work to that of any of the three human artists. 50 This would cast some doubt on the notion that a necessary condition of a work of art in the preference ratings of non-trained adults is its unquestionably recognizable human quality. Hussain's and Pronko's findings again underline the necessity for making explicit, in any study of aesthetic judgment or preference, the basis of aesthetic criteria on which the tests are predicated and against which subjects' information, aptitude, judgment, or preferences will be evaluated. This would seem to be at least one major way of evaluating the focus of measurement for a particular instrument or study so that replication or interpretation of findings could be achieved free of some of the limitations imposed by time-bound criteria. Tests such as the Meier Art Judgment Test are of historical significance and may be useful methodologically in some respects, but their usefulness as measurement instruments may be highly dependent on fuller understanding of such factors as have been discussed. The Davis Aesthetic Attention Test was developed as an attempt to overcome the criticism in the above.

8. The Work of Graves, Bulley and Dewar Relative to Preference

Another instrument still in wide use is the Graves Design Judgment Test, which actually asks subjects to make a preference. Graves 53,54, 55 describes the measurement variable as a preference rather than a judgment rating between two (sometimes three) "drawings (of) simple abstract designs..of similar type but (differing) in a way that can be rather easily conceptualized."

Graves' 53 test manual reports that art students' and non-art students' mean scores differ greatly; item analysis was effected through selection from a larger group of designs ....on the basis of expert judgment, group discriminatory value and consistency with total score. Here again, conceptualization as a basis for construction of the de-

signs may be highly relevant to interpretation of findings for if the designs reflect the aesthetic taste or criteria of a particular period or artistic bias, the results are chiefly of historical value while replication of the test with art- and non-art-trained students of another period may not distinguish readily as to which group will tend to prefer the Graves conceptualization of a "correct" choice between designs. 56

Child 56 compares the Graves instrument with the test devised and described by Bulley 57 and finds that results of the two correlate at 0.12. He evaluates the Bulley test as having more face validity than the Graves measure since it asks for judgment of aesthetic value between two works of art, not preference for one of two abstract designs.

> "Such a test..(Bulley's)..has better initial claim to measure aesthetic sensitivity than a test whose stimuli are not works of art, and whose instructions do not direct attention to aesthetic values." 56

This is only one example, as Child points out, of the general finding that tests purporting to measure aesthetic sensitivity tend to relate very little to each other. In the same comparative study, Child refers to the work of Dewar. 58 Dewar found that both art experts and laymen, when shown works of differing aesthetic merit, tend to express preference in an average order of preference undifferentiated by degree in the subjects of art training or experience. Inconsistent with these findings, however, was a study by Child 59 which indicated that the use of an average order in aesthetic preference does not relate to individual agreements.

9. The Work of Eysenck: The General Ability Factors

Dewar's work was a major foundation for the work of Eysenck relative to aesthetic sensitivity and measure. Eysenck postulated, on the basis of studies demonstrating "that people who show good taste in their judgments of simple colours and of colour combinations also do well on ...completely achromatic tests of composition"...that..."there exists some property of the central nervous system which determines aesthetic judgments, a property which is biologically derived..." 60 He analogized this property to Spearman's "g" factor in intelligence testing, calling this general ability aspect in subjects the "t" factor or the essence of "reality behind which is generally called good taste." 61,62 The influence of the "t" factor extends throughout aesthetic sensitivity, according to Eysenck, independent of learning, traditions, or other irregular associations, and it extends over modalities of sensory perception other than vision. Eysenck identified another aspect of perception, that of the "k" factor which emerged when the "t" factor is a bipolar personality component and, as a general aesthetic judgment factor, is represented by a preference for simple polygons, simple rhythms, and highly unified pictures. Eysenck worked with general population samples undifferentiated as to art-trained or non-art-trained groups.

Eysenck predicated aesthetic criteria based on group judgment on earlier work done by Kate Gordon 63 relative to average judgment of lifted weights by groups of judges. Gordon ran numerous tests and determined that the validity of average weight estimates increased as the number of judges increased. Eysenck finally arrived at four isolatible factors or variables through factorial analysis, i.e., (1) error or chance factors, (2) bi-polar factors (personality differences), (3) cultural milieu differences (differing nationalities or social classes), and (4) a general or "t" factor probably of neurological-genetic derivation. 60

Another aspect of Eysenck's work relates to Birkhoff's attempt to devise a formula for aesthetic measurement. It will be remembered that Birkhoff found artists' preferences to be for simple forms when their responses were measured against the outcomes of applying this formula. Eysenck employed two sets of polygons used by Birkhoff and asked 14 subjects to rank them in order of preference. He then suggested that two factors accounted for all the correlations, a general error (the "t") factor and a bi-polar (personality) factor. On this basis, he repudiated Birkhoff's formula, $(M = \frac{\text{Complexity}}{\text{Order}})$, stating that M (aesthetic measure of value or pleasure) equals complexity times order; in other words, M is the product of these components and not a ratio of one to the other. Child evaluates Eysenck's work in general thusly:

> "Since Eysenck's measure involving works of art was based on agreement with concensus without any criterion of aesthetic value, his evidence is of doubtful worth." 50

Eysenck was, of course, more interested in what factors were in the human subject rather than what factors produced aesthetic value; this is perhaps why it is incomprehensible to correlate his "t" factor investigations with Birkhoff's aesthetic measure investigations.

10. The Work of Beebe-Center Relative to That of Birkhoff

Perhaps even more significant than that discussed above was the attempt by Beebe-Center 64 to test directly the aesthetic measure hypothesis of Birkhoff. He examined the preferences of art students, lay students, and psychology students (at the college level). His results fail to correlate with Birkhoff's. The correlation between art students' preferences and the value formulated by Birkhoff's formula for an art object was 0.22 (Pearson Product Moment); the correlation between preferences of lay students and the value of Birkhoff's formula prescribed for the art object was 0.47 (Pearson Product Moment). This would seem to indicate that, as Beebe-Center reported, art students exhibit great divergency in aesthetic preference. Furthermore, Birkhoff's formula cannot be employed reliably to predict the aesthetic preferences of art students (or lay students either).

11. The Work of Barron, Child, and Paychaudhuri Relative to Personality Characteristics of Artist and Laymen.

An alternative mode of attempting to measure aesthetic sensitivity arises from work done in the area of creativity measurement correlated with personality variables, as compared with the approach based on assumption of intrinsic general factors within the human organism. As an aside, one could consider separate personality variable correlates as sub-domains of Eysenck's bi-polar personality factor. Whereas Eysenck was looking for evidence of a neurological, genetically derived factor in human aesthetic response, other investigators have tended to attempt correlation of specific measurable personality variables related to creativity with measured aesthetic preferences.

Barron 65,66 has conducted studies in which the Welsh Figure Preference Test was administered to artists and non-artists. The WFPT uses black and white drawings of differentiated degrees of complexity-simplicity as well as of symmetry-asymmetry and is described as a non-verbal approach to personality measurement. Barron's results indicated that observable differences between artists and non-artists relative to figure preference differentiated between those two groups in terms of distinct preference by the artist group for complex and asymmetrical figures. Conversely, artists tended to dislike simple and symmetrical figures; the split between the two groups was 20 points on a 65 point scale. Barron suggested that these findings might be accounted for by the bi-polar of 'k' factor of Eysenck. Another explanation may lie in the Welsh Figure Preference Test itself and its assumptions of aesthetic value, and in the current aesthetics of the artists tested by Barron and MacKinnon. As this writer has pointed out, 10 however, there has been no work done in the area of measuring recent or current aesthetic values of artists.

The normative population of professional artists, as used by Barron were probably artists influenced by the current fashions in art at the time. In the 1950's the dominant art style in the San Francisco area (where Barron worked) was abstract-expressionism and loose figurative paintings. Both styles would foster preferences for complexity-asymmetry.

Even though there are weaknesses in the normative process used by Barron, the basic styles of aesthetic preference identified by the WFPT do seem to be valid as basic personality styles, creative styles, cognitive styles, and perceptual styles.

Drawing upon the work of Barron and MacKinnon, Child 67 employed a questionnaire devised by these investigators to discriminate between those who demonstrate independence of judgment and those who do not. Child reports that people who are high in independence of judgment have a higher measure of aesthetic sensitivity than those who are low in this variable.

A second personality variable for which a questionnaire was devised was tolerance of ambiguity. Child also found a high relationship between high aesthetic sensitivity and this variable. 68 A third personality variable, regression in the service of the ego or playfulness, was measured by means of a questionnaire of David Singer. This variable also tended to correlate positively with high aesthetic sensitivity. Child concludes that those who share the aesthetic judgments of art experts tend to have certain personality characteristics, although he has established only tendencies, neither low enough correlation-wide to deny certain associations, nor high enough to prevent the realization that these variables are only a small portion of the possible variables associated with aesthetic sensitivity. 50

The factor of tolerance for ambiguity was one employed by Paychaudhuri 69 working at the University of Calcutta in a study of perceptual characteristics of incipient artists. He hypothesized that (a) incipient artists and non-art students differ significantly in the ability to tolerate ambiguity in works of art, and (b) fine arts students and commercial art students do not differ significantly in this personality dimension. The subjects were 60 art students and 75 non-art students in the Calcutta schools. The Welsh Figure Preference Test was the instrument utilized. Both hypotheses were confirmed; "t" test for the first hypothesis was 8.71 significant at the 0.001 level and the 't' test for the second hypothesis was not significant. It is revealing to note that, given the constant factor of the WFPT, there does seem to be some significant correlation between this personality characteristic and art-trained populations, even considering the added variable of transcultural factors.

Child has engaged in a considerable amount of work, in association with others, relative to cross-cultural aesthetic agreement by art-trained or art-interested individuals. This work has fascinating implications for the questions: Is there an inherent component in art-interested persons of different cultures which demonstrates universal criteria of aesthetic measure or sensitivity? To what degree does the cultural factor influence aesthetic judgment?

This question of cultural factors has implications for art education. We need to consider this question when we discuss differing art curricula for Negro, Mexican-American, etc. school populations.

12. The Work of Child, et al., McElroy, Lawlor and Machotka Relative to Trans-cultural Agreement

One way of testing Eysenck's general ability factor would be to replicate his studies with general population samples of varying cultures.

> "McElroy 70 failed to find any evidence of agreement between Australian aborigines and University of Sydney students in preference ranking of several sets of vis-

> ual materials. Lawlor 71 found no significant agreement between West Africans and Englishmen in preferential rankings of several West Arican decorative designs . . " 50

On the other hand, Machotka 72 found decided agreement among French and American children in their preferential ranking of 15 paintings. Although this investigator's primary objective seems to be an exploration into the bases for children's aesthetic preferences as differentiated by age groups, his findings relative to preference comparisons based on nationality (culture) and social class (working class and "liberal professional" class) of parents are of significant interest. He found that children in Lille and Paris, France, and Newton, Massachusetts, change their preferences and their reasons for preferences as they mature. Pre-school children tend to base their preferences chiefly on color differences. Reasons given by the 7- to 12-year-old children were related to clarity, realism, and harmony. Machotka relates that what he terms the "third stage" (ages 12 to 18) tend to give preference reasons based on "style, composition, affective tone, and luminosity." It is not difficult to see the similarity in Machotka's work with that of Jean Piaget relative to stages of development in children. Interestingly enough, Machotka considers the possibility of verbal skills as a factor in establishing preferential difference reasons, but does not regard verbal ability as a decisive component in interpretation of his findings. In terms of socio-economic class and cultural (national) differences, his population samples were as follows: the boys in the Lille, France, group were of working-class parental background while the boys in the Paris, France, and Newton, Massachusetts, groups were of professional parental socio-economic background. Results of correlations among the preferences of the three groups hold the most significance for the purposes of the present discussion. The Lille-Paris groups' mean preferences correlated at 0.84 (P 0.05); the Paris-Newton groups' mean preferences correlated at 0.74 (no significance level given); the Lille-Newton groups' mean preferences correlated at 0.66 (P 0.05). As Machotka concludes from these comparisons,

> "Concerning the relative provision of social class or of cultural environment, it is the cultural environment that creates the greatest community of preferences." 72

Cultural environment or nationality, then, seems to account for preferential agreement more than does socio-economic level.

Davis 27 explored the question of socio-economic differences in greater depth. She tested ninth grade children of differing socio-economic groups on her Davis Aesthetic Attention Test. She found significant differences in her two populations, with the males being greatly different and the females rather alike. The boys in the middle class school were more like the two girl groups and very different from the boys from the lower class school. It is not clear from her study whether the obtained differences were sex differences,differences in

verbal ability, differences in test-taking behavior, or cultural differences.

Recent studies of cross-cultural agreement by Child and Siroto 73; Ford, Prothro and Child 74; and Iwao and Child 75 compared the preferences of (1) American art experts and Japanese potters, (2) Fijian islanders (general population where everyone engages to some extent in artistic production) and American art students, and (3) American art experts and BaKwele (African) individuals interested in masks. Results of these studies indicate a tendency toward cross-cultural aesthetic agreement. A most significant variable which was held relatively constant in each of these studies was that of expert populations, rather than sampling untrained general populations. Such findings substantiate the 't' factor of Eysenck. One wonders, however, if such trans-cultural agreement among connoisseurs indicates the presence of a neurologically and genetically derived basis for "good taste," or whether an alternative explanation might not lie in the inclinations, training, and interest in art common to all these groups in varying degrees. Examination in more detail of this rival hypothesis might have important implications for education of aesthetic sensitivity with many different groups.

13. The Work of Rosen and Implications of Art Training for Preferential Agreement

In 1965 Rosen 76 partially replicated Barron's work with figure preference to ascertain the degree to which art training influenced aesthetic preference. His results indicated a significantly higher preference for complexity and asymmetry by those who had had art training at better than the 0.01 level of significance. The rival hypothesis that those who have an innate preference for complexity are more likely to study art was not dealt with. In reflecting on the paradox between the Barron-Rosen and Weber studies and the work of Birkhoff and Brighouse relative to preference for complexity or simplicity by art-trained individuals, one may also raise an equally intriguing question: To what extent does the nature of the training received by those interested in art (as a possible reflection of art trends popular at a particular time or prevalent aesthetic biases) influence aesthetic preferences for complexity-simplicity or symmetry-asymmetry? Thus, if one accepts the thesis that art training is a possible factor in the disparity between the studies of Barron-Rosen and Birkhoff, one must also look further, inquiring into the exact nature of that training in order to hypothesize possible reasons, based on time-bound aesthetic criteria, for two such incomparable conclusions.

14. The Work of Eisenman in Preference for Complexity

Taylor and Eisenman 77 investigated the perception and production of complexity by creative and less creative art students. The more creative subjects chose the more complex forms and created the more complex designs. The less creative subjects preferred the more simple designs.

Eisenman 78 found that non-art subjects preferred symmetrical shapes. The subjects rejected complexity to a highly significant extent, although they did not necessarily prefer the simplest shapes.

In a second study, Eisenman 79 analysed preferences in terms of birth order and sex. Female subjects tended to prefer the more complex shapes. First-born males preferred more complexity than later-born males, but later-born females preferred more complexity than first-born females.

15. Recent Studies on Variables of Complexity-Asymmetry

Mohan 80 investigated the relationship between personality and aesthetic evaluation. He found that artists' knowledge about the art works used for the study affected the preferences of extroverts but not introverts.

Vitz 81 tested the hypothesis that subjects prefer a specific degree of visual complexity. Angular patterns of increasing complexity were presented to a group of subjects. Results of these tests showed that the average curve of preference increased up to a moderate degree of complexity and then decreased. Vitz did not find any difference between subjects with an art interest and those with art training on the variables of preference for increased complexity.

Schnore and Partington 82 tested the immediate recall for visual patterns and found that recall errors are primarily a linear function of degree of symmetry and amount of visual information. The rate of error increases as the designs become less symmetrical. His studies using electroencephalographic and skin responses have demonstrated that complexity in the stimulus affects level of arousal. He also found that subjects rated the more complex stimulus figures as more interesting but less pleasing.

Berlyne and Peckham 83 used visual patterns, representing a number of complexity or irregularity variables, as stimuli for three of Osgood's semantic differential scales. Mean ratings of evaluative and potency dimensions were similar bimodal functions of judged complexity. Mean ratings on the Activity Scale were an inverted U-shaped function of judged complexity. The data were compared with judgements of pleasingness and interestingness and with EEG measures from previous experiments using the same stimulus materials. Reactions to complexity seem to involve two distinct clusters of variables, which may be closely related.

Day 84 reports that the more complex alternative stimulus figures are looked at longer, etc. However, at a higher absolute level of complexity, the simple figures are chosen and looked at longer.

Eisenman and Robinson 85 tested the generality of some complexity-simplicity measures as related to creativity by using the original

Birkhoff polygons and the Unusual Uses Test. They reported significant correlations between preference for complexity and measures of creativity (fluency 0.87 and originality 0.85). They also found that unsophisticated subjects (non-artists) tend to prefer an intermediate amoung of variability.

Eisenman and Gellens 86 measured preferences for complexity-simplicity and symmetry-asymmetry. By their separation of the relevant variables they were able to more precisely describe variables of aesthetic preference. They report a strong preference for complex-symmetrical polygons. It would seem that symmetry tends to make a complex polygon more simple.

C. STUDIES RELATIVE TO PERCEPTUAL TRAINING

There is an order of emphasis in research literature bearing on the problem under discussion (aesthetic attention and socio-economic level) which does not have its focus in aesthetic measure, judgment, or preference. This is the area relative to empirical aesthetics and art education which turns its sights to human perception of visual stimuli as it affects the production and viewing of art objects. To explore the history and scope of inquiry in this dimension fully is beyond the limits of this discussion. Suffice to say that psychologists, art educators, and others with an interest in visual phenomena, stimuli, and perception have been delving into this area for a considerable time.

1. The Work of Salome

Salome 87 sought to determine if the drawings of elementary school children would be altered as to visual information content when perceptual training was given. Drawing instruction was given to both experimental and control groups, but perceptual training was given only to the experimental group. A rating scale of three criterion categories was devised. The categories were (1) communicative symbols, (2) closure-clarity, and (3) proportion. Salome predicated his hypothesis (as follows) on a portion of Attneave's theories relative to concentration of essential (perceived) information along contour lines. 20 Salome's hypothesis states:

> "Perceptual training which encourages the child to look for information along contours of objects or patterns, at points of contour direction change, such as angles, peaks of curvature and at lines caused by abrupt color changes will increase the amount of visual information a child includes in his drawings." 3

He administered pre- and post-tests to control and experimental fourth- and fifth-grade intact classroom groups. His results showed that:

> "...perceptual training relevant to the utilization of visual

> cues located along contour lines does increase the amount of visual information fifth-grade children include in drawings.." 87

He compared mean scores on one drawing task and found that experimental groups in both grades performed at a higher level sooner than did control groups. The results were not as conclusive for the fourth-grade experimental group. The implications of Salome's work for art instruction and further research are as diverse as are the numerous potential modalities of visual cue perception. Further, from a psychological standpoint, his results would tend to indicate that there are definite aspects of visual information perception which may be increased or heightened through perceptual learning instruction. There are also important implications here for what Wilson calls 'aspective perception' in enlarging the number of aspects of an art object which a child (or adult) may be taught to see. 29

2. The Work of Efland

Efland 5 found that perceptual training, designed to develop the ability to discriminate oblique lines and angles, significantly improved differentiation of form in the man and house drawings of first grade children from what he described as an upper middle class environment. However, lower middle class children did not respond to the treatment. Efland speculates as follows:

> "This may indicate that class differences create differing levels of readiness for the treatments, or that differences in prior experience may have produced a different view of the importance of the training."

One of the queries which prompted this study was whether improvement in their drawings increases children's visual perception or if perception increases performance improvement in graphic expression. Citing Schaeffer-Simmern 88 and Arnheim 89, Efland described the theories of both relative to development of graphic representation seen as a differentiation process leading from early diffuse expression to that which is more articulated. Then he

> "suggests that children 'learn' to be dissatisfied with their early modes of expression because these do not allow them to depict objects in terms of existing pictorial conventions provided by the culture."

From personal experience, Efland noted a general falling off of graphic expression by the third grade, the very time at which Arnheim suggests that diagonal and oblique lines and forms should be finding their way into the child's graphic vocabulary. Efland hypothesized that children by this age have become dissatisfied with horizontal-vertical symbols and do not know how to represent oblique forms.

Therefore, two methods of drawing instruction were devised by Efland. One method directs the child's search toward oblique, vertical, and horizontal visual cues in forms. The second was designed to produce differentiation of form without perceptual training. The tests and treatment were administered to six first-grade classes; two received perceptual training, two received just drawing instruction and the second-grade classes received no instruction. His hypotheses were that training attendant upon oblique lines and angles would improve first-graders' differentiation of form, and that maturation alone would not account for improvement. Further, perceptual training would tend to increase ability to identify a simple form as measured by the Simple Embedded Figures Test. The first hypothesis was confirmed in the case of upper middle class children, but not with lower class children. Maturation was not found to be as great a factor as perceptual training since the second-graders did not perform as well as did the first-grade children who had received perceptual training.

Efland's work suggests that certain socio-economic factors affecting perceptual set and readiness are a possible component of development in graphic symbolization among children of lower class background. (The other possibility he mentions, that because of their psychosociological set lower middle class children failed to see the tasks as important, should not be forgotten.) Nevertheless, Efland has established that a difference does exist in the degree of influcence exerted by perceptual training on the drawings of children from varying backgrounds. Remaining to be explored are inquiries relative to identification and study of individual socio-psychological set variables as well as the influence of these variables on development of strategies and devices for altering and enlarging perceptual information (visual cues) of the lower middle class child. These are dimensions toward which this study points.

3. The Work of McWhinnie

The investigative studies of McWhinnie 2 are related in terms of visual perception to the work of Salome and Efland and in terms of figure preference for complexity-asymmetry to the work of Barron and Rosen. McWhinnie measured the relationship between figure preferences and figure drawing performance of sixth-grade children. He measured this relationship by administering the Welsh Figure Preference Test to 136 sixth-grade children and then rating their figure drawings for degree of differentiation. Earlier work by French 90 had shown that children tend to move from simple to complex forms in their preferences as they mature. McWhinnie hypothesized that a high positive correlation between performance on the Embedded Figure Test and figure drawings would be found; also, that there would be a positive relationship between preferences for complexity-simplicity and level of differentiation in figure drawings. He found that scores on the Embedded Figures Test for boys who had received perceptual training were positively related to preferences for complexity-asymmetry on the WFPT. He also found that scores on the WFPT were negatively related to ratings of figure drawings. In

other groups (regular art and control groups) as well as for girls, significant negative relationships were found among the three variables. McWhinnie suggests instability of behaviors at this age level and the possible effects of test fatigue as two possible explanations for the variance of his results to those of other studies. Nevertheless, one implication of his work is that complete reliance on previous research, regardless of age or other individualizing factors (differences in classroom factors, socio-economic level, test fatigue, administrative directions, etc.), may prove unsatisfactory in a particular situation. His findings suggest strongly that (with regard to his population sample at least) there appears to be no positive relationship between figure drawing performance (even with perceptual training) and preference for complexity-asymmetry. One might speculate that, at the sixth-grade level, performance in graphic symbolization has not kept pace with preferences for complexity, although this is only the most obvious of possible explanations for McWhinnie's findings.

McWhinnie 91 next investigated the effects of a longer and more intensified program of perceptual learning upon the selected variables under study. He summarized the following results of 10 weeks of perceptual learning upon the behaviors of 4th, 5th, and 6th grade children on the following variables:

(a) Preference for Complexity — (WFPT)

The treatment did not produce significant changes in preferences for visual complexity.

(b) Preference for Complexity in Works of Art — (BAST)

The regular art group, instead of the perceptual training group, did produce an increase in preference for complexity in works of art.

(c) Ability to Differentiate Form on Drawing — (EFDT)

Significant treatment effects were obtained on this variable in 4th and 5th grade but not at the 6th grade level.

(d) Ability to Separate Figure from Ground — (EFT)

Significant treatment effects were obtained on this variable as a result of the perceptual training.

McWhinnie 92 next studied the interrelationships between the four major classes of variables in his experimental study. In a study on the relationship between perceptual variables and creativity variables he reported the following:

(a) Preference for Complexity — (WFPT)

In the 5th grade sample positive correlations were found between verbal creativity and preference for complexity and negative correlations between non-verbal creativity and preference for complexity.

(b) Preference for Complexity in Works of Art — (BAST)

He achieved mixed patterns of negative correlations between creativity variables and preference at all three grade levels.

(c) Perceptual Field-Independence — (EFT)

No significant relationships were found on this variable except at the 6th grade level where he found that EFT was negatively related to measures of creativity.

(d) Figure Drawing Test — (EFDT)

In the 4th grade positive relationship between drawing and creativity were found whereas at the 6th grade level negative relationships were obtained.

McWhinnie 93 next studied the interrelationships between the perceptual and preference variables.

(a) Preference for Complexity — (WFPT)

Positive correlations were obtained for preference complexity on the WFPT and for complexity in works of art. Negative correlations were obtained between preference variables and the EFT and drawing behaviors. McWhinnie identified two clusters of behavior: (a) active behaviors (drawing and EFT), and (b) passive (aesthetic preference variables). Also his data indicated that the two active variables are highly related and so are the two passive behaviors.

McWhinnie 93 also investigated the relationship between preference for complexity on the WFPT and on works of art. A significant pattern of positive correlations were found between the two variables for the boys but not for the girls.

4. Work of Yingling

Yingling 94 found that both a sample of junior high school students and art majors chose work on the basis of style (abstract or representational) rather than on aesthetic quality. In her study she compared preference for aesthetic style as well as aesthetic quality.

5. Work of Davis

Davis 27 tested the differences in controlled attention to quali-

ties of art as a result of socio-economic differences. She compared aesthetic preference of lower and middle class junior high students. She found a significant difference as a result of socio-economic differences. She also found a significant pattern of sex differences.

6. Work of Renick

Renick 95 developed a perceptual assessment test to investigate the perceptual styles of Negro and white children. She developed the following sub tests for her instrument:

(a) deductive reasoning in visual problems,

(b) inductive reasoning in visual problems,

(c) deductive-inductive reasoning,

(d) ability to copy outer contour of geometric form drawings,

(e) ability to copy inner structure of geometric form drawing, and

(f) shape combining in one drawing.

Renick tested 3rd, 4th, and 5th grade children and analysed her data separately by age, sex, and race. Renick identified certain specific perceptual and reasoning styles for each age and race and specific implications of those discrete styles for instructional problems in art. Her work has implications for children's visual problem-solving abilities.

CHAPTER III. RESEARCH DESIGN

A. PROCEDURES

The purpose of this study was to investigate the effects of a type of perceptual training upon variables of aesthetic preference. The learning program was designed to enable the individual to resist a set for simplicity-symmetry in favor of a set for complexity-asymmetry. The subjects in the experimental condition were given practice in the manipulation of the psychophysical elements that Hochberg had empirically found to determine the perception of complexity-asymmetry in a variety of tri-dimensional configurations. The study was conducted at three age levels.

Fourth, fifth, and sixth grade children near Columbus, Ohio, were used for a population sample of 270 subjects (90 at each grade level). The following experimental conditions were used:

1. Perceptual Training (30 children at each level)

This group was given the instructional program consisting of a series of lessons that were organized into a booklet which was duplicated for each student (see appendix 10). The program was designed for use in an elementary school classroom with a teacher having no special preparation in the teaching of art.

The perceptual learning program consisted of a series of lessons designed to influence the

a. manipulation of the visual elements of complexity and symmetry, and

b. ability to handle visual information.

2. Regular Art (30 children in each grade)

This group followed the regular course of study in art within the school district for each grade level.

3. Control (30 children in each group)

This group did not receive any art instruction for the eight-week experimental period.

Each subject under each of the three conditions was tested before and after the experimental period. The subjects were assigned at random by group to treatment conditions. A 2x2x2 analysis of variance was used and F ratio was computed to test for significant differences at the 0.05 level of statistical significance on the four major vari-

ble clusters.

B. HYPOTHESES TESTED

Four major hypotheses in terms of learning programs were tested. These hypotheses (listed below) reflect the major variables that are related to this aspect of perceptual functioning.

1. Will a subject who receives perceptual training show an increase in his preference for the complex-asymmetrical figures on the Welsh Figure Preference Test?

2. Will a subject who receives perceptual training show an increase in the differentiation of form on a Figure Drawing Task?

3. Will a subject who receives perceptual training demonstrate an increase in the ability to be able to separate the figure from the ground on the Embedded Figures Test?

4. Will a subject who receives the perceptual training show an increase in adaptive figural flexibility on the Minnesota Tests of Creative Thinking? (Non-verbal Form A and B)

C. POPULATION USED

Fourth, fifth, and sixth grade classes from the Mifflin School District (near Columbus, Ohio) were used for the experimental population. Mifflin is a small school district, with self-contained classrooms. There is no special art instruction and each classroom teacher provides his or her own art lessons. The district requires art for one hour per week. There is no art curriculum guide for the district, although this writer is preparing one for the district under a separate Title III (ESEA) grant. The Mifflin district has used student teachers in art from The Ohio State University for the past several years.

The school population is lower-middle class to upper-lower class and the school district has qualified under Title I for poverty funds from the USOE. The population is white and most of the families have come to Columbus from rural southern Ohio, Kentucky, and the rural south. There are a few Negro children in the district.

D. TEST INSTRUMENTS USED TO COLLECT DATA

1. Variables of Aesthetic Preference

a. The Welsh Figure Preference Test (WFPT)

A test developed by Frank Barron consists of 86 black and white

line drawings in a test booklet. The subject indicates his or her preference for each picture by indicating like or dislike in an IBM answer sheet. Raw scores indicating preference for complexity-asymmetry were converted into percentile and standard scores of each S. We obtained the following odd-even reliability in our sample: Pre-test 0.94.

b. Barron Slide Test (BAST)

A test developed by Frank Barron consists of 45 color 2 X 2 slides of paintings from various historical periods (see Appendix I). The subject indicates his or her preference for each slide by indicating like or dislike on an IBM answer sheet. Raw scores indicating preference for complexity-asymmetry were converted into percentile and standard score. Odd-Even Pre-Test reliability was as follows:

(1) Pre-Test

(a) 4th grade = 0.32
(b) 5th grade = -0.19
(c) 6th grade = 0.47

In order to improve post-test reliability substitutions were made for certain selected slides on the basis of an item analysis conducted by the Test Development Center of The Ohio State University (see Appendix I for new list of slides).

Scoring for each of these tests was based on guidelines set forth by Barron in the test manual. The subjects' preferences were compared to the preference choices of a criterion group of professional painters used by Barron in his initial research.

2. Variables of Drawing Behavior

a. Efland Figure Drawing Scale: (Appendix 4)

This drawing rating scale was developed by Arthur Efland of The Ohio State University. It was based upon a modification of a drawing rating scale used by H. A. Witkin and assesses the level of differentiation of form and details in the drawing of a human figure.

Previous work with this test instrument by Efland 5 and McWhinnie 2 have demonstrated its usefulness in measuring the variables of interest in this study. The reliabilities reported by Efland and McWhinnie were high, indicating stability of the instrument.

The subject draws a person on a white 8-1/2 X 11 sheet of paper using a pencil. Ten minutes is allowed for this task. The drawings are rated according to Efland's scales. Inter-rater reliability was reported at greater than 90%.

b. Efland Tree and House Test: (Appendix 3 and 5)

This drawing scale was developed by Arthur Efland of The Ohio State University. 5 As with the Person Test, it has proved to be a reliable instrument for use with the variables under consideration in this study. The subjects were allowed 10 minutes to make a drawing of a house and a tree. The drawings were rated using Efland's scales. Inter-rater reliability was reported at greater than 90%.

3. Variables of Field-Independence

a. Embedded Figures Test

We used a standardized test developed by the Educational Testing Service, Princeton, New Jersey. This test was developed by Witkin and his associates. It consists of 16 hidden figure drawings with the criterion figure on the back of each. The subject is required to draw the proper figure in the puzzle picture with a black grease pencil; 15 minutes were allowed for this task.

b. Hidden Figures Test (Appendix 6)

We used a second test consisting of 30 drawings adapted from the original test of Gottschald. The subject is given 10 minutes for this task. Instead of tracing the correct figures, as with the first test, the subject is required to check his choice on an IBM sheet. This test does not involve the time and memory variable of the first EFT.

c. Rod and Frame Test

We used a modification of this test which was also developed by Witkin. This test required the individual to separate figure from ground and overcome an embedding content.

The version used in this study consisted of 30 black and white 35 mm slides projected on a screen for 1/10 second in a group setting. The subject indicated whether or not the image appeared to be upright or tilted. This task, like the EFT, required the subject to be able to separate the figure from the ground.

4. Variables of Creativity

We used two forms of the non-verbal creative thinking tests developed by Paul Torrance. These tests were scored according to test manuals. The two tests were Non-Verbal Form A and Non-Verbal Form B. The tests were scored for the variables of

Fluency - number of responses,

Flexibility - number of categories of responses,

Originality - uniqueness of response, and

Elaboration - degree of elaboration of response.

Form A was used as a pre-test and Form B was the post-test. The students were given 30 minutes, 10 minutes for each of the three parts.

Each test was scored and administered according to the test manuals.

5. Davis Aesthetic Attention Test (Appendix 2)

This test, developed by Carol Davis, a Masters candidate at The Ohio State University, measured the aesthetic responses to groups of art slides by means of a semantic differential. The subjects' responses were guided by a controlled attention to aesthetic qualities in the works of art.

The test consists of three sets of slides which are projected upon three screens. The subject selects from among each group of three according to how the slides fit the verbal description for each group.

6. Renick Perceptual Test

This test, developed by Patricia Renick, 95 a Masters candidate at The Ohio State University, identifies a basic perceptual style on a variety of perceptual problems. We used the following six subscores on this test:

(a) deductive reasoning
(b) inductive reasoning,
(c) deductive-inductive,
(d) copying outer contour,
(e) copying inner structure, and
(f) shape combining.

E. ANALYSIS OF DATA

1. Variance Analysis

A 2x2x2 analysis of variance was used to test for significance at the 0.05 level.

	Age	Sex
Perceptual		
Art		
Control		

The data was analyzed separately by age and sex in each treatment condition. The null hypotheses was tested for each variable by a one-tail test at the 0.05 level.

2. Correlational Analysis

Pre-test scores were used in a correlational analysis for significant interrelationships among the variables as a possible result of treatment. A "T" test was used to measure levels of significance in correlational data. The correlational data were analyzed separately by sex and grade level.

CHAPTER IV. ANALYSIS OF DATA

Contents

PART ONE VARIANCE ANALYSIS

The purpose of this study was to measure the effects of a specific type of perceptual learning upon the variables of aesthetic preference, perceptual style, and creativity.

The instructional program (See Appendix 10) was designed to enable the individual to resist a perceptual set for simplicity-symmetry in favor of a set for complexity-asymmetry. The study was conducted at three grade levels and in three conditions. A three-way analysis of variance was used to test for significant group differences. The first set of tables to follow reports the variance analysis in which the difference between the subject's post - pre test score was used.

A. VARIABLES OF AESTHETIC PREFERENCE

TABLE I. Analysis of Variance: WFPT Post test, Raw Score [1]

Source	Degrees of Freedom	Sum of Squares	Mean Square	F ratio	P Value
Sex	1	275.0547	275.0547	1.788	N.S.
Condition	2	37.02441	18.51220	0.120	N.S.
Grade	2	474.7261	237.3630	1.542	N.S.
Error	243	37382.02	153.8355		
Total	248				

(Critical value at 5% level for 1 - 120 needs to be 3.92 and for 2 - 120 df needs to be 3.07)

The data reported in the above table indicates that there were no significant differences among groups. We achieved no treatment effects on WFPT using the raw scores.

[1]The tests were scored according to manual. The higher the subjects score the greater is preference for complexity. The subjects total raw score was used in this analysis.

TABLE II. Variance Analysis, WFPT, Raw Scores, Pre-Test

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P Value
Sex	1	990.5215	990.5215	4.6001	0.05
Grade	2	156.2656	78.1328	0.36	N.S.
Error	245	52754.89	215.326		
Total	248				

(Critical value for 1,120 d.f. at 5% level needs to be 3.92)

Means in above data were Male N = 117 = 38.145
Female N = 132 = 42.053

We found a significant sex difference in our pre-test data, with the females having a greater degree of preference for complexity. We did not find a significant sex interaction on our post-test data, which leads one to assume that the treatment effects caused the two sex groups to become alike on the post-test.

TABLE III. Analysis of Variance, WFPT, Percentile Scores, Post Test

Source	Degrees of Freedom	Sum of Squares	Mean Square	F ratio	P Value
Sex	1	513.8184	513.8184	0.826	N.S.
Condition	2	11225.04	5612.52	9.0215	0.001
Grade	2	874.5586	437.2793	0.703	N.S.
Error	242	150554.6	622.126		
Total	247				

(Critical value for 2,120 at 1% level is 4.79)

Mean differences in above table were condition one = 9.765
condition two = 2.341
condition three =-6.780

We achieved significant treatment effects at the 0.01 level. It would seem that the experimental treatment did produce a significant difference in the level of preference of the perceptual training group for complexity-asymmetry.

TABLE IV. Welsh Figure Preference Test Scores (Pre-test) Percentile Scores

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P Value
Sex	1	3827.715	3827.715	4.677	0.05
Grade	2	428.2305	214.1652	0.26	N.S.
Error	244	96_4.6	818.256		
Total	247				

(Critical value for 2, 120 DF at the 5% level is 3.07 and for 2,120 df at the 1% level is 4.79)

Pre Test Means were

Male	N = 116	46.965
Female	N = 132	47.098
Grade 4	N = 83	52.506
Grade 5	N = 81	50.074
Grade 6	N = 84	50.607

The Pre-test data reported in Table IV indicated significant sex differences, with the female Ss having a higher score indicating a greater preference for complexity. Since there were no sex differences reported in our post-test data in Table III we can conclude that the treatments in both perceptual training group and the art group may have helped to eliminate these initial sex differences.

TABLE V. Welsh Figure Preference Test, Standard Scores Pre-Post

Source	Degrees of Freedom	Sum of Squares	Mean Squares	F ratio	P Value
Sex	1	117.7017	117.7017	1.549	N.S.
Condition	2	1653.374	826.687	10.877	0.01
Grade	2	127.1365	63.5682	0.836	N.S.
Error	243	18468.17	76.000699		
Total	248				

(Critical value for 2,120 at 1% level needs to be 4.79)

Mean differences in the above table were

Male	N = 117	=	0.738
Female	N = 132	=	-0.492
Condition 1	N = 82	=	2.951
Condition 2	N = 85	=	0.682
Condition 3	N = 82	=	-3.207
Grade 4	N = 83	=	-0.734
Grade 5	N = 82	=	1.0
Grade 6	N = 84	=	0.071

The data reported in Table V indicates that the perceptual training group increased in their preferences for complexity-asymmetry and were significantly different from the two control groups. The control group which received only the testing seems to have made a significant decrease in level of preference for complexity. The treatment effects as reported in Table V were significant at the 0.01 level.

TABLE VI. Welsh Figure Preference Test, Pre-Test Scores, Standard Scores

Source	Degrees of Freedom	Sum of Squares	Mean Squares	F ratio	P Value
Sex	1	448.7942	448.7942	4.659	0.05
Grade	2	66.73267	33.36633	0.34	N.S.
Error	245	23598.26	96.31943		
Total	248				

(Critical value for 2,120 DF at the 5% level is 3.07 and for 2,120 DF at the 1% level is 4.79)

Pre-test means for above table were

Male N = 117 = 48.803
Female N = 132 = 59.015
Grade 4 N = 83 = 50.734
Grade 5 N = 82 = 49.646
Grade 6 N = 84 = 50.214

The analysis of our pre-test data indicated a significant sex difference in preference for complexity. This sex difference was not evident in the analysis of our post-test data. It would seem that the two treatments (perceptual learning and art) caused the boys to increase in their preference for complexity. This result replicates the findings of one of our previous studies.

TABLE VII. Barron Art Slide Test, Pre-Post, Raw Scores

Source	Degrees of Freedom	Sum of Squares	Mean Squares	F ratio	P Value
Sex	1	9.587036	9.587036	0.26	N.S.
Condition	2	43.80579	21.90289	0.60	N.S.
Grade	2	187.5134	93.7567	2.577	0.10
Error	249	9058.303	36.37873		
Total	254				

(Critical value for 2,120 at the 10% level is 2.35 and at the 5% level is 3.07)

Mean differences reported in above table were

		mean differences (Post-pre)
Male	N = 124	0.193
Female	N = 131	-0.129
Condition 1	N = 83	0.650
Condition 2	N = 86	-0.220
Condition 3	N = 86	-0.325
Grade 4	N = 86	-0.651
Grade 5	N = 86	-0.50
Grade 6	N = 83	-1.108

We did not achieve any significant differences in the above data. It would seem that the experimental treatment did not effect the preference for complexity in works of art. There was some limited evidence (at 10% level) of a significant difference in the 6th grade.

We did not find any significant differences or significant interaction effects in our pre-test data.

TABLE VIII. Barron Art Slide Test, Post-Pre, Percentile Scores

Source	Degrees of Freedom	Sum of Squares	Mean Squares	F ratio	P Value
Sex	1	11193.57	11193.57	2.782	0.10
Condition	2	1840.102	920.051	0.23	N.S.
Grade	2	4046.828	2023.414	0.50	N.S.
Error	249	1001864.	4023.5502		
Total	254				

(Critical value for 1,120 at the 10% level is 2.75)

Mean differences in above data were

		Post-Pre
Male	N = 124	1.387
Female	N = 131	-9.679
Condition 1	N = 83	-19.265
Condition 2	N = 86	-3.139
Condition 3	N = 86	-3.930
Grade 4	N = 86	-2.023
Grade 5	N = 86	-3.546
Grade 6	N = 83	-11.578

We achieved a very limited significant difference at the 10% level in terms of sex. It would seem that there was a tendency for the males to have a higher preference for complexity in slides of art works. No significant treatment effects were found in our data.

We did not achieve any significant differences on our pre-test data.

TABLE IX. Barron Art Scale, Post-Pre, Standard Scores

Source	Degree of Freedom	Sum of Squares	Mean Squares	F ratio	P Value
Sex	1	505.6880	505.6880	3.671	0.10
Condition	2	11.46875	5.73437	0.42	N.S.
Grade	2	158.0366	79.0183	0.57	N.S.
Error	245	33743.87	33743.87		
Total	250				

(Critical value for 1,120 DF at the 5% level is 3.92 and for 1,120 at the 10% level is 2.75)

Mean differences in above data were

Male	N = 124	1.354
Female	N = 127	-1.188
Condition 1	N = 82	0.024
Condition 2	N = 84	-0.250
Condition 3	N = 85	0.023
Grade 4	N = 84	-0.583
Grade 5	N = 86	-0.639
Grade 6	N = 81	1.074

We achieved some limited significant differences at the 10% level for the variable of sex. There was a tendency for the boys to have a greater degree of preference for complexity than the girls.

There were no significant sex differences in the analysis of our pre-test data. It would seem that the two experimental treatments may have caused some change in the males' preference for complexity. This would be a replication of our two previous studies.

TABLE X. Davis Aesthetic Attention Test (Post Test scores only)

Source	Degrees of Freedom	Sum of Squares	Mean Squares	F ratio	P Value
Sex	1	1.56973	1.56973	0.107	N.S.
Grade	2	521.1629	260.5815	17.713	0.01
Condition	2	33.75739	16.87869	1.147	N.S.
Error	169	2486.205	14.7113		
Total	174				

(Critical value for 2,120 df at the 1% level needs to be 4.79.)

Mean Values for above data are

Male	83	24.313
Female	92	24.010
Condition 1	88	22.443
Condition 2	87	25.885
Condition 3	0	
Grade 4	55	24.127
Grade 5	62	23.677
Grade 6	58	24.689

We achieved a significant grade/age effect in the Davis Aesthetic Attention Test data. As measured by this instrument there would seem to be a decrease in attention at the fifth grade level. This finding of a change with age will be discussed at length in Chapter V.

b. Variables of Field-Independence

TABLE XI. Embedded Figures Test (Post-Pre)

Source	Degrees of Freedom	Sum of Squares	Mean Squares	F ratio	P Value
Sex	1	0.1313477	0.1313477	0.008	N.S.
Condition	2	4.460999	2.230499	0.13	N.S.
Grade	2	4.985596	2.492798	0.14	N.S.
Error	204	3517.200	17.24118		
Total	209				

There were no significant differences in the data reported in the above table for this variable. There were no significant interaction effects and no sex differences found in our pre-test data.

TABLE XII. Rod and Frame Test (Post-Pre)

Source	Degrees of Freedom	Sum of Squares	Mean Squares	F ratio	P Value
Sex	1	3.805176	3.805176	0.08	N.S.
Condition	2	198.0009	99.0004	2.008	N.S.
Grade	2	12.62451	6.31225	0.13	N.S.
Error	234	11536.87	49.30286		
Total	239				

(Critical value for 2,120 D.F. at 10% level needs to be 2.35)

There were no significant differences nor significant interaction effects in the data reported in the above table. We also achieved no significant pre-test differences.

TABLE XIII. Embedded Figures Test II (Post-Pre)

Source	Degrees of Freedom	Sum of Squares	Mean Squares	F ratio	P Value
Sex	1	17.32312	17.32312	0.892	N.S.
Condition	2	62.69128	31.34564	1.614	N.S.
Grade	2	147.7474	73.8737	3.804	0.02
Error	248	4815.442	19.41710		
Total	253				

(Critical value for 2,120 D.F. at 2% level is 3.80.)

Mean differences for above data were

Male	N = 122	5.573
Female	N = 132	6.136
Condition 1	N = 83	5.228
Condition 2	N = 84	6.416
Condition 3	N = 87	5.942
Grade 4	N = 87	5.022
Grade 5	N = 83	6.879
Grade 6	N = 84	17.642

We achieved a significant difference with regard to age. The sixth grade children were able to perform the EFT tasks with greater accuracy.

There were no significant age/grade differences on our pre-test data, hence it may be that the two experimental treatments did enable the 6th grade children to perform at a higher level on the EFT.

TABLE XIV. Efland Tree Drawing Test (Post Test Scores),

Source	Degrees of Freedom	Sum of Squares	Mean Squares	F ratio	P Value
Sex	1	2.11805	2.11805	.631	N.S.
Grade	2	3.59913	1.79957	.536	N.S.
Condition	2	11.99511	5.99756	1.786	N.S.
Error	256	859.5998	3.3578		
Total	261				

There were no significant differences in the above data.

TABLE XV. Efland House Drawing Test (Post test scores)

Source	Degrees of Freedom	Sum of Squares	Mean Squares	F ratio	P Value
Sex	1	.96610	.96610	.591	N.S.
Grade	2	13.07581	6.53791	4.001	.02
Condition	2	21.23792	10.61896	6.499	.01
Error	257	419.9205	1.6339		
Total	262				

Critical value for 2,120 df at the 2% level is 3.80 and for 2,120 d.f. at the 1% level is 4.79.

Means for above data are

	N	Means
Condition 1	83	3.204
Condition 2	88	3.113
Condition 3	72	4.625
Grade 4	90	3.355
Grade 5	94	3.617
Grade 6	79	2.924

We did not achieve any significant treatment effects in the above data. There was a significant difference at the 0.02 level, with the control group superior to the two treatment groups. This finding suggests that the groups were unequal at the beginning.

We also achieved a significant grade difference at the 0.01 level, with the fourth and fifth grades being superior to the sixth grade in differentiation of form on the house drawing test.

TABLE XVI. Efland Person Drawing Test (Post Tests) Scores

Source	Degrees of Freedom	Sum of Squares	Mean Squares	F ratio	P Value
Sex	1	9.71325	9.71325	4.227	.05
Grade	2	21.89664	10.94832	4.765	.02
Condition	2	53.79195	26.89598	11.705	.01
Error	270	620.3941	2.2978		
Total	275				

Critical value for 1,120 d.f. at the 5% level needs to be 3.92. Critical value for 2,120 d.f. at the 2% level needs to be 3.80 and for 2,120 d.f. at the 1% level need to be 4.79.

Means for above data are

	N	Means
Male	132	4.113
Female	144	3.756
Condition 1	88	3.545
Condition 2	93	3.989
Condition 3	94	4.265
Grade 4	94	3.808
Grade 5	94	4.500
Grade 6	98	3.090

We achieved a significant sex difference, with the male subjects being higher on the variable of differentiation of form than the females. This difference was significant at the 5% level. We also achieved a significant grade difference, with fifth grade higher than the fourth or the sixth and both 4th and 5th significantly higher than the 6th grade. This difference was significant at the 2% level. We achieved significant treatment effects but again, as in house drawing, the control group was superior to the two experimental groups, which leads one to assume the groups were unequal at start.

c. Creativity Variables

TABLE XVII. Minnesota Test of Creative Thinking (Post test only) Non-Verbal A, Fluency,

Source	Degrees of Freedom	Sum of Squares	Mean Squares	F ratio	P Value
Sex	1	.0291	.0291	.000	N.S.
Grade	2	1005.121	502.561	4.759	0.02
Condition	2	40.5132	20.2566	.192	N.S.
Error	244	25766.57	105.600		
Total	249				

Critical value for 2,120 d.f. at the 2% level needs to be 3.80 and at the 1% level needs to be 4.79.

Means for above data are

	N	Means
Male	119	22.815
Female	130	22.877
Condition 1	88	19.284
Condition 2	78	23.230
Condition 3	84	26.226
Grade 4	80	22.650
Grade 5	87	23.413
Grade 6	83	22.445

We achieved a significant grade/age effect in our post-test fluency data. There would seem to be some increase in fluency at grade 5.

TABLE XVIII. Minnesota Tests of Creative Thinking (Post test only) Non-Verbal A, Flexibility,

Source	Degrees of Freedom	Sum of Squares	Mean Squares	F ratio	P Value
Sex	1	.01160	.01160	.000	N.S.
Grade	2	377.3113	188.6557	4.043	.02
Condition	2	4.50	2.250	.048	N.S.
Error	244	11386.70	46.6668		
Total	249				

Critical value for 2,120 d.f. at the 2% level is 3.80 and at the 1% level is 4.79.

Means for above data are

	N	Means
Male	119	16.420
Female	131	17.244
Condition 1	88	18.079
Condition 2	78	15.923
Condition 3	84	15.238
Grade 4	80	16.450
Grade 5	87	16.632
Grade 6	83	16.265

We achieved a significant grade/age difference at the 0.02 level. The data indicated a slight increase in flexibility at the fifth grade level.

TABLE XIX. Minnesota Test of Creative Thinking, (Post-test only)
Non-Verbal A, Originality

Source	Degrees of Freedom	Sum of Squares	Mean Squares	F ratio	P Value
Sex	1	185.4021	185.4021	1.494	N.S.
Grade	2	978.1860	489.0930	3.942	0.02
Condtion	2	714.5146	357.2573	2.880	N.S.
Error	244	30270.75	124.06045		
Total	249				

Critical value for 2,120 d.f. at the 2% level is 3.80.

Means for above data are

	N	Means
Male	119	38.436
Female	131	40.251
Condition 1	88	39.806
Condition 2	78	41.679
Condition 3	84	36.821
Grade 4	80	40.225
Grade 5	87	40.873
Grade 6	83	37.024

We achieved significant age/grade difference at the 0.02% level with the 4th and 5th grades superior to the 6th grade on the variable of originality.

TABLE XX. Minnesota Tests of Creative Thinking, (Post-test only), Non-Verbal A, Elaboration

Source	Degrees of Freedom	Sum of Squares	Mean Squares	F Ratio	P Value
Sex	1	23.90356	23.90356	.190	N.S.
Grade	2	231.9109	115.9555	.921	N.S.
Condition	2	203.8435	101.9218	.810	N.S.
Error	244	30717.50	125.89139		
Total	249				

We failed to achieve any significant differences in the above data.

TABLE XXI
Summary of Results of Variance Analysis

Variables	Age			Condition			Sex	
	4	5	6	P.T.	A.	C.	M.	F.
a) Aesthetic Preference								
WFPT								
raw								*(+)Pre
percentage				*(+)				*+ pre
standard				*(+)				*+ pre
Barron art								
raw								
percentage								
standard								
Davis		*(+)						
b) Field Independence								
EFT(1)								
EFT(2)			*(+)					
R & F								
Figure		*(+)				*(+)	*(+)	
House			*(+)			*(+)		
Tree								
c) Creativity								
Fluency		*(+)						
Flexibility								
Originality			*(+)					
Elaboration								

* A significant effect achieved at either 0.05 or 0.01 levels.

PART B

Correlational Analysis (4th and 5th Grades only)

A second purpose of this study was to measure relationships between the three clusters of variables; i.e., (1) aesthetic preference, (2) perceptual style, and (3) creativity. For this aspect of the study we used the pre-test scores for our variables in a correlational analysis the results of which will be presented in the tables to follow.

TABLE XXII. Relationships between Aesthetic Preference for Complexity on the WFPT and in Works of Art, 4th and 5th Grade

(A) Male

	Slides		
	R.	P.	S.
WFPT			
Raw	-0.14	0.13	-0.26
Percentile	-0.15	0.13	-0.26
Standard	-0.15	0.14	-0.26
N =	41	41	41

The data in the above table indicateslittle relationship between preference for complexity in works of art and in the WFPT. This finding was a replication of similar findings in a previous study. 93 This finding differs from the findings of Barron and others when they used adult groups.

(B) Female

Relationships between Aesthetic Preference for Complexity on WFPT and in Works of Art (4th and 5th Grade)

	Slides		
	R.	P.	S.
WFPT			
Raw	-0.08	-0.09	-0.08
Percentile	0.04	0.06	0.04
Standard	-0.08	-0.09	-0.08
N = 49			

The data in the above table indicateslittle relationship between preference for complexity in works of art and on the WFPT. This finding was a replication of similar findings in a previous study. 93

(C) Total Group

Relationshps between Aesthetic Preference for Complexity on WFPT and in Works of Art (4th and 5th Grades).

	Slides		
	R.	P.	S.
WFPT			
Raw	-0.10	0.07	-0.16
Percentile	-0.02	0.10	-0.10
Standard	-0.11	0.07	-0.17
N = 83			

The data in the above table indicates little relationship between preference for complexity in works of art and on the WFPT. This finding was a replication of similar findings in a previous study. 93

(Tables of means and S.D. for these date will be found in Appendix 6, Tables 6b and 6c.)

(Analysis for grade levels will be found in Appendix 7, Tables 7e and 7f).

TABLE XXIII Relationships between Preference for Complexity and Perceptual Field Independence (4th and 5th Grades)

(A) Male

	$EFT_{(1)}$	R & F	$EFT_{(2)}$
WFPT			
Raw	-0.09	0.02	0.09
Percentile	-0.03	0.01	0.12
Standard	-0.07	0.03	0.09
Slides			
Raw	-0.18	-0.06	0.08
Percentile	-0.14	0.62 (.001)	0.90 (.001)
Standard	-0.02	-0.49 (.001)	-0.60 (.001)
N =	43	42	43

There were no relationships between preference for complexity and measures of field independence for WFPT scores. We did, however, obtain significant relationships between the percentile scores of the slide test and two measures of field independence.

(B) Female

Relationships between Preference for Complexity and Field Independence (4th and 5th Grades)

	$EFT_{(1)}$	R & F	$EFT_{(2)}$
WFPT			
Raw	0.22	0.09	0.13
Percentile	0.29	0.04	0.28
Standard	0.21	0.09	0.12
Slides			
Raw	0.10	-0.01	0.18
Percentile	0.10	0.04	0.15
Standard	0.11	0.00	0.18
N =	44	44	46

There were no significant relationships in the above data.

(C) Total

Relationships between Preference for Complexity and Field Independence (4th and 5th Grades)

	$EFT_{(1)}$	R & F	$EFT_{(2)}$
WFPT			
Raw	0.02	0.07	0.09
Percentile	0.09	0.04	0.15
Standard	0.03	0.07	0.09
Slides			
Raw	-0.05	-0.02	0.10
Percentile	-0.08	0.44 (.001)	0.82 (.001)
Standard	0.00	-0.27 (.01)	-0.38 (.001)

N = 90

We obtained significant relationships between two measures of field independence and preference for complexity on the slide test. This difference occurred in our male sample.

(See Appendix 6 for means and S.D. for above data, Tables 6f and 6g).

(See Appendix 7 for analysis of relationships for grade level, Tables 7h and 7i.)

TABLE XXIV Relationships between Preference for Complexity and Drawing Variables (5th Grade)

(A) Male

	Tree	Person	House
WFPT			
Raw	0.01	0.41	0.21
Percentile	-0.01	0.44	0.18
Standard	0.01	0.41	0.22
Slides			
Raw	-0.29	0.79 (.01)	-0.44
Percentile	-0.69 (.01)	0.56	-0.16
Standard	0.78 (.01)	-0.25	-0.12
N =	10	10	12

Relationships between Preference for Complexity and Drawing Variables

(B) Female (5th Grade)

	Tree	Person	House
WFPT			
Raw	0.47	0.08	0.35
Percentile	0.51	0.01	0.38
Standard	0.46	0.10	0.36
Slides			
Raw	-0.31	0.14	0.11
Percentile	-0.26	0.15	0.18
Standard	-0.30	0.13	0.11
N =	12	12	14

We achieved two positive and one negative relationship between aesthetic preference and drawing behaviors. These relations occurred in our male but not female groups.

Relationships between Preference for Complexity and Drawing Variables

(C) Total (5th Grade)

	Tree	Person	House
WFPT			
Raw	0.18	0.26	0.30
Percentile	0.20	0.21	0.32
Standard	0.17	0.27	0.31
Slides			
Raw	-0.27	0.36	0.03
Percentile	-0.57 (0.01)	0.35	-0.05
Standard	0.32	0.04	0.09
N =	21	22	26

We achieved one significant negative relationship between preference for complexity in slides and tree drawings. It would seem that the preference variables and drawing variables are not related. This is a replication of the findings of a previous study.

(Means and S.D. for above data are in Appendix 6, Table 6h)

TABLE XXV Relationships between Aesthetic Preference and Creativity (Non-Verbal A) (4th and 5th Grade)

(A) Male

	Fluency	Flexibility	Originality	Elaboration
WFPT				
Raw	0.22	0.18	0.01	0.13
Percentile	0.21	0.19	0.01	0.16
Standard	0.22	0.18	0.01	0.13
Slides				
Raw	0.17	0.17	-0.07	0.01
Percentile	0.60 (.001)	0.82 (.001)	0.19	0.48(.001)
Standard	-0.32 (.05)	-0.47 (.01)	-0.28	-0.42(.01)

N = 43

We achieved a pattern of positive and significant correlations between preference for complexity in works of art and for three of the four creativity variables when using percentile scores on slide test. However, when using standard scores on the slide test we achieved a pattern of significant negative relationships for the same creativity measures.

(B) Female (4th and 5th Grade)

	Fluency	Flexibility	Originality	Elaboration
WFPT				
Raw	-0.20	-0.02	0.11	0.12
Percentile	-0.07	0.07	0.17	0.07
Standard	-0.20	0.02	0.11	0.13
Slides				
Raw	0.37 (.02)	0.23	0.19	0.10
Percentile	0.38 (.02)	0.25	0.18	0.08
Standard	0.36 (.02)	0.22	0.19	0.09
N =	41	41	41	41

We achieved a pattern of positive and significant relationships for preference for complexity on slide test and fluency factor. This finding indicates a significant pattern of sex differences.

(C) Total (4th and 5th Grades)

	Fluency	Flexibility	Originality	Elaboration
WFPT				
Raw	0.04	0.09	0.07	0.13
Percentile	0.09	0.14	0.11	0.12
Standard	0.04	0.10	0.07	0.13
Slides				
Raw	0.25 (.02)	0.19	0.08	0.06
Percentile	0.54 (.001)	0.72 (.001)	0.17	0.33 (.01)
Standard	-0.08	-0.24 (.05)	-0.07	-0.17
N =	84	84	84	84

In the above data we achieved a pattern of positive significant relationships between preference for complexity on the slide test and four creativity variables.

(For means and S.D. data see Appendix 6, Tables 6d, 6e).

(For correlations by grade level see Appendix 7, Tables 7l, 7m).

(B)
Renick Perceptual Variables

The tables to follow will present the relationships between the six Renick Test variables and the measures of aesthetic preference, drawing, field dependence, and creativity. The Renick Test variables attempt to present six aspects of perceptual and cognitive styles.

TABLE XXVI Relationships between Renick Variables and Aesthetic Preference for Complexity (4th and 5th Grades)

(A) Male

	Deductive	Inductive	Deductive-Inductive	Outer Contour	Inner Structure	Shape Combining
WFPT						
Raw	0.26	0.09	0.16	0.10	0.16	0.14
Percentile	0.24	0.09	0.18	0.08	0.16	0.12
Standard	0.26	0.09	0.16	0.09	0.16	0.13
Slides						
Raw	0.21	0.00	-0.09	0.20	0.20	0.21
Percentile	0.04	0.06	-0.09	0.03	0.18	0.10
Standard	0.18	-0.15	-0.01	0.17	0.09	0.14
N =	41	41	41	41	41	41

None of the above were significant.

(B) Female (4th and 5th Grades)

	Deductive	Inductive	Deductive-Inductive	Outer Contour	Inner Structure	Shape Combining
WFPT						
Raw	0.08	-0.39(.01)	-0.07	-0.24	-0.07	-0.17
Percentile	-0.13	-0.36(.02)	-0.20	-0.28	-0.25	-0.29
Standard	0.07	-0.39(.01)	-0.07	-0.24	-0.07	-0.18
Slides						
Raw	-0.13	0.23	-0.04	-0.08	-0.05	-0.07
Percentile	-0.12	0.28	0.01	-0.07	-0.04	-0.06
Standard	-0.13	0.24	-0.04	-0.10	-0.06	-0.09
N =	44	44	44	44	44	44

We achieved a pattern of significant negative correlations between preference for complexity and inductive reasoning factor. There is also a trend in our female data for the Renick variables to be negatively related to preference for complexity.

(C) Total (4th and 5th Grades)

	Deductive	Inductive	Deductive-Inductive	Outer Contour	Inner Structure	Shape Combining
WFPT						
Raw	0.18	-0.20	0.04	-0.07	0.05	-0.01
Percentile	0.06	-0.20	-0.04	-0.11	-0.06	-0.09
Standard	0.18	-0.20	0.04	-0.08	0.04	-0.02
Slides						
Raw	0.06	0.13	-0.06	0.05	0.07	0.06
Percentile	0.03	0.07	-0.05	0.01	0.12	0.07
Standard	0.05	0.06	-0.03	0.04	0.02	0.03
N =	87	87	87	87	87	87

We failed to achieve any significant results in above data.

(For means and S.D. see Appendix 6, Table 6a).

(For correlations by grade level see Appendix 7, Tables 7a and 7b).

(For intercorrelations see Appendix 8, Table 8a).

TABLE XXVII Intercorrelations between Renick Variables and Field Independence Measures (4th and 5th Grades)

(A) Male

	Deductive	Inductive	Deductive-Inductive	Outer Contour	Inner Structure	Shape Combining
$EFT_{(1)}$	0.00	0.00	-0.00	-0.19	-0.10	-0.15
R & F	-0.04	0.12	-0.04	-0.17	0.04	-0.07
$EFT_{(2)}$	-0.13	0.03	-0.09	-0.20	-0.04	-0.13
N =	45					

There were no significant relationships in the above data for male subjects.

(B) Female

	Deductive	Inductive	Deductive-Inductive	Outer Contour	Inner Structure	Shape Combining
$EFT_{(1)}$	-0.03	-0.11	-0.17	-0.14	-0.12	-0.14
R & F	-0.02	0.13	-0.14	-0.18	-0.16	-0.18
$EFT_{(2)}$	-0.31 (.05)	-0.27 (.06)	-0.40 (.01)	-0.50 (.001)	-0.44 (.01)	-0.50 (.001)
N =	45					

We obtained a pattern of significant and negative correlations between one form of the EFT and the Renick variables. This finding was for females but not males, which indicates a pattern of sex differences on the Renick Test.

(C) Total (4th and 5th Grades)

	Deductive	Inductive	Deductive-Inductive	Outer Contour	Inner Structure	Shape Combining
$EFT_{(1)}$	0.01	-0.07	-0.06	-0.16	-0.09	-0.14
R & F	0.00	0.07	-0.07	-0.17	-0.02	-0.10
$EFT_{(2)}$	-0.16	-0.06	-0.17	-0.26	-0.13	-0.21
N =	90					

(For correlations by Grade level see Appendix 7, Table 7 c).

TABLE XXVIII Relationships between Renick Variables and Drawing Behaviors (5th Grade Only)

(A) Male

	Deductive	Inductive	Deductive-Inductive	Outer Contour	Inner Structure	Shape Combining
Tree	0.14	-0.52	0.00	0.09	-0.18	-0.04
Person	-0.11	-0.19	0.00	-0.00	0.01	0.00
House	-0.26	-0.40	0.00	-0.05	0.09	0.02
N =	11					

(B) Female (5th Grade Only)

	Deductive	Inductive	Deductive-Inductive	Outer Contour	Inner Structure	Shape Combining
Tree	-0.43	-0.06	0.12	-0.01	0.33	0.15
Person	0.02	-0.23	0.36	-0.18	0.13	-0.06
House	-0.14	-0.42	0.43	-0.16	0.59 (.05)	0.18
N =	12					

(C) Total (Fifth Grade)

	Deductive	Inductive	Deductive-Inductive	Outer Contour	Inner Structure	Shape Combining
Tree	0.01	-0.47 (.05)	0.03	0.06	-0.03	0.01
Person	-0.09	-0.12	0.26	-0.08	0.00	-0.04
House	-0.14	-0.27	0.46 (.05)	-0.11	0.22	0.05
N = 23						

Except for one or two isolated cases the drawing behaviors and the Renick variables do not seem to be related.

TABLE XXIX Relationships between Renick Variables and Creativity Test Measures (4th and 5th Grade)

(A) Male

	Deductive	Inductive	Deductive-Inductive	Outer Contour	Inner Structure	Shape Combining
Fluency	0.33 (.05)	0.22	-0.02	0.13	0.17	0.16
Flexibility	0.10	0.08	0.00	-0.01	0.10	0.04
Originality	-0.08	0.03	-0.06	-0.11	-0.14	-0.13
Elaboration	-0.17	0.09	-0.00	-0.10	-0.00	-0.06
N =	45					

None of the above were significant.

(B) Female

	Deductive	Inductive	Deductive-Inductive	Outer Contour	Inner Structure	Shape Combining
Fluency	0.11	0.11	-0.11	0.13	-0.02	0.06
Flexibility	0.06	-0.12	-0.00	0.05	-0.02	0.01
Originality	0.13	-0.20	-0.00	0.00	-0.10	-0.04
Elaboration	-0.01	-0.27	-0.10	0.07	0.01	0.04
N =	45					

None of the above were significant.

(C) Total (4th and 5th Grades)

	Deductive	Inductive	Deductive-Inductive	Outer Contour	Inner Structure	Shape Combining
Fluency	0.28 (.01)	0.12	-0.06	0.13	0.10	0.12
Flexibility	0.10	-0.01	0.00	0.00	0.06	0.03
Originality	0.02	-0.12	-0.03	-0.05	-0.11	-0.08
Elaboration	-0.09	-0.12	-0.05	-0.01	0.00	-0.00
N = 90						

We achieved one significant relationship between fluency and deductive reasoning; this relationship occurred for the male but not for the female Ss.

(For correlations by grade level see Appendix 7, Table 7d).

TABLE XXX Interrelationships Among Drawing Behavior and Measures of Field Independence (5th Grade)

(A) Male

	EFT 1	EFT 2	R & F
Tree	0.28	-0.70 (.01)	-0.67 (.02)
House	0.01	0.00	-0.14
Person	0.18	0.51	0.35
N = 11			

(B) Female (5th Grade)

	EFT 1	EFT 2	R & F
Tree	-0.04	0.22	0.43
House	-0.21	-0.07	0.00
Person	-0.21	0.04	-0.24
N - 12			

(C) Total Group (5th Grade)

	EFT 1	EFT 2	R & F
Tree	-0.23	-0.51 (.02)	-0.31
House	-0.14	-0.09	-0.08
Person	0.02	0.33	0.08
N - 23			

We achieved only three scattered relationships between drawing and perceptual behaviors and these were negative. We can conclude that there are no relationships between these variables. This finding did not replicate earlier studies by either this writer or by H. A. Witkin.

TABLE XXXI Relationships between Drawing and Creativity (5th Grade)

(A) Male

	Tree	Person	House
Fluency	-0.76 (.01)	0.24	-0.24
Flexibility	-0.73 (.01)	0.28	-0.21
Originality	-0.50 (.06)	0.00	-0.31
Elaboration	-0.76 (.01)	0.34	-0.25

N = 11

We achieved a pattern of significant negative relationships between differentiation of form on the tree drawing test and the four measures of creativity.

(B) Female (5th Grade)

	Tree	Person	House
Fluency	0.13	-0.01	0.32
Flexibility	0.20	0.07	0.43
Originality	0.30	0.45	0.74 (.01)
Elaboration	0.51	0.43	0.78 (.01)

N = 12

We achieved three positive correlations in our female sample. The differences between male and female data indicate sex differences on the creativity variables.

(C) Total (5th Grade)

	Tree	Person	House
Fluency	-0.50	0.10	0.00
Flexibility	-0.51	0.17	0.04
Originality	-0.17	0.13	0.26
Elaboration	-0.29	0.36	0.38

N = 23

None of the above were significant.

TABLE XXXII Summary of Correlational Analysis

	Grade 4			Grade 5			Total		
	M	F	T	M	F	T	M	F	T
Aesthetic									
WFPT			R & F+ EFT2+ Creat+			Renick−	Renick−		
Slides				Tree+ Person+		Renick+	R & F+ EFT2+		R & F+ EFT1+
Davis									
Perceptual									
EFT1			Creat+						
R & F			WFPT+ Slides−	Tree−			Slides+		Slides+
EFT2			WFPT+ Slides+	Tree−	Tree− Renick− EFT2−	WFPT− Slides+	Slides+		Slides+
Renick							EFT2− WFPT− Per+		Tree−
Drawing									
Tree				Slides+ R & F− EFT2−	EFT2−				Renick−
House									Person+
Person				Slides+			Renick+		House+
Creativity							WFPT+		WFPT+
Fluency			EFT2 Slides+				Tree− Renick+		Renick+
Flexibility			R & F	Tree−					
Originality			R & F Slides+1 EFT2		House+		WFPT+		WFPT+
Elaboration			R & F Slides+ EFT2		House+ Tree+		WFPT+		WFPT+

CHAPTER V. INTERPRETATION AND DISCUSSION OF RESULTS

This study had a twofold purpose

(1) Test the effects of a specific type of perceptual learning on variables which previous research and theory indicated as being related to artistic behavior and to art learning.

(2) Measure the interrelationship among the cluster of variables believed to be related to artistic behavior and to art learning.

A. EXPERIMENTAL RESULTS

The following chart will attempt to summarize the result of the learning experience and will compare results obtained in our current study with results of two previous experiments.

TABLE XXXIII Summary of Results

	Age			Condition			Sex		SFVSC* Study			Stanford Study (6th Grade only)
	4	5	6	PT.	A.	C.	M	F	T.	A.	S.	
A. Aesthetic Preference												
WFPT												
Raw								+				Post-test(2) don't like
%				+				+				
Standard				+				+				
Slides												
Raw									+	4+5		
%												
Standard												
Davis		+										
B. Field Independence												
EFT[1]									+	5		
EFT[2]			+									
R & F												
Figure		+				+	+		+	4+5		Male increase only
Home			+			+						
Tree												
C. Creativity												
Fluency		+										
Flexibility												
Originality			+									
Elaboration												

* San Fernando Valley State College

1. Effects on Aesthetic Preference

We achieved significant treatment effects for preference for complexity on the WFPT when we used standard scores and percentile scores in our data analysis. In our post-test scores neither age nor sex were significant factors.

These findings were a partial replication of findings in our Stanford study but they were not a replication of our San Fernando Valley State College Study. The discrepency in results between the present study and the latter one are due to the fact that in the latter study we used only raw scores and not either percentile or standard scores.

Based on our three studies we would conclude that the experimental treatment in perceptual learning does increase the individual's preference for complexity on the WFPT and this change in behavior can be measured when the raw scores are converted into both percentile and standard scores. The treatment would seem to affect aesthetic preferences for complexity at the three grade levels used.

The WFPT is also sensitive to significant sex differences in aesthetic preference. The female subjects had a significantly higher preference for complexity on the pre-test scores. In addition to increasing preference,the treatment also seems to eliminate those initial sex differences. We found no sex differences in our post-test data. This is also a replication of the results obtained in our Stanford study at the 6th grade level.

We achieved no significant results on either the Barron or Davis art slide tests. This is different from the findings in our SFVSC study in which we did achieve significant treatment effects on this variable.

The discrepency in the results between the two studies may be accounted for by the fact that aesthetic preference for complexity in works of art may be a less stable variable and subject to intervening variables not controlled for in our research design. In light of this discrepency it would be important to replicate this aspect of the study and to continue to explore effects in aesthetic preference in slides.

2. Effects on Creativity

We achieved no significant treatment effects on this variable. Since we did not measure treatment effects on creativity in our previous studies, we can not compare our three studies on this variable.

We did achieve significant age differences on our pre-test scores for fluency and originality. It would seem that 5th grade children are superior on fluency and 6th graders on originality.

3. Effects on Drawing Behaviors

a. Person Drawing

Our results are not at all clear on this measure. We measured significant treatment effects in our control groups. We also obtained significant grade and sex differences.

As in our SFVSC study we achieved significant differences in 5th grade children and with our male Ss. Based on our three studies we can conclude that treatments seem to affect the male but not female drawings.

b. House Drawings

Our house drawing results were similar to the person drawing discussed above. We achieved significant treatment effects in our control group. We also achieved a significant grade difference at the 6th grade level but no sex differences.

c. Tree Drawings

We achieved no results on this measure.

4. Effects on Field Independence

We achieved no treatment effects and only one age difference. This is quite different from our SFVSC study in which we achieved clear treatment and age differences.

5. Implications

a. For Research

Based on a comparison of experimental results from our three studies we would question the wisdom of this approach for future research in art education. The attempt at assessing instructional outcomes of art learning and perceptual training on basic behavioral variables has serious conceptual and methodological problems as follows:

(1) Specific learnings in art are not sensitive to changes on standardized test instruments such as those used in our three studies. We would suggest that specific learning in art and specific behavioral objectives be assessed by instruments designed to measure those specific behaviors. The study in perceptual learning by Salome demonstrates the wisdom of such an approach.

Specific test measures need to be designed for specific behaviors in art and specific instructional methods.

(2) We question the use of behavioral theories as sources for specific art treatments and as sources for curricula in art.

(3) We would suggest that research in art education concern itself with testing instructional methods and strategies which have as their origins the nature of art and the disciplines of art rather than disciplines of psychology.

b. For Teaching

Our specific lessons and their content do seem to have an effect on aesthetic preference for complexity. They also seem to have a specific effect on the behavior of the boys at the three grade levels tested. We see two main implications for the curriculum;

(1) Some degree of perceptual learning does seem to be useful in the elementary art curriculum. Such a program of instruction would seem to be similar to analytical design problems.

(2) We would suggest that sex differences found in our data be considered in designing curricula in art; that the elementary boys can profit from a more analytical program of instruction.

We need to be very careful that such an instructional program will not become too formalistic in nature. Such programs of study seem to depend on a formalistic aesthetic. We recommend it with some caution.

6. Summary

Based on our work in perceptual learning in art over the past four years, we advise that future research in art education take a new direction which should consider the nature of the discipline of art itself. Learning experiences should have their origins in the discipline itself and the instruments used should be designed specifically to assess the behaviors under study. There has been a tendency within the field of art education to confuse educational problems with psychological ones.

B. CORRELATIONAL ANALYSIS

The results to be discussed in this section are more relevant to psychology than to art education. The results, their implications and suggestions for future work, will be discussed in relation to the psychology of art rather than art education.

In fact, the dependence of art educator upon psychological research may have caused the confusion between art education and psychological problems which were implicit in our discussion of the results in Section A. In our discussion of this section we will be talking as a psychologist rather than as an art educator.

In looking at our total group data (4th and 5th grades) we can conclude the following

(1) any significant relationships (either positive or negative) occurred in our male group;

(2) the negative correlations seem to occur within our perceptual field independence measures, and our drawing measures when correlated with other tests;

(3) the positive correlations seem to occur within our aesthetic preference and creativity groups;

(4) the negative correlations seem to occur more within our 5th grade sample;

(5) the positive correlations seem to occur more within our 4th grade sample;

(6) in our 4th grade sample we achieved a strong pattern of positive relations between variables of creativity and two measures of perceptual field independence and preference for complexity on slides;

(7) in our 5th grade sample we achieved a pattern of negative relationships between drawing and field independence;

(8) Our data both in this study and in a previous one indicate that we are measuring two broad clusters of behavior; i.e.,
   (a) <u>active</u> — drawing, perceptual field independence, and

   (b) <u>passive</u> — aesthetic preference and creativity;

(9) There would seem to be significant age differences between our behavior clusters:

   (a) positive relationships at the 4th grade level and

   (b) negative relationships at the 5th grade level;

(10) In addition there would seem to be a pattern of significant sex differences with all the relationships either positive or negative occurring within our male sub groups. Again in general this is a replication of our previous study. This finding would seem to indicate the following:

   (a) female behavior seems to be more discrete on the variables under study, and

   (b) male behavior seems to be less discrete and more glo-

bal, especially at the 4th grade level.

C. Implications for treaching

Our correlational analysis can give us some suggested guidelines for the general structure of art curricula in the upper elementary grades. We suggest the following guidelines:

(1) That the two broad clusters of behavior, active and passive, be considered in the formulation of art activities. Such a balance could be a balancing of activities that involve making art with those which involve talking about art. Such a curricular balance has indeed been suggested by Barkan and Chapman.

(2) There seems to be a need for differentiation of art curriculum between 4th and 5th grade level. We would suggest that 4th grade activities could be more global, whereas 5th grade activities need to be more discrete. Fifth grade curricula could be more structured and differentiated between active and passive behaviors.

(3) There seems to be a need for a differentiation of activities between males and females in upper elementary grades.

D. Implications for Research

We will discuss research implications for both art education and psychology.

(1) We need to examine more closely the nature of female behaviors on the variables under study. We need to design other kinds of studies to be able to differentiate relationships within our female samples.

(2) The four perceptual field independence measures divide into two groups: i.e., (a) EFT, (b) R & F, EFT, and (c) Renick. The four tests would seem to be measuring different behaviors. There is a discrepancy between our results and those of Witkin.

(3) There is a negative relationship between drawing measures and field independence measures, again a discrepancy between our work and H.A. Witkin. These two discrepancies need to be studied.

E. General Summary

There would seem to be a positive relationship between preference for complexity and variables of creativity. This was clear for both 4th and 5th grade samples. There was, in addition, a clear positive relationship between creativity, preference for complexity and field

independence in our 4th grade groups. These relations occur for our male but not female samples. As far as our male 4th and 5th grade sample, there does indeed seem to be a positive relationship between preference for complexity, field independence, and crativity. This finding was similar to the majority of the results in the research reviewed in Chapter II. While our general theory was indeed substantiated for our 4th grade males it did not hold for our female samples nor was it as clear for our 5th and 6th grade groups.

In general our present findings replicate those of a previous study.

We were able to achieve a treatment effect on preference for complexity on WFPT but not on slides. It would seem that aesthetic preferen-e is the variable that is more sensitive to learning experience than the other three clusters of variables. The sensitivity of aesthetic preference to learning experiences has important curriculum consequences for questions of aesthetic education.

F. Implications for Theory

Based on our extensive review of the literature over the past four years, we formulated a theory which hypothesized that there would be positive relationships between variables of creativity and perception. We hypothesized that the creative individual was

(1) more field independent on perceptual measures,

(2) preferred complexity asymmetry or figure preference tests,

(3) had a greater differentiation of form on drawing tests.

Our theory was confirmed in our two major studies for our 4th grade children and especially in our male sub sample.

Inverse relationships were found in our 5th and 6th grade samples. From an analysis of our data we conclude that our theory of relationships between creativity and perception describe a more global way of behavior which is evident in 4th but not 5th or 6th grade children. The behaviors under study would seem to become more discreet with age level studied.

Positive interrelationships among our variables would seem to be characteristic of male behavior and behavior of younger children. Negative interrelationships are more descriptove of adult behavior and maturity toward a more discreet level of mental life characterized by our female sub sample.

Our general findings are confirmed by developmental theories and the research of Piaget.

G. Implications for Testing Instruments

In this section, we will discuss the implications of our several studies for development and revision of the testing instruments employed.

(1) Aesthetic Preference Tests

Earlier problems with the use of the WFPT were avoided by converting the raw test scores into standard scores and percentiles. The Barron slide test however does not seem to be useful in its present form. We would suggest tests designed to measure variables of aesthetic preference in works of art, take a form like the Davis Aesthetic Attention Test. The strengths of the Davis Test are (a) it avoids the forced choice of the Barron, (b) it avoids the question of like or dislike which in work with children seem to be rather unstable, and (c) it substitutes an approach which has its origin in the nature of the discipline of art itself.

(2) Perceptual Field Independence Measures

The hidden figures test and the R & F test seem to be more responsive to changes and relationships in work with children than the EFT developed by Witkin and published by Educational Testing Service.

(3) Drawing Test

The drawing tests used in this study were too simplistic in form and lacked real aesthetic quality. We would suggest using the Efland scales on more complex drawings done by children. It seems that when children are asked to draw a simple house, tree, a person, they reproduce a stereotyped symbol devoid of aesthetic quality. We suggest using children's art work which is not produced within the testing context.

(4) Creativity Tests

The Minnesota Tests of Creative thinking, as used in this study, functioned well, were responsive and sensitive to behavior changes, and were easily scored according to test manuals.

List of Appendices

Appendix 1

(A) Barron Art Slide Test
(slides used for Pre-test)

	PAINTER	TITLE	KEY
1.	Daumier, Honore	The Amateurs	(C)
2.	Vlaminck, Maurice de.	The Seine at Charrieres sur-Seine	(C)
3.	Leger, Fernand	Two Profiles	(C)
4.	Renoir, Jean	Woman in White reading	(C)
5.	Gauguin, Paul	The Hayricks	(C)
6.	Gauguin, Paul	Why are you Angry	(C)
7.	Degas, Edgar	Portrait of Camilla Carafa	(C)
8.	Leger, Fernand	Three Musicians	(C)
9.	DeSegousac, Andre	Village on the Marne	(C)
10.	Daumier, Honore	The Print Collector	(C)
11.	Redon, O.	Flowers in a Vase	(S)
12.	Corot, J. B. C.	Dance of the Nymphs	(S)
13.	Vuillard, Edouard	In Bed	(C)
14.	Toulouse-Lautrec, F.	The Clowness	(C)
15.	Modigliani, Amadeo	Burgundy Woman	(C)
16.	Modigliani, Amadeo	Portrait of a Woman	(C)
17.	Rembrandt van Rijn	Hendrickje Stoffels	(S)
18.	Cezanne, Paul	The Bathers	(C)
19.	Toulouse-Lautrec, F.	Jane Avril "La Melinite"	(C)
20.	Toulouse-Lautrec, F.	Two Waltzers	(C)
21.	Picasso, Pablo	Fruit Dish & Pitcher	(C)
22.	Picasso, Pablo	Flowers & Fruit by Window	(C)
23.	Leonardo Da Vinci	The Virgin of the Rocks	(S)
24.	Leonardo da Vinci	Anne Selfdritt	(S)
25.	Leonardo da Vinci	St. John the Baptist	(S)
26.	Rembrandt, van Rijn	Self Portrait at 23	(S)
27.	Rembrandt, van Rijn	Self Portrait	(S)
28.	Rembrandt, van Rijn	The Syndics of the Cloth Guild	(S)
29.	Cezanne, Paul	Nature Morte aux Oignons	(C)
30.	Clouet, J.	Francis the First	(S)
31.	Cezanne, Paul	Still Life with Apples	(C)
32.	Gauguin, Paul	La Orana Maria	(C)
33.	Gris, Juan	Guitar Player	(C)
34.	Gris, Juan	The Breakfast	(C)
35.	Corot, Camille	Woman with a Flower	(S)
36.	Botticelli, Sandro	Maria mit dem Kinde	(S)
37.	Van Gogh, Vincent	Bridge at Arles	(C)
38.	Gainsborough	Blue Boy	(S)
39.	15th Century	Annunciation	(S)
40.	Whistler, James	Mother	(S)
41.	Holbein, Hans	Portrait	(S)
42.	15th Century	Desposition	(S)
43.	15th Century	St. George	(S)

44.	15-16th Century	Mary	(S)
45.	Fragonard, Jean	Family	(S)
46.	16th Century	Portrait	(S)

(B) Barron Art Slide Test
(Post-test slides)

	ARTIST	TITLE	KEY
1.	Vlaminck, Maurice de	The Seine at Carriesur Seine	(C)
2.	Leger, Fernand	Two Profiles	(C)
3.	Holbein, Hans	Portrait	(S)
4.	Fragonard, Jean	Family	(C)
5.	Renoir, Jean	Woman in White Reading	(C)
6.	Gaugin, Paul	The Yellow Christ	(C)
7.	15th Century	Annunciation	(C)
8.	Rembrandt	Syndices of the Cloth Guild	(S)
9.	15th Century	St. George	(S)
10.	Gaugin, Paul	The Vision after the Serma	(C)
11.	Degas, Edgar	Dancers in Pink	(C)
12.	Leger, Fernand	Three Musicians	(C)
13.	Daumier, H.	The Refugees	(C)
14.	15th Century	Desposition	(S)
15.	Redon, O.	The Green Death after 1905	(C)
16.	Holbein, Hans	Portrait of a Woman	(S)
17.	Corot, J. B. C.	Dance of the Nymphs	(S)
18.	Vuillard, Edouard	Mother and Sister of the Artist	(C)
19.	Whistler, James	Mother	(S)
20.	Toulouse-Lautrec	Two Waltzers	(C)
21.	15th Century	Annunciation	(S)
22.	Rembrandt	The Supper at Emmaus	(S)
23.	Gainsborough	Blue Boy	(S)
24.	Leonardo da Vinci	Anna Selfdritt	(S)
25.	Toulouse-Lautrec	Jane Anise "La Metinite"	(C)
26.	Rembrandt	Self-Portrait at 24	(S)
27.	Picasso, P.	Flames and Fruit by Window	(C)
28.	Renoir, J.	Girl Reading	(C)
29.	Modigliani, A.	Gypsy Woman with Baby	(C)
30.	Cezanne, P.	The Card Players	(C)
31.	Rembrandt	The Night Watch	(S)
32.	Vincent Van Gogh	Bridge in Arles	(C)
33.	Toulouse-Lautrec	Dr. Tapla de Celeyron	(C)
34.	Botticelli, Sandro	Bloull Kunst-Dia	(S)
35.	Gris, Jean	The Breakfast	(C)
36.	Cezanne, P.	Life with Apples	(C)
37.	Leonardo da Vinci	Virgin of the Rocks	(S)
38.	Corot, Camille	Woman with a Flower	(S)
39.	Clouet, J.	Charlotte de France	(S)
40.	Picasso, P.	Fruit Dish and Pitcher	(C)
41.	Gaugin, Paul	Woman and White Horse	(C)
42.	Cezanne, P.	Still Life with Onions	(C)
43.	Leonardo da Vinci	St. John the Baptist	(S)
44.	Gris, Jean	The Chessboard	(C)
45.	Modigliani	Portrait of Henri Louren	(C)

Appendix 2

Davis Aesthetic Attention Test

NAME_____AGE____GRADE____DATE_____

DIRECTIONS

Please fill in the above information.

Now, read through these directions with me.

We are trying to find out how students look at works of art and how they think and feel when they look at pictures, sculpture, and other kinds of art.

You will be shown a series of sets of three pictures at a time. You will also be given a word on each page of this booklet to fit the pictures you see. These will be words like complicatedness and peacefulness. You will then be asked to decide which one of the three pictures best fits peacefulness or makes you feel peaceful, for instance.

When you decide on the picture, pencil in the box on your booklet page that matches the position of the picture on the screen. For instance, if you choose the picture on the left, you should pencil in the box on the left (or box A). If you choose the picture in the middle, you should choose the box in the middle (or box B).

You will see five sets of pictures for each word such as peacefulness. Each word is on one page so you will mark an answer for five sets of pictures. At the end of each page, put your pencil down and STOP.

DO NOT TURN TO THE NEXT PAGE UNTIL THE SIGNAL IS GIVEN TO DO SO.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

WARM-UP PRACTICE

To give you some practice, we are going to warm-up with two sets of pictures.

For number 1, choose the picture which is the most <u>complicated</u>.

1. A  B  C 

For number 2, choose the picture which makes you feel most <u>peaceful</u>.

2. A  B  C 

Did you make a choice for each one?

Did you mark <u>only</u> one box? In each of the following, you must mark one box; you must not mark more than one box. Otherwise, your test is not complete. Are there any questions at all? This is the time to be sure you understand what to do.

NOW TURN TO THE NEXT PAGE.

In the following five sets of slides look for the ONE picture in each set which is the most COMPLICATED.

COMPLICATEDNESS

	A.	B.	C.
1.	___	___	___
2.	___	___	___
3.	___	___	___
4.	___	___	___
5.	___	___	___

When you finish, STOP.

Wait for the signal before going on to the next page.

In the following five sets of slides look for the ONE picture in each set which shows the most MOVEMENT.

MOVEMENT

	A.	B.	C.
1.	___	___	___
2.	___	___	___
3.	___	___	___
4.	___	___	___
5.	___	___	___

When you finish, STOP.

Wait for the signal before going on to the next page.

In the following five sets of slides look for the ONE picture in each set which shows the most examples of REPETITION or of repeatingness.

REPETITION

	A.	B.	C.
1.	___	___	___
2.	___	___	___
3.	___	___	___
4.	___	___	___
5.	___	___	___

When you finish, STOP.

Wait for the signal before going on to the next page.

In the following five sets of slides look for the ONE picture in each set which shows the largest amount of ONENESS or is the most whole or unified.

ONENESS

	A.	B.	C.
1.	—	—	—
2.	—	—	—
3.	—	—	—
4.	—	—	—
5.	—	—	—

When you finish, STOP.

Wait for the signal before going on to the next page.

In the following five sets of slides look for the ONE picture in each set which shows the most MYSTERY or makes you feel the most mysterious.

MYSTERY

	A.	B.	C.
1.	—	—	—
2.	—	—	—
3.	—	—	—
4.	—	—	—
5.	—	—	—

When you finish, STOP.

Wait for the signal before going on to the next page.

In the following five sets of slides look for the ONE picture in each set which shows the most PEACEFULNESS or makes you feel the most peaceful.

PEACEFULNESS

	A.	B.	C.
1.	—	—	—
2.	—	—	—
3.	—	—	—
4.	—	—	—
5.	—	—	—

When you finish, STOP.

Wait for the signal before going on to the next page.

In the following five sets of slides look for the ONE picture in each set which shows the most FEAR or makes you feel the 'spookiest' or most fearful.

FEARFULNESS

	A.	B.	C.
1.	___	___	___
2.	___	___	___
3.	___	___	___
4.	___	___	___
5.	___	___	___

When you finish, STOP.

Wait for the signal before going on to the next page.

In the following five sets of slides look for the ONE picture in each set which shows the most LIVELINESS or makes you feel the liveliest.

LIVELINESS

	A.	B.	C.
1.	___	___	___
2.	___	___	___
3.	___	___	___
4.	___	___	___
5.	___	___	___

When you finish, STOP.

Slides Used for Davis Test

Complicatedness

LIST OF REPRODUCTIONS

A.	B.	C.
1. Lippold, "Variation No. 7, Full Moon"	Notke, "St. George and the Dragon"	el Florentino, "Samson Destroying the Gates"
2. Chagall, "Reubon"	Concharova, "Green and Yellow Forest"	Zerbe, "Diesel Engine"
3. de Senlis, "Cluster of Grapes"	Caillaud, "Islands"	Negrette, "Labor in the Fields"
4. Michelangelo, "Battle of the Senators"	Lampa, Peru: Parish Church	Arequipa: San Agustin Facade
5. Paris: Notre Dame	de Bear, "Adoration of the Magi"	Highboy: 1735 (American)

LIST OF REPRODUCTIONS--continued

6. Marin, "Singer Building"	Lippold, "New Moon-light"	Kandinsky, "Light Construction"
7. Marini "Horse and Rider"	Temple at Delphi: "Battle of Gods against Giants"	Archipenko, "Woman Combing her Hair"
8. Kokoschka, "The Tempest"	Goes, "The Nativity"	Klee, "Warning of the Ships"
9. Schneider, "Composi-tion"	Kline, "Initial"	Hartung, "T 1956-1959"
10. van Dyck, "The Crucifixion"	Chagall, "Red Sun"	Kokoschka, "Self-Portrait"

LIST OF REPRODUCTIONS--continued

11. Picasso, "View of Paris with Notre Dame"	Lippold, "Devotions I and II"	Meistermann, "Glass Window"
12. Mortensen, "Painting"	Manessier, "Plainsong"	Klee, "Gray Man and Coast"
13. Primitive Figure: Bakota Style.	Wright: "Falling Water"	Natchez, Mississippi: "Auburn"
14. Amiens: Stained Glass Window	Rome: Round Temple by the Tiber	Curry, "Elephants at the Circus"
15. Rivers, "Continued"	Saqqara: Tomb of Akhotna (detail)	Sequesta, Sicily: Temple

LIST OF REPRODUCTIONS--continued

16. Aztec Drum dated with 2-reed	Olmec statuette	Picasso, "Celeste"
17. Brancusi, "Adolescent Torso"	Brancusi, "Bird"	Olmec Mask, Stone
18. Nicholson, "Relief"	Teotihuacan Mask (Wood)	Brancusi, "The New-Born"
19. Teotihuacan Mask (Stone)	Arp, "Human Concretion"	Brancusi, "Bird in Space"
20. Picasso, "Seated Harlequin"	Klee, "Lady Demon"	Davis, J. "Esther Tuttle"

LIST OF REPRODUCTIONS--continued

21. Singier, "Sea Window"	Tanguy, "The Smile Lingers"	Klee, "Demon as Pirate"
22. Brouwer, "Landscape"	Whistler, "Battersea Bridge"	Bill, "Six Centers of Energy"
23. Giacometti, "Chariot"	Tootihuacan: God-Shrine	Picasso, "Boy on a Horse"
24. Vlaminck, "Valley of the Aure River"	Ryder, "Moonlight Marine"	Klee, "Nocturnal Festival"
25. Church, "Cotopaxi, Ecuador"	Homer, "Moonlight Woods Isle Light"	Graves, "Blind Bird"

LIST OF REPRODUCTIONS--continued

26. Moore, "Reclining Figure"

27. Nolde, "The Pentecost" (detail)

28. Mondrian, "Church Tower, Domburg:

29. Aegina: Hercules

30. Bosch, "St Jerome in Prayer" (detail)

Harnett: "The Old Violin"

Michelangelo, "Lorenzo di Medici"

Cole, "In the Catskills"

Matisse, "The Boudoir"

Homer, "Sloop, Bermuda"

Picasso: "Two Acrobats with a Dog"

Cassatte, "The Bath"

van Ghent, "Calvary Triptych" (detail)

Klee, "Fairy Tale"

Bonnard, "The Breakfast Room"

LIST OF REPRODUCTIONS--continued

31. Olmec Mask	Roszak, "Spectre of Kitty Hawk"	Munch, "The Dance of Life"
32. Bosch, "Christ Bearing the Cross"	Africa: Mask	Bruegel, "Dulle Griet" (detail)
33. Mexico: Grotesque Figurine	Albright, "Into the World There Came a Sould Called Ida"	Blume, "The Eternal City"
34. Klee, "A Girl Possessed"	Bosch, "The Temptation of St. Anthony" (detail)	Klee, "Actor's Mask"
35. Oppenheimer, "Fur-lined Teacup"	Picasso, "Bull's Skull"	de Kooning, "Woman II"

LIST OF REPRODUCTIONS--continued

36. Pereira, "Oblique Progression"	Marin, "Boat of Deer Isle"	Braque, "La Ciotat"
37. Chagall, "Flowering Feathers"	Derain, "Landscape"	Mathieu, "The Capetians"
38. Mondrian, "Hill in the Sunlight"	Beckmann, "Odysseus"	Davis, S., "Visa"
39. Klee, "Full Moon"	Hofmann, "The Magician"	Klee, "Ecstacy"
40. Mondrian, "Broadway Boogie Woogie"	Reims: Annunciation, Head of an Angel	Klee, "Senecio"

LIST OF REPRODUCTIONS--continued

Complicatedness

Picasso, "The Three Musicians"

Klee, "The Twittering Machine"

Olmec: Tuxtle Statuette

Peacefulness

Homer, "Breezing Up"

Marc, "Yellow Horses"

Bruegel, "Hunters in the Snow" (detail)

Appendix 3

Efland Tree Drawing Scale

The criteria for drawing the tree is the increased use of lines at angles other than right angles. This will be seen especially in the branches of the tree.

1. The trunk is perpendicular to the base of the drawing, branches may not be present.

2. Branches are present but usually are placed perpendicularly to the trunk. Generally they do not occur in the part assigned to indicate foliage.

3. Branches are drawn in a variety of radiating directions, appear integrated with foliage, but they all originate in the same part of the trunk.

4. There is some evidence that the branches sub-divide into smaller twigs.

5. There is a deliberate effort to draw branches in a great variety of directions. There appears to be a variety of angles.

Appendix 4

Efland House Drawing Scale

The criteria for this scale is the increased use of more complex angles and lines which are placed in the oblique direction.

1. There is at least one enclosed shape bounded by four sides if rectangular, five sides if an attempt is made to indicate a pitched roof.

2. Chimneys and TV antennae are not perpendicular to the ground. Assume that the base of the paper is the ground.

3. An attempt has been made to indicate the shape of the roof (usually a triangle but not necessarily so) but do not score this category if category 2 has not been passed.

4. An attempt has been made to show the plane of the roof, not merely the line that indicates the edge. This will usually be a parallelogram or trapezoid or a combination of several shapes.

5. There is an attempt to show more than one side of a house, however, these may be indicated as a house with a flat base. Do not credit if three

sides of a house appear (as in the drawing illustrating category 4).

6. There is some awareness of perspective with the side drawn obliquely to the front of the house. There is evidence that the two sides refer to discriminably different planes. The ground may be indicated as a plane rather than a base line.

7. The base of the house is not parallel with the base of the paper. One corner appears nearer than the sides.

Appendix 5

Efland Figure Drawing Test

1. There is an attempt to depict a man or a woman though these may not be distinguishable except through hat or hair. At least one enclosed shape and some indication of limbs are present.

2. Figures usually are comprised of more than one shape. Limbs are solid shapes rather than sticks. Figure appears assembled from many simpler shapes.

3. Different forms are used to symbolize male and female. They are no longer interchangable. The neck is usually present.

4. There is <u>some</u> attempt to fuse the parts of the figure into a more unified drawing. This will be found mostly in the treatment of the shoulders and hips.

5. Waistline is indicated by a narrowing of the figure if female and hip structure if male. Small appendages such as ears, nose, fingers, palms, and feet usually are indicated. Some of these may be omitted.

6. Clothing is separate from body as shown by the neckline, cuff, and sleevelines but not hem line. In general there should be an overall consistency in this feature.

7. Parts are integrated through the use of contour lines especially in profile view. The contour lines are more fluid, less rigid than in category four. The line symbolizes a more specific less general feature.*

*(Efland has further clarified this category as follows: 7 will be noted especially in profile views where noses are revealed through profile line. If you want to be sure use this mainly for drawings showing the profile since they occur infrequently in the lower categories. At least this has been my experience. You might also use it only when 5 or 6 have been filled. In general, I do not keep scoring if they miss more than two categories." (personal communication)

8. Parts of the figure may overlap such as arm in profile view, or legs in running position. If parts are hidden due to overlapping they are credited as being present.

9. Limbs and body outline are shaped to indicate very specific characteristics, e.g., the bulging muscles of the "he-man" or hourglass figure of the beauty queen. Facial expressions may convey a

mood other than the typical smile.

Appendix 6

Tables of Means and S. D. for all Data
(Pre-Tests, 4th and 5th Grade)

Table 6a

Means & S. D. for Renick Test Variables

	Deduction					Induction				
	M	F	TOTAL	4th	5th	M	F	TOTAL	4th	5th
Means	1.84	1.50	1.66	1.97	1.38	1.22	1.80	1.52	1.73	1.34
S.D.	2.16	1.64	1.90	1.80	1.96	1.50	1.92	1.75	1.93	1.57
N=	45	50	95	45	50	45	50	95	45	50

	Ded. - Induct.					Outer Contour				
	M	F	TOTAL	4th	5th	M	F	TOTAL	4th	5th
Means	0.24	0.30	0.27	0.35	0.20	8.40	8.32	8.35	9.91	6.96
S.D.	0.60	0.64	0.62	0.71	0.53	5.20	4.78	4.96	5.29	4.23
N=	45	50	95	45	50	45	50	95	45	50

	Inner Structure					Shape Combining				
	M	F	TOTAL	4th	5th	M	F	TOTAL	4th	5th
Means	5.26	5.18	5.22	6.0	4.52	13.66	13.50	13.57	15.91	11.48
S.D.	4.77	4.45	4.58	4.84	4.26	9.56	8.55	8.99	9.73	7.79
N=	45	50	95	45	50	45	50	95	45	50

From an inspection of the above data we can note the following two trends on the Renick variables:

1. Male superiority on deductive reasoning
   Female superiority on inductive reasoning
2. 4th grade was superior to 5th grade performance on five of the six test measures.

Table 6b

Means & S. D. for Aesthetic Variables

	WFPT (Raw)			Slides (Raw)		
	M	F	TOTAL	M	F	TOTAL
Mean	38.39	36.97	37.67	23.43	23.00	23.20
S.D.	12.31	14.51	13.41	2.89	3.04	2.96
N =	43	44	87	41	49	90

	WFPT (%)			Slides (%)		
	M	F	TOTAL	M	F	TOTAL
Mean	45.79	39.38	42.38	72.97	49.57	60.23
S.D.	25.75	30.29	28.29	134.35	30.60	93.57
N =	44	50	94	41	49	90

	WFPT (Stand.)			Slides (Stand.)		
	M	F	TOTAL	M	F	TOTAL
Mean	48.97	48.09	48.52	46.92	47.95	47.48
S.D.	8.21	9.71	8.96	13.27	10.73	11.89
N =	43	44	87	41	49	90

Table 6c

Means & S. D. for Aesthetic Variables

	WFPT (Raw)		Slides (Raw)	
	4th	5th	4th	5th
Means	36.60	38.63	23.27	23.13
S.D.	13.55	13.36	3.28	2.67
N =	41	46	44	46

	WFPT (%)		Slides (%)	
	4th	5th	4th	5th
Means	39.62	44.91	69.15	51.69
S.D.	29.0	27.65	130.89	28.15
N =	45	49	44	46

	WFPT (Standard Score)		Slides (Standard Score)	
	4th	5th	4th	5th
Means	47.80	49.17	46.95	48.00
S.D.	9.03	8.95	12.59	11.30
N =	41	46	44	46

Table 6d

Means & S. D. for Creativity Tests

	Fluency			Flexibility		
	M	F	TOTAL	M	F	TOTAL
Means	25.42	21.64	23.53	18.20	17.17	17.68
S.D.	11.55	7.35	9.81	8.42	4.77	6.82
N =	45	45	90	45	45	90

	Originality			Elaboration		
	M	F	TOTAL	M	F	TOTAL
Means	45.26	40.73	43.00	28.8	27.48	28.14
S.D.	11.57	11.65	11.77	10.59	10.93	10.72
N =	45	45	90	45	45	90

Table 6e

Means & S. D. for Creativity Tests

	Fluency		Flexibility	
	4th	5th	4th	5th
Means	24.62	22.53	18.53	16.91
S.D.	10.33	9.31	7.99	5.52
N =	43	47	43	47

	Originality		Elaboration	
	4th	5th	4th	5th
Means	42.32	43.61	28.51	27.80
S.D.	9.49	13.61	10.50	11.01
N =	43	47	43	47

Table 6f

Means & S. D. for Perceptual Variables

	EFT 1			R & F			EFT 2		
	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
Means	2.66	1.56	2.08	19.93	17.04	18.45	10.11	8.97	9.53
S.D.	3.47	1.50	2.66	4.92	4.73	5.01	13.25	5.17	9.97
N =	45	50	95	43	45	88	45	46	91

Table 6g

Means & S. D. for Perceptual Variables

	EFT 1		R & F		EFT 2	
	4th	5th	4th	5th	4th	5th
Means	1.13	2.94	16.80	19.95	7.61	11.34
S.D.	1.39	3.21	6.24	2.87	13.32	4.69
N =	45	50	42	46	44	47

The difference in means and S. D. between grade levels seems to reflect the fact that older children find these three test instruments easier to do and the spread of range of difference (as reflected in S. D.) becomes less in the older groups.

Table 6h

Means & S. D. for Drawing Tests (5th Grade)

	Tree			Person			House		
	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
Means	3.45	3.25	3.34	4.27	4.66	4.47	2.85	8.14	5.50
S.D.	1.57	0.96	1.26	1.34	1.07	1.20	2.21	13.58	9.92
N =	11	12	23	11	12	23	14	14	28

Appendix 7

Correlations of Grade Level

Table 7a

Correlations for Renick Variables and Aesthetic Preference

4th Grade

	Deduction	Induction	Ded.-Ind.	Outer	Inner	Shape
WFPT						
Raw	0.12	-0.10	0.16	0.02	0.18	0.10
%	0.09	-0.16	0.04	-0.00	0.11	0.05
Standard	0.11	-0.10	0.17	0.01	0.16	0.09
Slides						
Raw	0.13	0.01	-0.05	0.08	0.15	0.12
%	0.03	0.02	-0.07	-0.01	0.15	0.07
Standard	0.11	-0.00	0.00	0.10	0.03	0.07
N =	41	41	41	41	41	41

None of the above relationships were significant.

Table 7b

Correlations for Renick Variables and Aesthetic Preference

5th Grade

	Deductive	Inductive	Ind.-Ded.	Outer	Inner	Shape
WFPT						
Raw	0.27	-0.31 (.05)	-0.06	-0.14	-0.06	-0.11
%	0.06	-0.23	-0.13	-0.19	-0.22	-0.23
Standard	0.28 (.05)	-0.31 (.05)	-0.06	-0.14	-0.06	-0.11
Slides						
Raw	-0.02	0.29 (.05)	-0.10	-0.01	-0.04	-0.03
%	-0.03	0.32 (.05)	-0.10	-0.04	-0.06	-0.05
Standard	0.01	0.17	-0.07	-0.00	0.02	0.00
N =	46	46	46	46	46	46

In our 5th grade, preference for complexity would seem to be negatively related to inductive reasoning but positively related to the same variable on the slide test.

(In much of our data we have observed that the WFPT and slide test operate not only independent of each other but in opposite directions.)

Table 7c

Relationships between Renick Perceptual Variables and Field Independence

4th Grade

	Deductive	Inductive	Ded.-Ind.	Outer Contour	Inner Structure	Shape Combining
EFT 1	0.31 (.05)	-0.00	-0.00	0.10	-0.03	0.04
R & F	0.22	0.26	-0.09	-0.06	0.04	-0.01
EFT 2	-0.07	-0.06	-0.18	-0.16	-0.00	-0.08

N = 42

Table 7c (cont.)

5th Grade

	Deductive	Inductive	Ded.-Ind.	Outer Contour	Inner Structure	Shape Combining
EFT 1	-0.00	-0.04	-0.04	-0.17	-0.06	-0.12
R & F	-0.20	-0.25	0.10	-0.10	0.02	-0.05
EFT 2	-0.34 (.02)	0.01	-0.06	-0.44 (.01)	-0.45 (.01)	-0.48 (.001)

N = 43

We achieved a pattern of significant negative relationships between one measure of field independence and four out of six Renick measures. Throughout our data EFT 2 tended to react differently from the other two field independence measures.

Table 7d

Correlations between Renick Variables and Creativity Measures

4th Grade

	Deductive	Inductive	Ded.-Ind.	Outer Contour	Inner Structure	Shape Combining
Fluency	0.24	0.24	-0.09	0.12	0.21	0.17
Flexibility	0.05	0.02	-0.05	-0.05	0.11	0.02
Originality	-0.01	-0.02	-0.06	-0.06	-0.04	-0.05
Elaboration	-0.16	0.05	-0.13	0.00	0.03	0.01

N = 43

None of the above were significant.

Table 7d (cont.)

5th Grade

	Deductive	Inductive	Ded.-Ind.	Outer Contour	Inner Structure	Shape Combining
Fluency	0.30 (.05)	-0.06	-0.07	0.07	0.00	-0.01
Flexibility	0.11	-0.12	0.05	-0.07	-0.09	-0.16
Originality	0.07	-0.21	0.00	0.00	-0.04	-0.09
Elaboration	-0.05	-0.34 (.02)	0.02	-0.07	-0.02	-0.05

N = 47

Table 7e

Relationships between Aesthetic Preference for Complexity in Works of Art and on WFPT

4th Grade

	Slides		
WFPT	Raw	%	Standard
Raw	0.00	0.15	-0.11
%	0.04	0.17	-0.08
Standard	-0.00	0.15	-0.12
N =	41	41	41

Table 7f

Relationships between Aesthetic Preference for Complexity in Works of Art and on WFPT

5th Grade

	Slides		
WFPT	Raw	%	Standard
Raw	-0.24	-0.19	-0.24
%	-0.11	-0.06	-0.13
Standard	-0.23	-0.19	-0.23
N =	46	46	46

The data in Tables 7e and 7f indicate little relationship between aesthetic preference for complexity in works of art and on the WFPT.

Table 7g

Relationships between Preference for Complexity and Field Independence

4th Grade

WFPT	EFT 1	R & F	EFT 2
Raw	0.00	0.11	0.13
%	0.02	0.05	0.18
Standard	0.00	0.12	0.14
Slides			
Raw	-0.13	0.05	0.15
%	-0.14	0.59 (.001)	0.93 (.001)
Standard	-0.02	-0.38 (02)	-0.54 (.001)
N = 41			

We achieved four significant relationships between preference for complexity and field independence.

Table 7h

Relationships between Preference for Complexity and Field Independence

5th Grade

WFPT	EFT 1	R & F	EFT 2
Raw	0.00	-0.06	-0.05
%	0.09	-0.06	0.08
Standard	0.00	-0.06	-0.06
Slides			
Raw	-0.02	-0.24	-0.00
%	0.00	-0.19	0.03
Standard	-0.01	-0.17	-0.08

We achieved no significant relationships in the above 5th grade data.

Table 7i

Relationships between Aesthetic Preference for Complexity and Creativity (Non-Verbal A)

4th Grade

	Fluency	Flexibility	Originality	Elaboration
WFPT				
Raw	0.14	0.25	0.14	0.02
%	0.15	0.27	0.11	-0.00
Standard	0.14	0.26	0.14	0.02
Slides				
Raw	0.32 (.05)	0.18	0.10	0.09
%	0.72 (.001)	0.86 (.001)	0.30 (.05)	0.48 (.001)
Standard	-0.21	-0.47 (.001)	-0.13	-0.27
N =	40	40	40	40

We achieved a positive and significant pattern of relationships between preference for complexity on the slide test (using percentile score) and the four creativity variables.

Table 71

Relationships between Aesthetic Preference for Complexity and Creativity

5th Grade

	Fluency	Flexibility	Originality	Elaboration
WFPT				
Raw	-0.03	-0.10	0.01	0.22
%	0.06	-0.01	0.11	0.24
Standard	-0.03	-0.10	0.01	0.22
Slides				
Raw	0.16	0.19	0.07	0.01
%	0.17	0.21	0.09	0.05
Standard	0.06	0.11	-0.02	-0.06
N =	44	44	44	44

We failed to achieve any significant relationships in our 5th grade data.

Table 7k

Relationships between Field Independence and Creativity

4th Grade

	EFT 1	R & F	EFT 2
Fluency	0.04	0.57 (.001)	0.65 (.001)
Flexibility	-0.08	0.59 (.001)	0.87 (.001)
Originality	0.20	0.39 (.01)	0.32 (.05)
Elaboration	0.02	0.42 (.001)	0.50

N = 41

We achieved a pattern of significant relationships between field independence as measured by EFT 2 and R & F Tests with the creativity variables.

It would seem that the more field-independent 4th graders are also the more creative.

Table 71

Relationships between Field Independence and Creativity

5th Grade

	EFT 1	R & F	EFT 2
Fluency	-0.02	-0.20	0.04
Flexibility	-0.14	-0.12	0.23
Originality	-0.16	-0.16	0.30(.05)
Elaboration	-0.08	-0.24	0.23
N = 44			

Only one of the above relationships was significant. This was quite the reverse of our fourth grade data.

Appendix 8

Intercorrelations of Each Test Instrument

Table 8a

Intercorrelations Renick Variables

Male

	Deductive	Inductive	Ded.-Ind.	Outer Contour	Inner Structure	Shape Combining
Deductive	1.00	0.10	0.15	0.47(.01)	0.36(.02)	0.44(.01)
Inductive	0.10	1.00	0.26	0.29(.05)	0.33(.02)	0.32(.02)
Ded.-Ind.	0.15	0.26	1.00	0.16	0.15	0.16
Outer Con.	0.47(.001)	0.29(.05)	0.16	1.00	0.83(.001)	0.96(.001)
Inner St.	0.36(.02)	0.33(.02)	0.15	0.83(.001)	1.00	0.95(.001)
Shape Comb.	0.44(.01)	0.32(.02)	0.16	0.96(.001)	0.95(.001)	1.00

N = 45

Table 8a (cont.)

Intercorrelations Renick Variables

Female

	Deductive	Induc-tive	Ded.-Ind.	Outer Contour	Inner Structure	Shape Comb.
Deductive	1.00	0.23	0.37(.01)	0.29(.05)	0.51(.001)	0.43(.01)
Inductive	0.23	1.00	0.14	0.23	0.19	0.23
Ded.-Ind.	0.37(.01)	0.14	1.00	0.32(.02)	0.46(.001)	0.42(.01)
Outer Con.	0.29(.05)	0.23	0.32(.02)	1.00	0.71(.001)	0.93(.001)
Inner St.	0.51(.001)	0.19	0.46(.001)	0.71(.001)	1.00	0.92(.001)
Shape Comb.	0.43(.01)	0.23	0.42(.01)	0.93(.001)	0.92(.001)	1.00

N = 50

Table 8a (cont.)

Intercorrelations Renick Variables

Total

	Deductive	Inductive	Ind.-Ded.	Outer Contour	Inner Structure	Shape Comb.
Deductive	1.00	0.15	0.24(.02)	0.39(.001)	0.42(.001)	0.43(.001)
Inductive	0.15	1.00	0.19	0.25(.02)	0.24	0.26(.02)
Ind.-Ded.	0.24(.02)	0.19	1.00	0.24(.02)	0.31(.01)	0.29(.01)
Outer Con.	0.39(.001)	0.25(.02)	0.24(.02)	1.00	0.77(.001)	0.94(.001)
Inner St.	0.42(.001)	0.24(.02)	0.31(.01)	0.77(.001)	1.00	0.93(.001)
Shape Comb.	0.43(.001)	0.26(.02)	0.29(.01)	0.94(.001)	0.93(.001)	1.00

N = 95

Table 8b

Interrelations Among Drawing Behaviors

Male Fifth Grade

	Tree	Person	House
Tree	1.00 (N=11)	-0.06 (N=11)	0.38 (N=11)
Person	-0.06 (N=11)	1.00 (N=11)	0.08 (N=11)
House	0.38 (N=11)	0.08 (N=11)	1.00 (N=11)

Table 8b (cont.)

Female Fifth Grade

	Tree	Person	House
Tree	1.00 (N=12)	-0.17 (N=12)	0.37 (N=12)
Person	-0.17 (N=12)	1.00 (N=12)	0.59 (N=12)
House	0.37 (N=12)	0.59 (N=12)	1.00 (N=12)

Table 8b (cont.)

Total Group

	Tree	Person	House
Tree	1.00 (N=23)	-0.11 (N=23)	0.20 (N=23)
Person	-0.11 (N=23)	1.00 (N=23)	0.41 (N=23)
House	0.20 (N=23)	0.41 (N=23)	1.00 (N=23)

Table 8c

Intercorrelations Among Perceptual Measures

Males

	EFT 1	R & F	EFT 2
EFT 1	1.00 (N-45)	0.10 (N=43)	0.05 (N=45)
R & F	0.10 (N=43)	1.00 (N=43)	0.68 (N=43)
EFT 2	0.05 (N=45)	0.68 (N=45)	1.00 (N=45)

Table 8c (cont.)

Intercorrelations Among Perceptual Measures

Females

	EFT 1	R & F	EFT 2
EFT 1	1.00 (N=50)	0.19 (N=45)	0.52 (N=46)
R & F	0.19 (N=45)	1.00 (N=45)	0.24 (N=43)
EFT 2	0.52 (N=46)	0.24 (N=43)	1.00 (N=46)

Table 8c (cont.)

Intercorrelations Among Perceptual Measures

Total

	EFT 1	R & F	EFT 2
EFT 1	1.00 (N=95)	0.17 (N=88)	0.13 (N=91)
R & F	0.17 (N=88)	1.00 (N=88)	0.50 (N=86)
EFT 2	0.13 (N=91)	0.50 (N=86)	1.00 (N=91)

Table 8d

Intercorrelations Among Creativity Test Measures

Male

	Fluency	Flexibility	Originality	Elaboration
Fluency	1.00	0.79 (.001)	0.56 (.001)	0.46 (.001)
Flexibility	0.79 (.001)	1.00	0.60 (.001)	0.58 (.001)
Originality	0.56 (.001)	0.60 (.001)	1.00	0.44 (.01)
Elaboration	0.46 (.001)	0.58 (.001)	0.44 (.01)	1.00

N = 45

All of the above relationships were significant at better than the 0.01 level.
This finding indicates that the four sub-measures of creativity are highly related to one another.

Table 8e

Intercorrelations Among Creativity Test Measures

Female

	Fluency	Flexibility	Originality	Elaboration
Fluency	1.00	0.70 (.001)	0.57 (.001)	0.31 (.05)
Flexibility	0.70 (.001)	1.00	0.82 (.001)	0.38 (.05)
Originality	0.57 (.001)	0.82 (.001)	1.00	0.51 (.01)
Elaboration	0.31 (.05)	0.38 (.05)	0.51 (.01)	1.00

N = 45

All of the above relationships were significant. The results indicate a consistency of creativity behavior for Female Ss.

(Note we did not present data for total group or by grade level since on the strength of the patterns of relationships in the data presented we can conclude additional analyses would not reveal any different results.)

Appendix 9

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Appendix 10

PERCEPTUAL EXERCISES

FORM F

FIFTH GRADE

NAME_____

SCHOOL_____

BOY_____GIRL_____AGE_____

DATE_____

You will be part of an experimental study being conducted by Dr. Harold Mc Whinnie of the School of Art, Ohio State University to test some new materials being developed for the teaching of art. In doing the drawings in this exercise book you may use a ruler if you wish. You will be given a red and a blue pencil, use these only when you are directed to do so by the instructions in the book. For all other drawings use your black pencil. You may use an eraser whenever you need to. Be sure to follow the instructions which appear at the bottom of each page.

DO NOT OPEN THIS EXERCISE BOOK UNTIL YOU ARE TOLD TO DO SO

(2)

On this page draw a human figure. You will be given 5 minutes to do so.

S T O P

On this page draw a tree and a house. You will be given 10 minutes to do so.

S T O P

VISUAL INFORMATION:

The art lessons that are to follow will explore some of the ways in which we deal with the world that we see. When you read a book or work the answer to a problem you learn how to use facts, ideas, numbers, and words. These are called pieces of information. When we look at people or things about us in the world we also handle a form of information which we will call visual information. In these drawing leasons we are going to explore some of the ways in which we handle or make use of this visual information. These will in part be lessons in how we see!

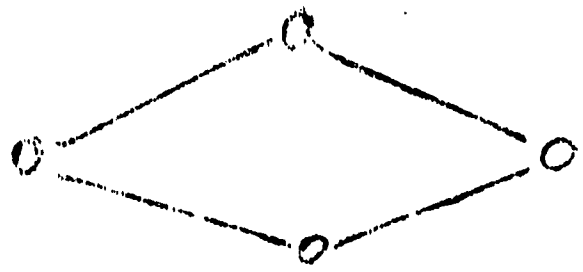
GO ON TO THE NEXT PAGE

LESSON ONE

TWO IN ONE

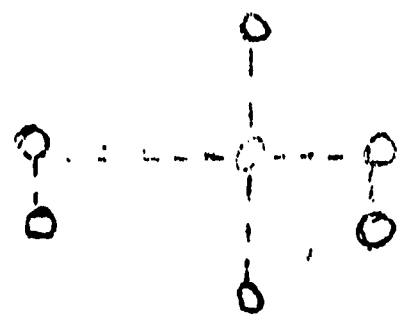
HERE IS OUR

SHAPE A



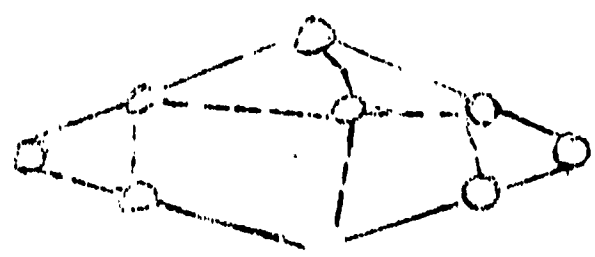
HERE IS OUR

SHAPE B



HERE IS OUR NEW

SHAPE C



In figure C, which shape is easier to see, A or B?_____

You should be able to see shape A easier than shape B.

Dis you? _____ Yes _____ No

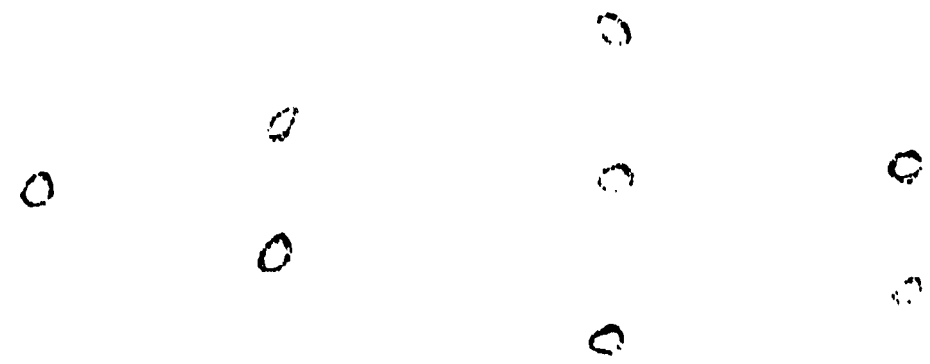
GO ON TO THE NEXT PAGE

The reason why it was easier to see shape A instead of shape B was because shape B was made with dotted lines. In order for our eyes to see shape B we had to connect those dotted lines. Our eyes had to be used more in order for us to be able to see shape B instead of shape A.

NOW YOU COMBINE THE SHAPES A AND B IN FOUR DIFFERENT WAYS

On the next two pages you will be given four figures which are made up of dots. These dots can be used to make shape C. Draw each of these figures by following the instructions that are printed below each pattern of dots. (You may look at shape C on the previous page as often as you wish.

(1)



DRAW BOTH SHAPES A AND B WITH DOTTED LINES

Which shape is the easiest to see?

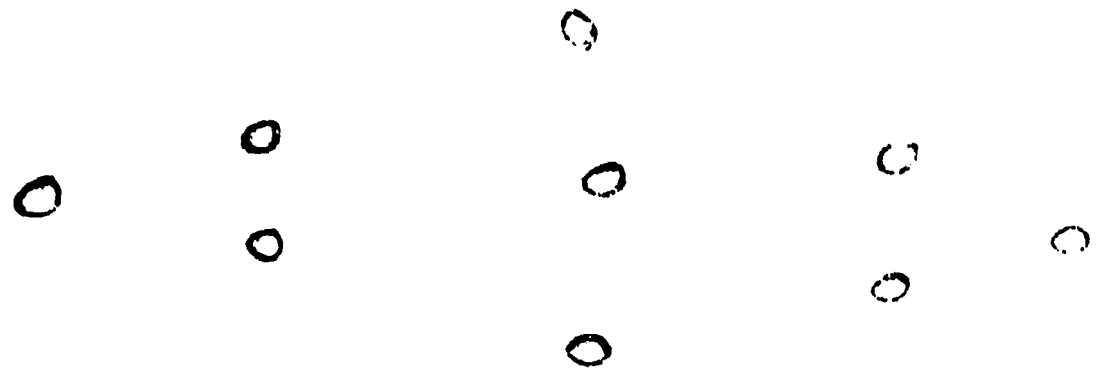
(check one)

Shape A_____ Shape B_____

GO ON TO THE NEXT PAGE

(7)

(2)



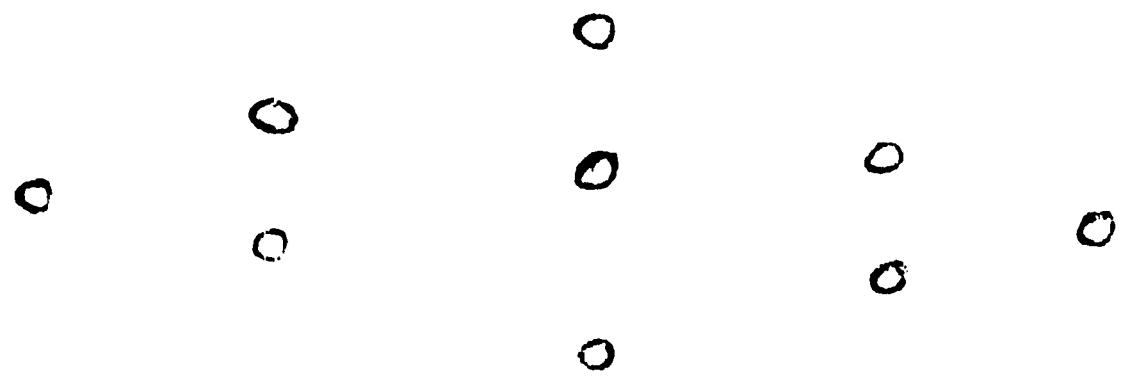
DRAW BOTH SHAPES A AND B WITH SOLID LINES

Which shape is the easiest to see?

(check one)

Shape A _____ Shape B _____

(3)



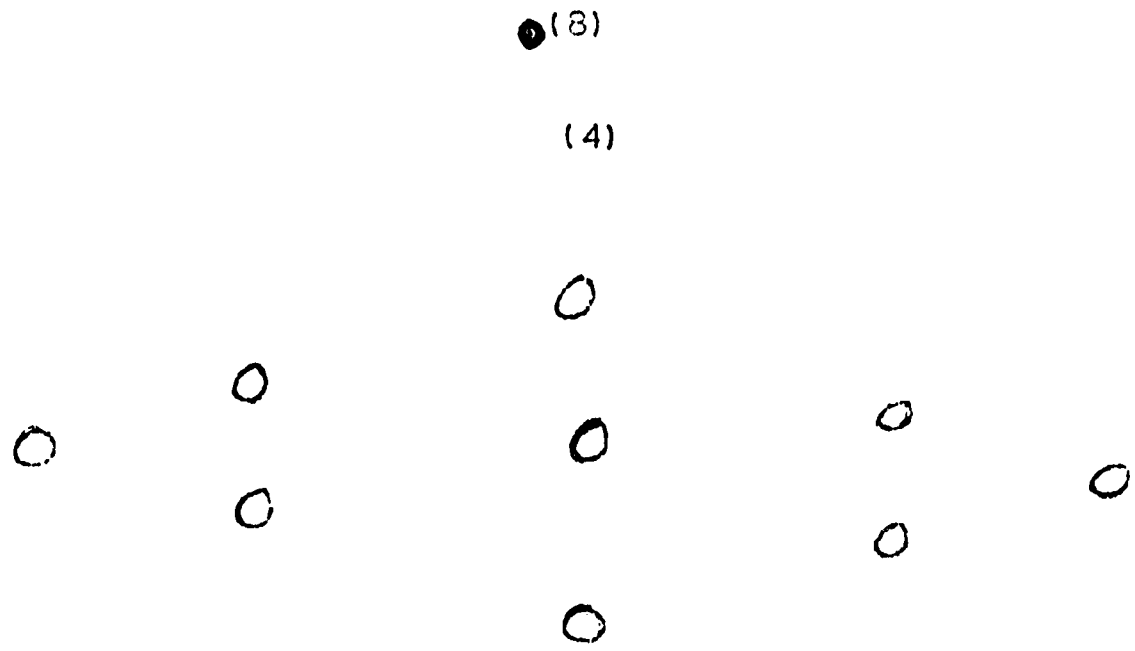
DRAW <u>SHAPE A</u> WITH DOTTED LINES: DRAW <u>SHAPE B</u> WITH SOLID LINES

Which shape is the harder to see?

(check one)

Shape A _____ Shape B _____

<u>GO ON TO THE NEXT PAGE</u>



DRAW <u>SHAPE A</u> WITH SOLID LINES: DRAW <u>SHAPE B</u> WITH DOTTED LINES

Which shape is the harder to see?

Shape A _____ Shape B _____

<u>S T O P</u>

<u>CLOSE YOUR EXERCISE BOOK</u>

FOR THE TEACHER: -

(1) Give your class some pieces of red paper.

(2) Have them cut red circles  of the same size and shape.

(3) Fix a small piece of masking tape on back of red disks.

(4) Have each child select an object (brought from home) and place the red disks at those parts of the object which seem to be the most important.

(5) Have the children draw their object.

GO ON TO THE NEXT PAGE

Draw your object here. You may use pencil or colors if you wish.

S T O P

LESSON TWO

POINTS OF VISUAL INFORMATION

The X 's in figure A show those points that give to us the most information about what the picture should look like.

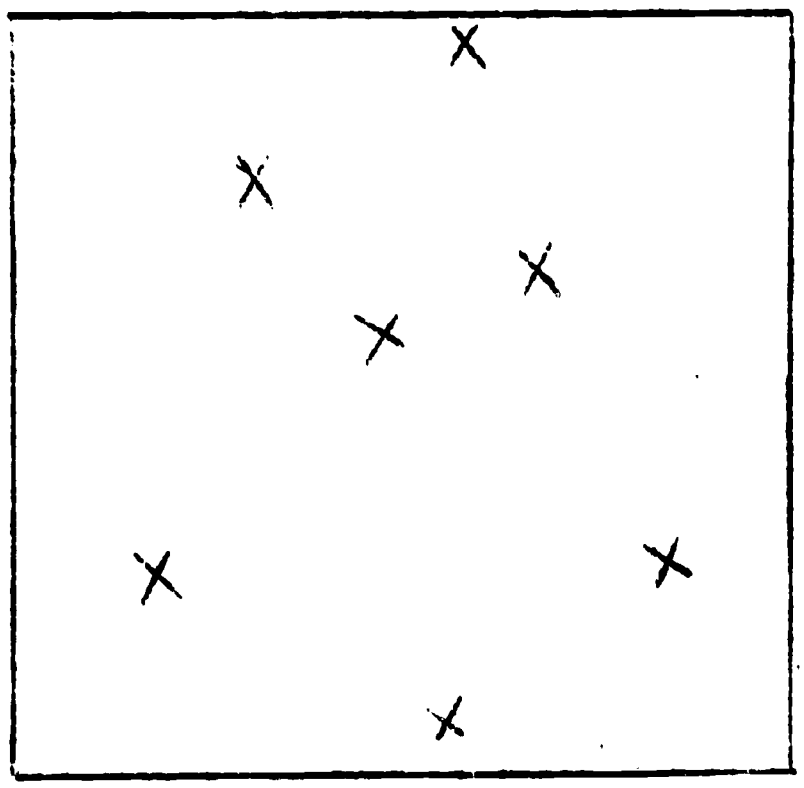


FIGURE A

GO ON TO THE NEXT PAGE

Notice what happens when we connect the X's with a continuous outline around the outside of the shape.

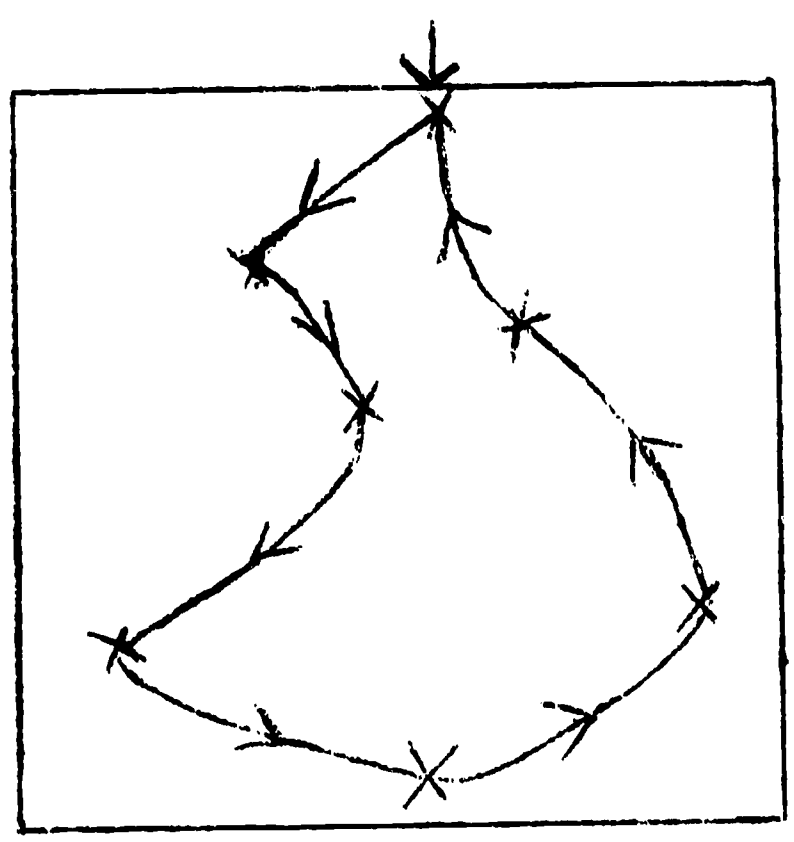


FIGURE B

Now, you connect the X's with an outline. See what shape you will make.

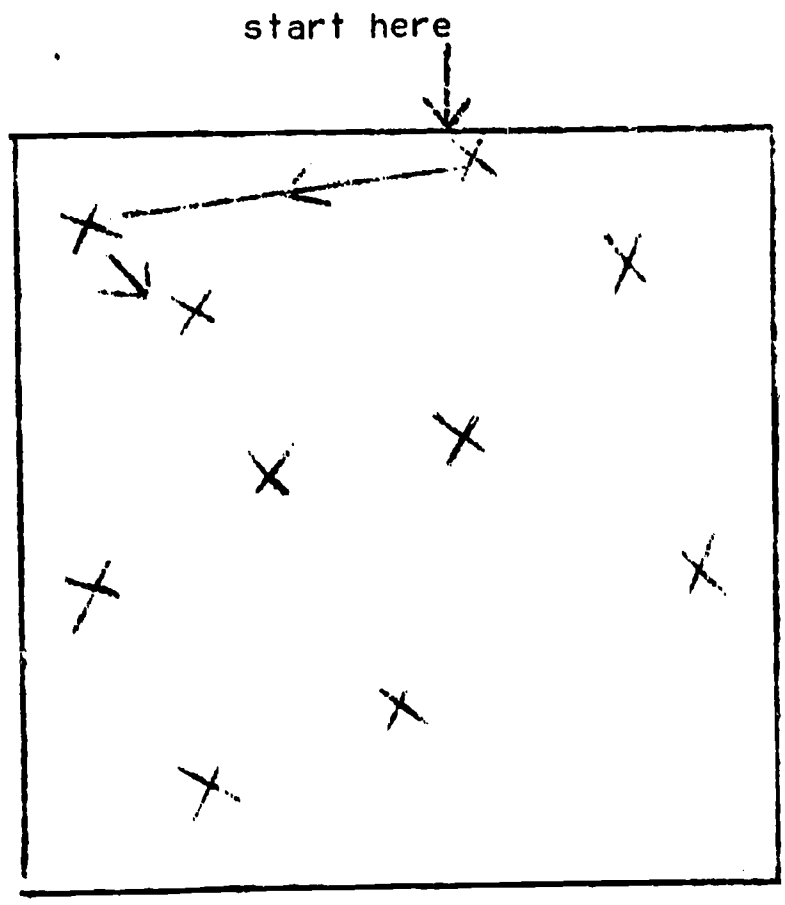


FIGURE C

GO ON TO THE NEXT PAGE

Try another picture.

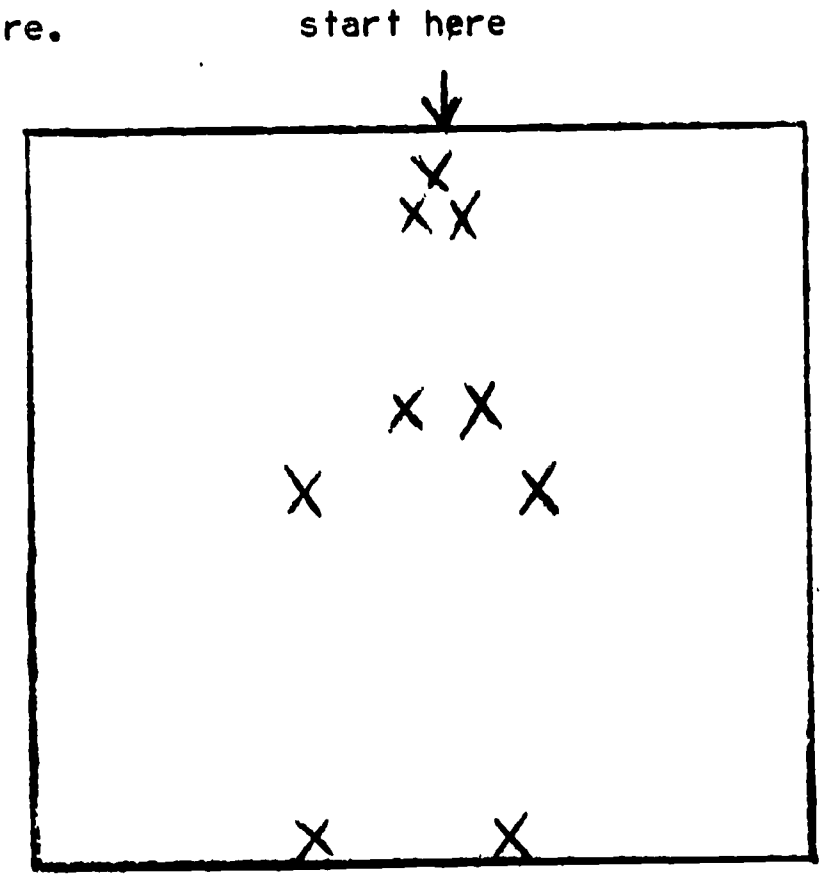


FIGURE D

The X 's can also represent an actual object.

When we connect the X 's with an outline below we will get a picture of a bottle.

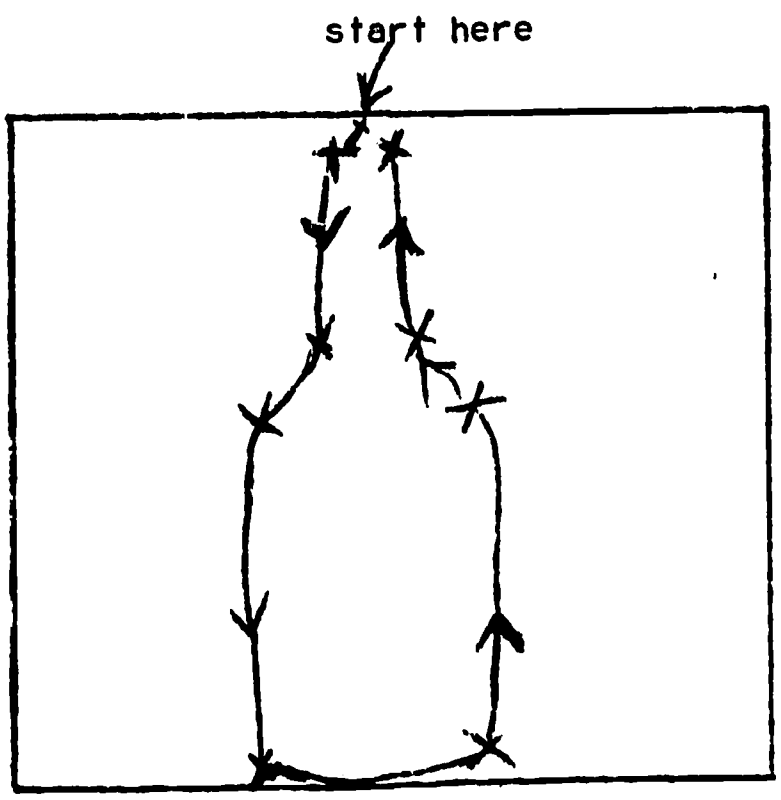


FIGURE E

GO ON TO THE NEXT PAGE

Now, you connect the X 's in our next picture

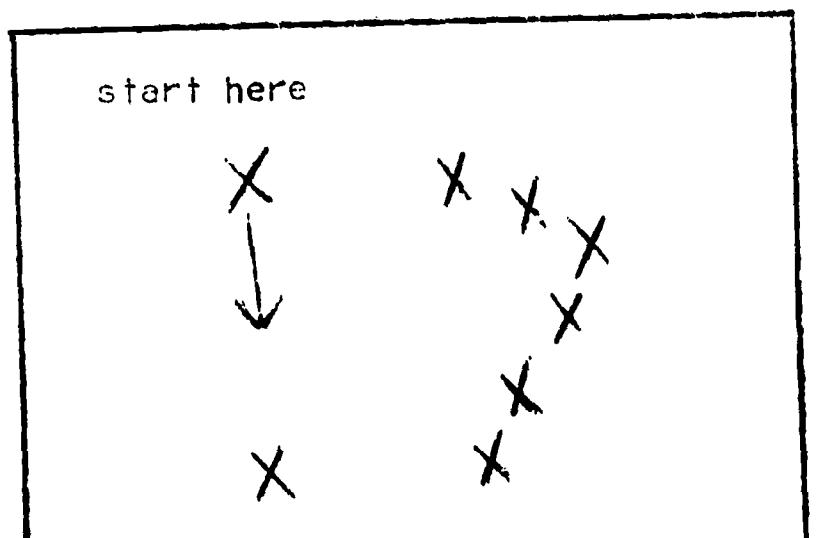


FIGURE F

Does the shape you made look like a cup?

YES ☐ NO ☐

Now, take a new figure and connect the X 's

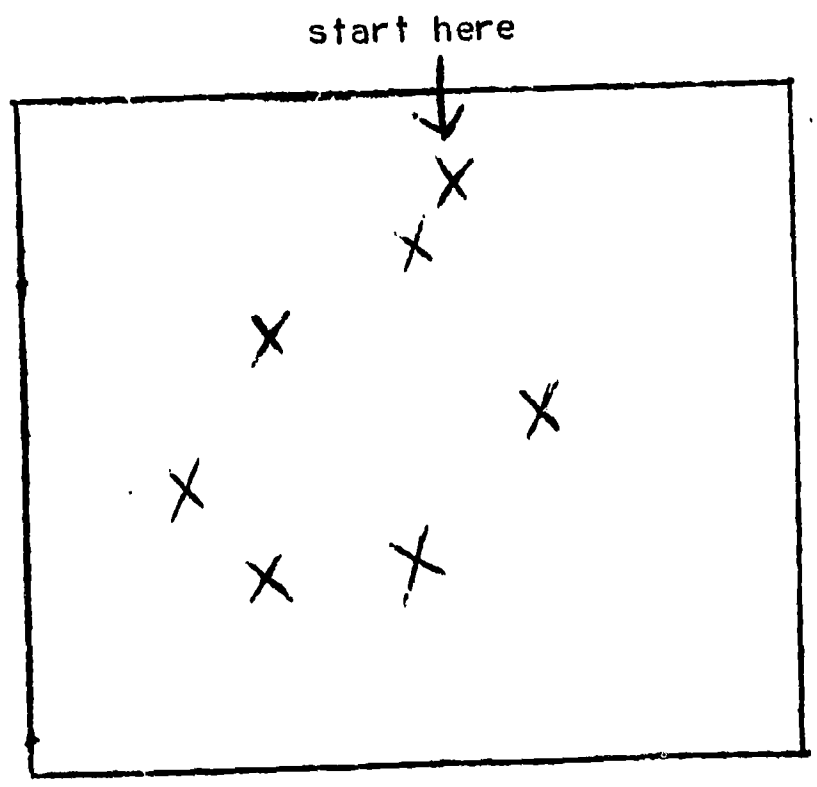


FIGURE G

GO ON TO THE NEXT PAGE

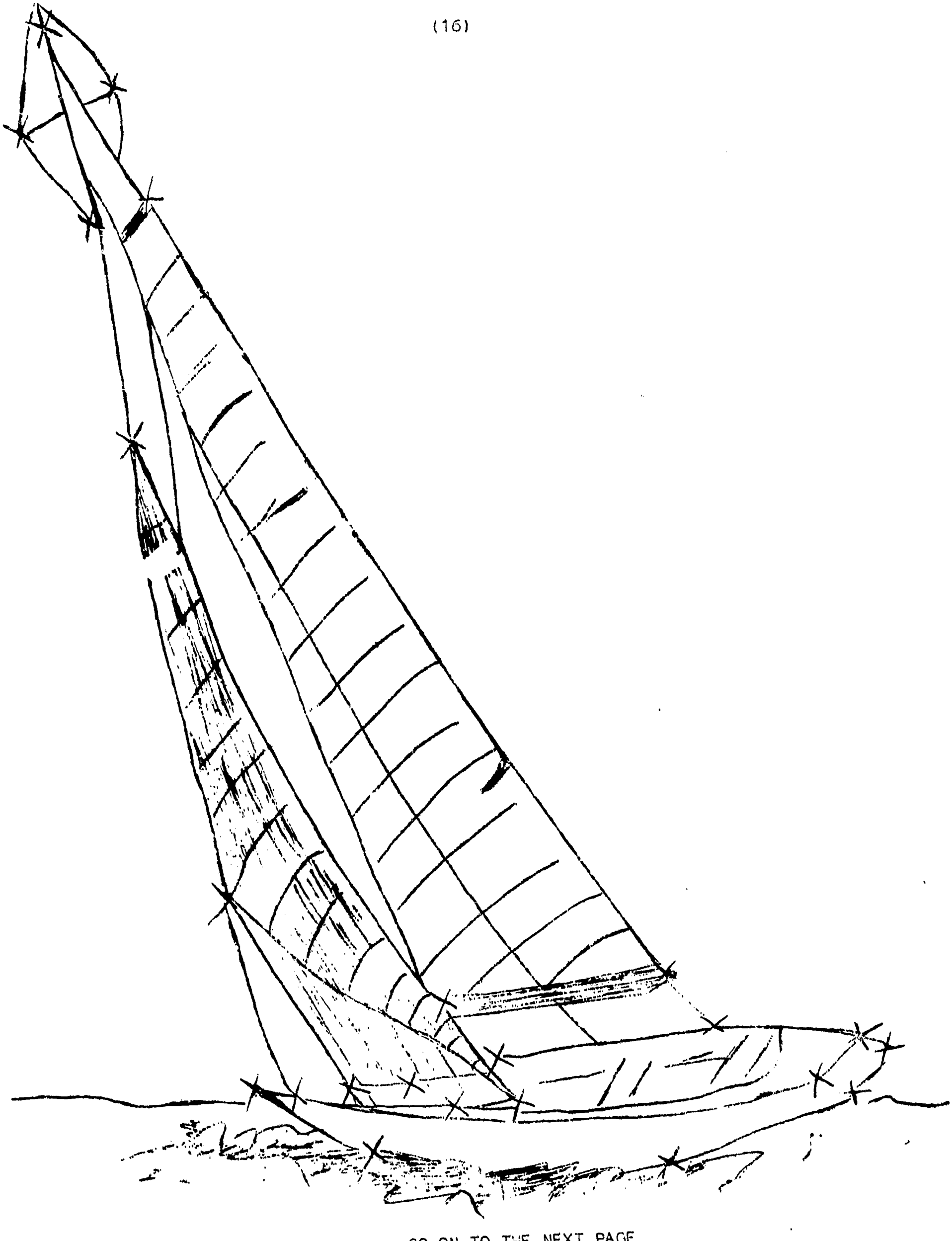
Does the shape that you just created look like a pear?

YES ☐ NO ☐

On the next page there is a picture of a sailboat.

On this photograph we have marked with 's those <u>points of visual information</u> which are most important.

GO ON TO THE NEXT PAGE



GO ON TO THE NEXT PAGE

On this picture mark with your pencil those points that seem to be most important to you.

GO ON TO THE NEXT PAGE

STILL LIFE DRAWING

On the table at the front of the room we have grouped a collection of objects for you to draw. On these objects we have glued Red ○'s. These dots represent our points of visual information.

You are now to make a drawing of this still life. Pay special attention to these Red ○'s.

TO THE TEACHER:

Have the children draw the still life on 12 x 18 manila paper. They may use crayons or chalk.

They should have about 30 minutes to do this lesson.

S T O P

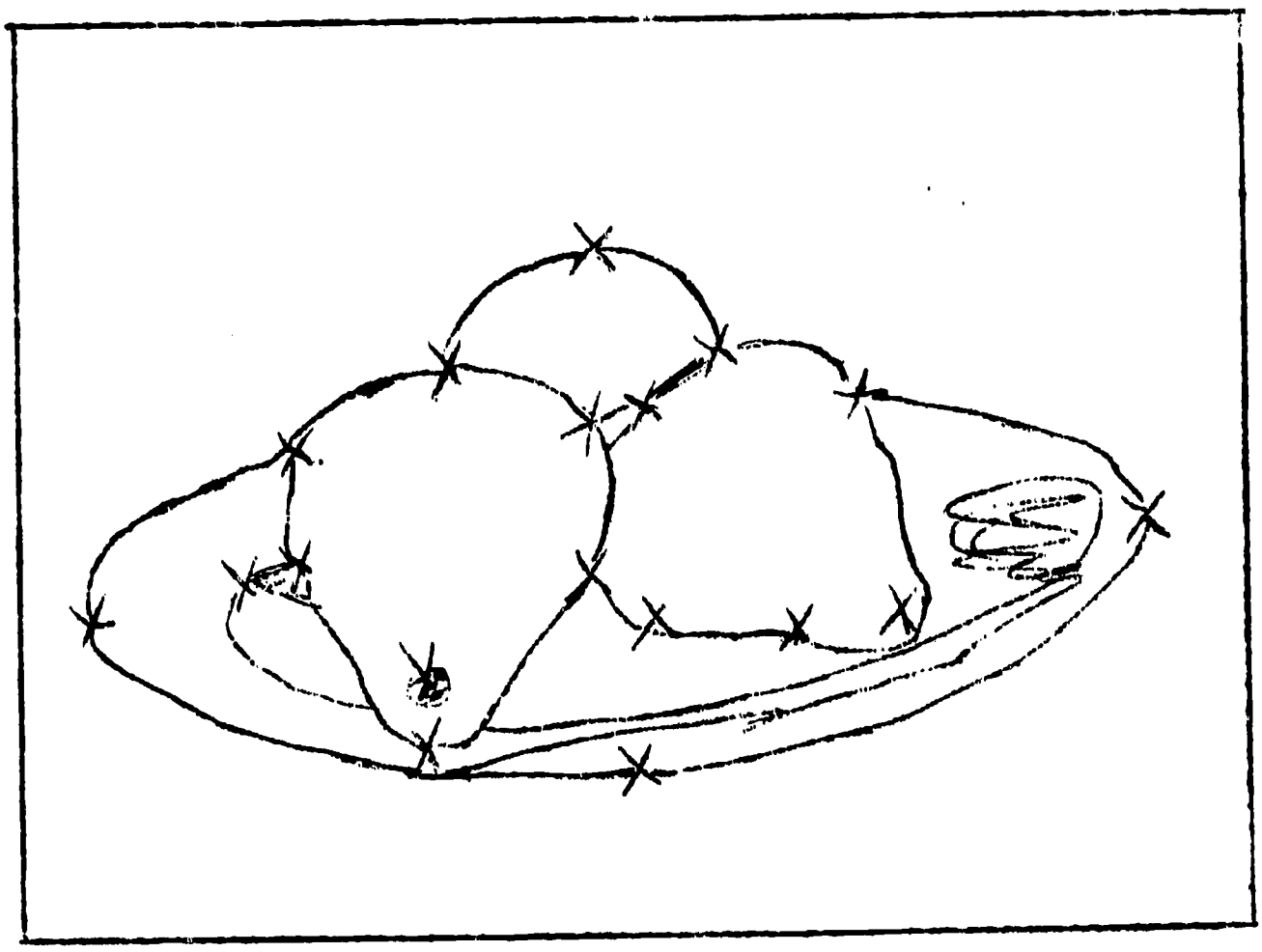
CLOSE YOUR EXERCISE BOOK

LESSON THREE

VISUAL INFORMATION POINTS

If you will remember our last lesson, we learned about points of visual information. We also did a still life drawing in which we tried to see how those information points could be used in a drawing.

(Show slide of painting)



(1)

In this example of a painting by the French painter Paul Cezanne let us mark those points in the painting which give to us the basic shape of the painting.

GO ON TO THE NEXT PAGE

FOR THE TEACHER:

(1) Have the children use their red dots from Lesson one and place them over the slide on the screen at the points of information.

(2) Show next slide.

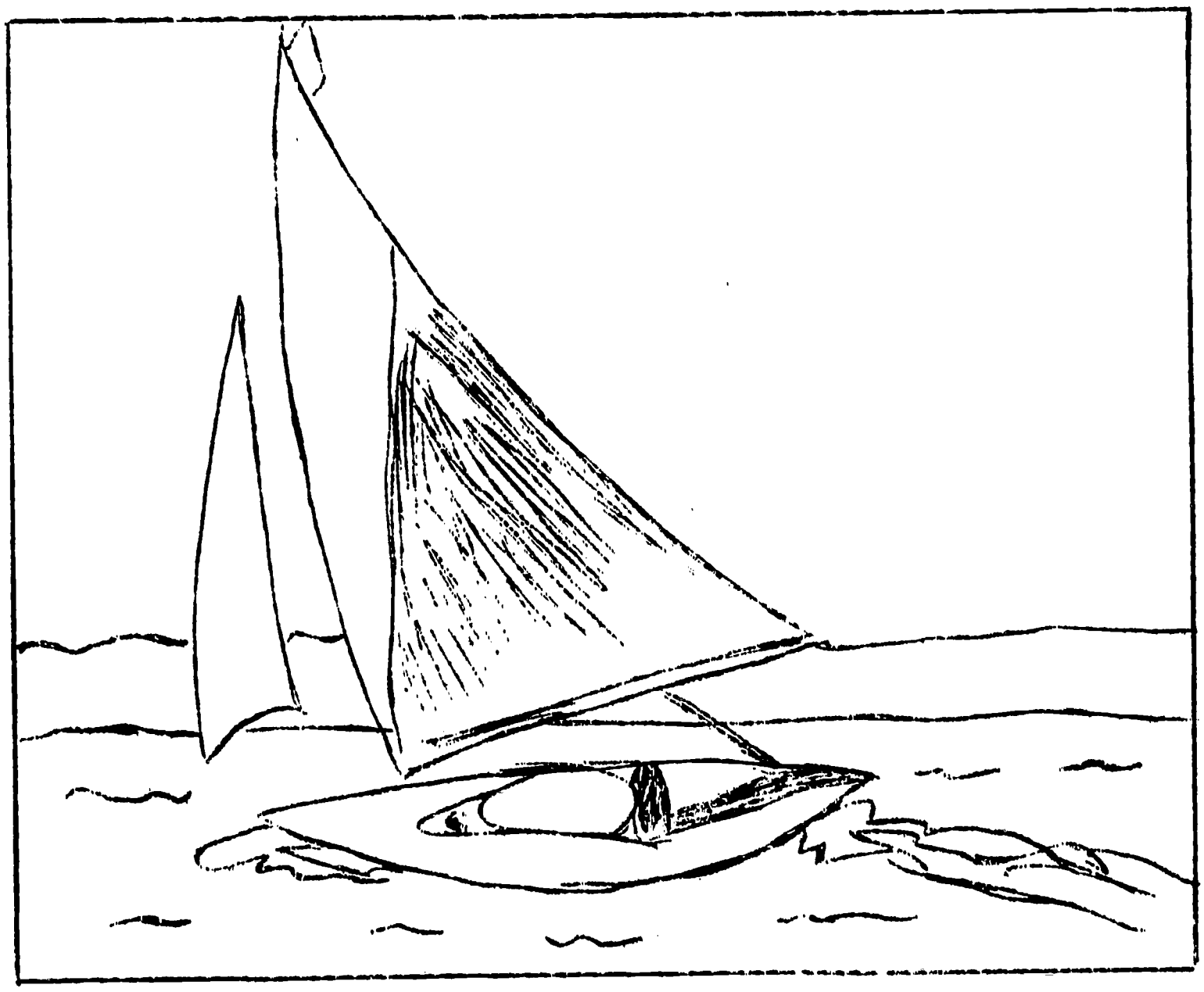
(3) Repeat with dots.

(4) Show next slide.

(5) Repeat with dots.

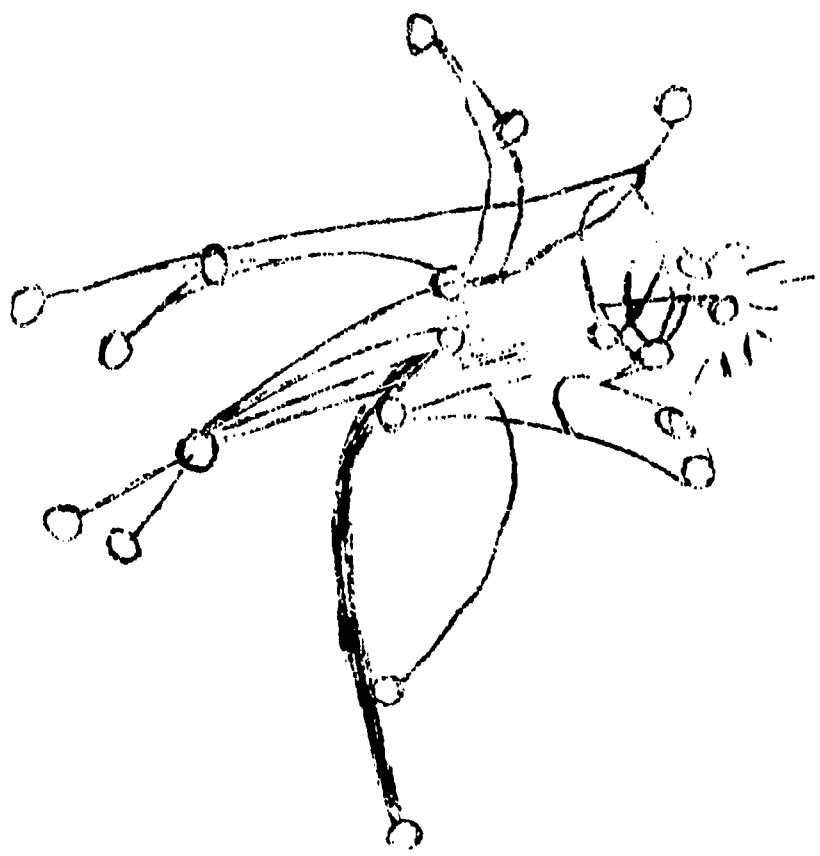
GO ON TO THE NEXT PAGE

Let us take another picture. This time you mark with your pencil those points that give us the most visual information about the picture.



On the next page you will find a picture of a flower. We have marked for you those points which are the most important.

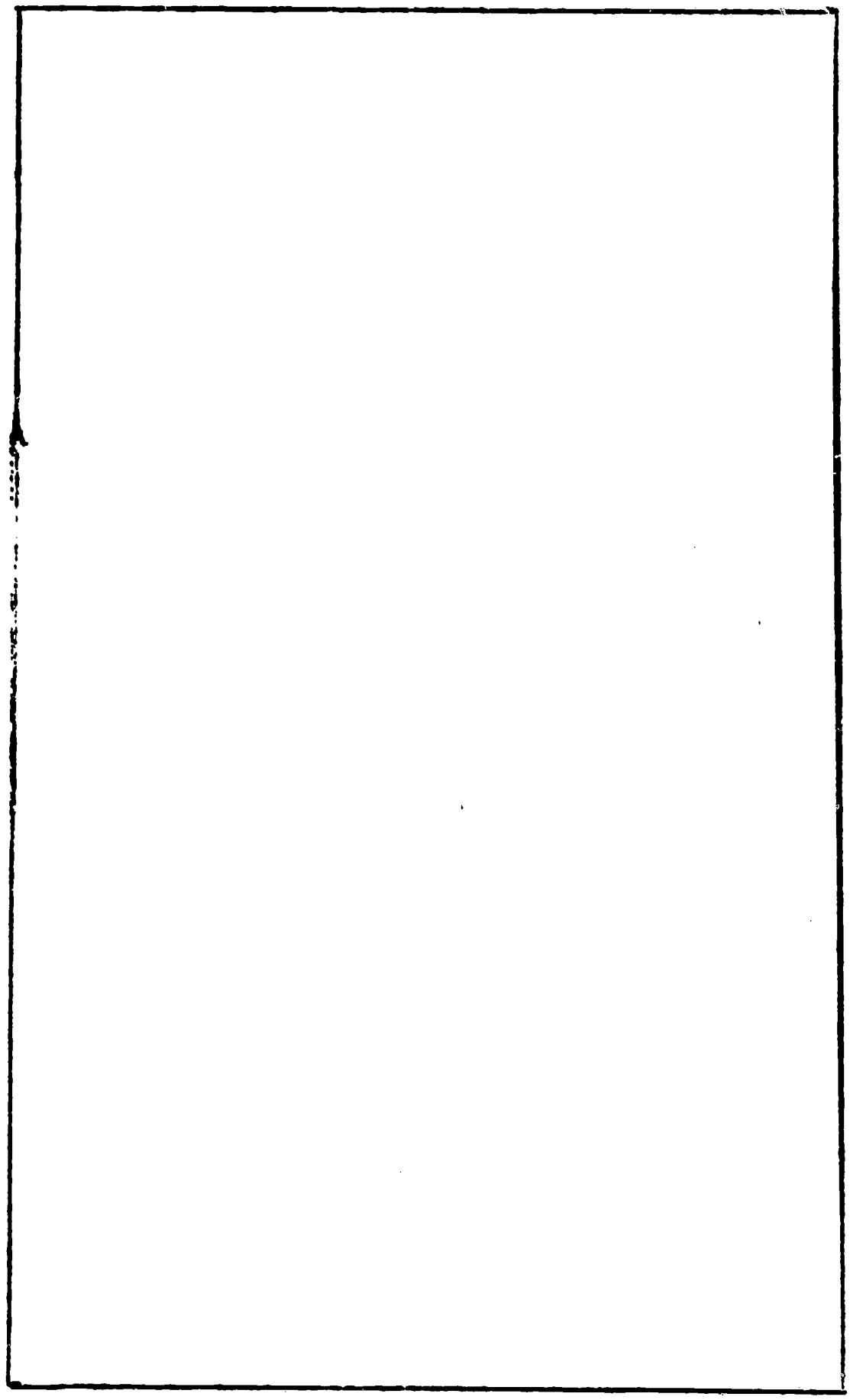
GO ON TO THE NEXT PAGE



Now, here is another picture, this time you mark those points that are the most important.

GO ON TO THE NEXT PAGE

You will now be given several bottles to draw. Make a drawing with your pencil. Try to draw the bottles as well as you can.



S T O P

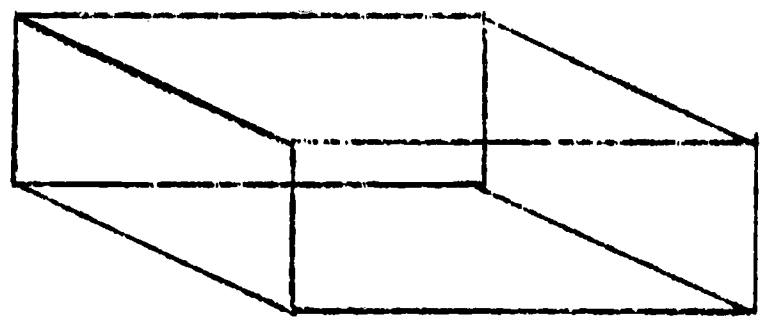
CLOSE YOUR EXERCISE BOOK

LESSON FOUR

FIND THE HIDDEN PATTERN

In this lesson we will be drawing some boxes and making designs.

LOOK AT THIS BOX



Can you see the top

_____

(If you cannot see the top please raise your hands)

If you can see the top of the box, label the sides of the box as follows:

top - A

front - B

back - C

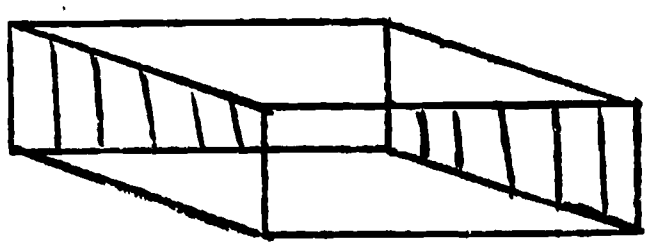
bottom - D

left side - E

right side - F

GO ON TO THE NEXT PAGE

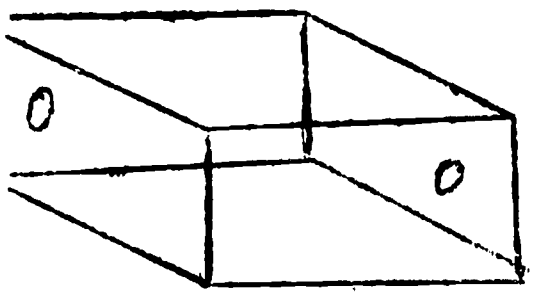
In the drawing below parts os some of the sides of the box have been filled in with lines to form patterns.



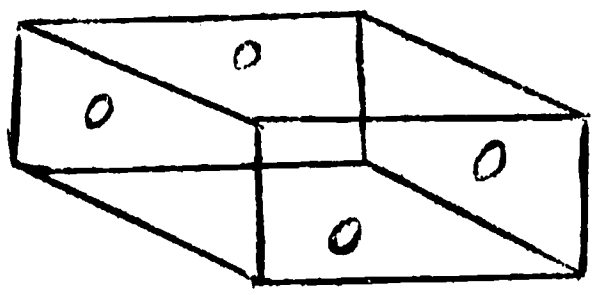
Can you still see the outline of the box?_____

If the answer is yes, then trace over the outline of the box with your black pencil.

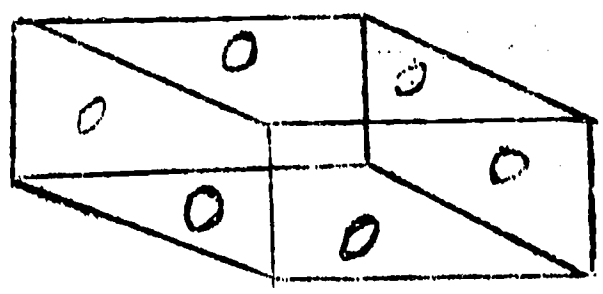
BELOW YOU WILL FIND THREE MORE BOXES. LOOK AT THE SECTIONS OF THESE BOXES WHICH ARE MARKED WITH A . FILL IN THESE SECTIONS WITH PATTERNS MADE UP OF VERTICAL LINES AS WE DID IN THE BOX ABOVE.



(a)



(b)



(c)

Which box is the more difficult to see?_____

Which box is the easiest to see?_____

Which box do you like to look at the best?_____

GO ON TO THE NEXT PAGE

On the next page there are five different patterns which may look like flage to you.

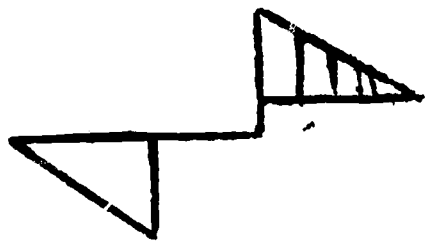
1. Draw each pattern in a box.
2. Fill in eachpattern with solid black pencil.

NOTE:

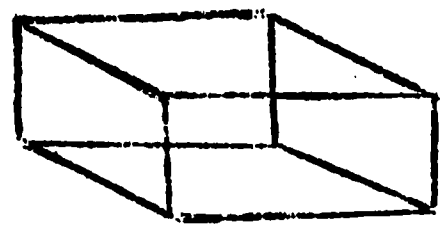
One of the flag patterns is drawn incorrectly so that it cannot be matched to a box.

1. Draw a circle around the letter of this flag pattern.
2. Draw a circle around the line in this picture pattern that has not been drawn correctly.

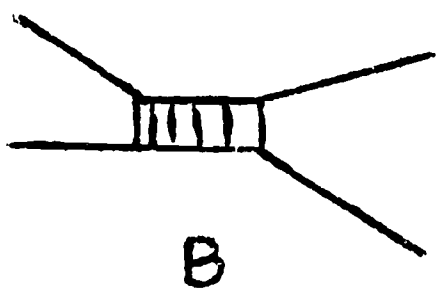
GO ON TO THE NEXT PAGE



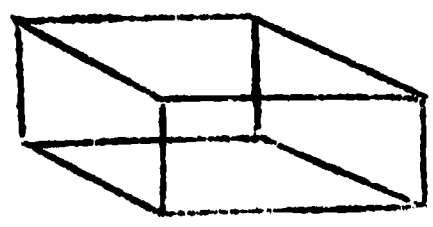
A



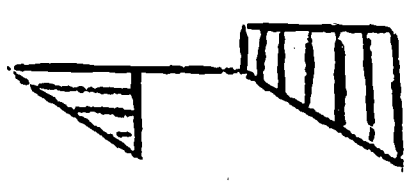
A



B



B



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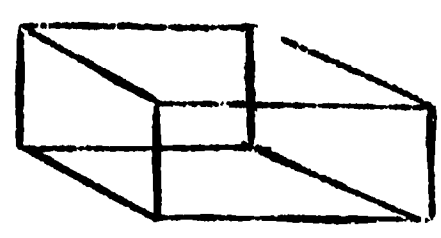
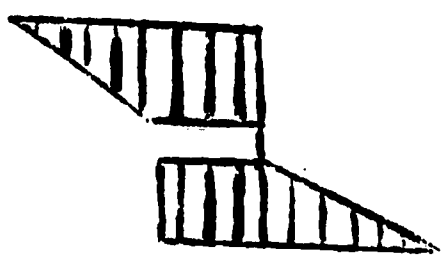
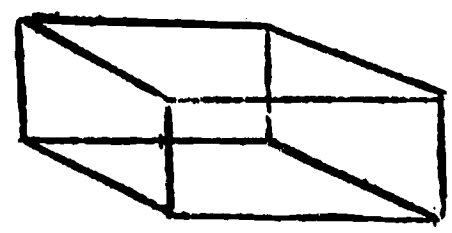


C

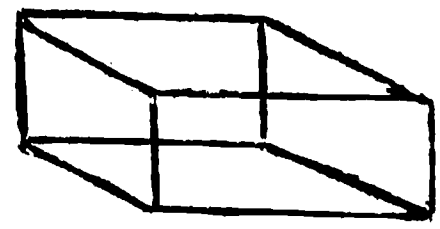


D



D

E



E

GO ON TO THE NEXT PAGE

NOW READ THIS PAGE

WE HAVE JUST HAD ANOTHER LESSON IN HOW WE SEE

When you read books about space travel for example, you are able to get a great deal of information from your reading about space. As we look at objects in the world about us we get another kind of information. This we call VISUAL INFORMATION.

In the boxes that you have just looked at on the previous two pages, was it easier to see the outline of the box than to see the hidden patterns of the flage.?

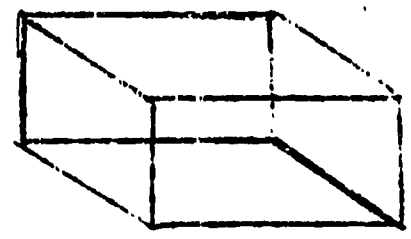
YES ☐ NO ☐

It was probably easier to see the shape of the box than it was to see the hidden patterns.

THE OUTSIDE VISUAL INFORMATION

(the outline of the box)

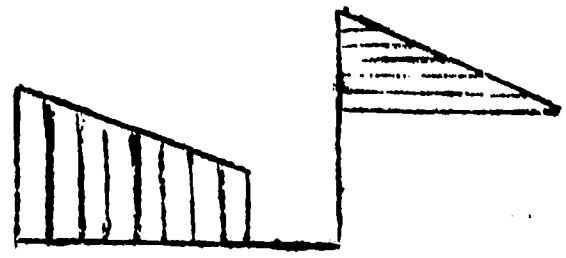
The reason for this was



is more powerful than

THE INSIDE VISUAL INFORMATION

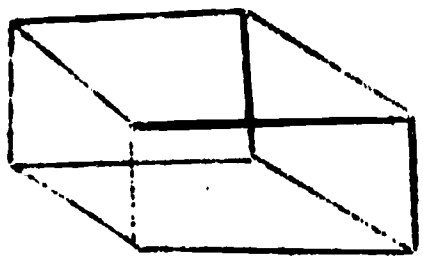
(the hidden flags)



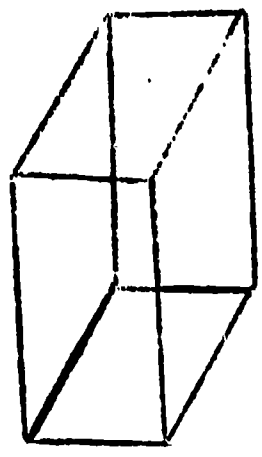
GO ON TO THE NEXT PAGE

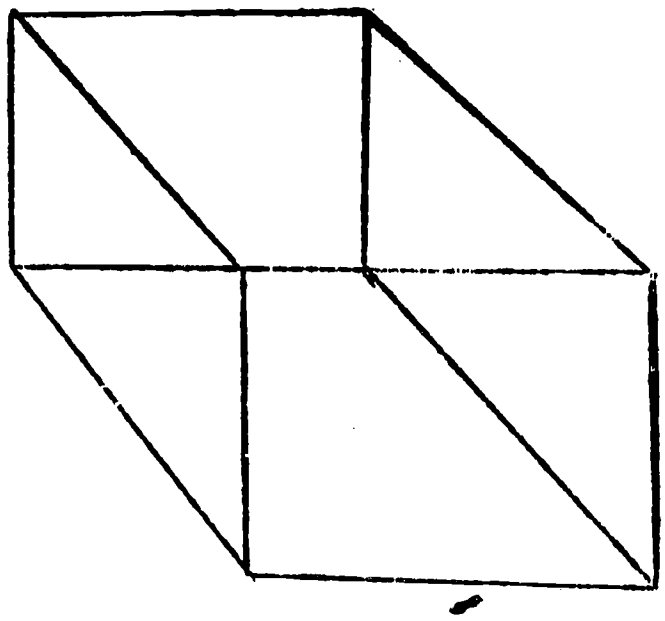
On this page you will find some new boxes.

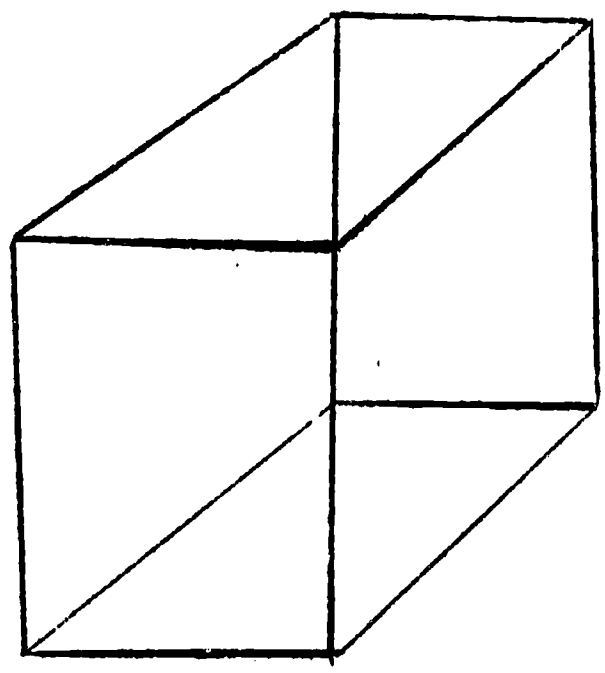
TRY TO HIDE THESE BOXES



Fill in the sides of each box with whatever patterns you wish. Try to hide the shape of each box.







GO ON TO THE NEXT PAGE

You will now be given a sheet of drawing paper. We have made a large box for you to draw. The sides of this box have been filled in with colored strings in order to create designs and many different patterns.

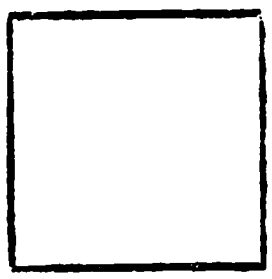
Draw this box and make it as large as you can. Pretend that there are many objects, animals, and people trapped inside this box. THIS BOX IS A LARGE JAIL! Draw the various things which you wish to have trapped in our jail. Show some of them trying to escape or get out of the jail.

You may use pencil, crayon, chalk, whatever you wish.

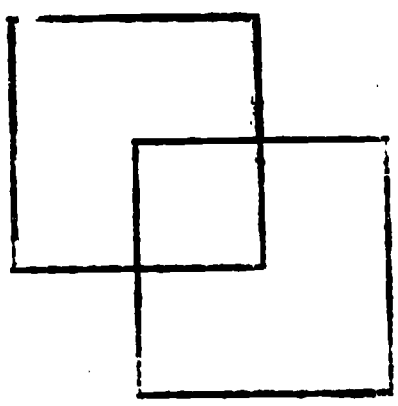
GO ON TO THE NEXT PAGE

Try to draw this box and make it as realistic as you can.

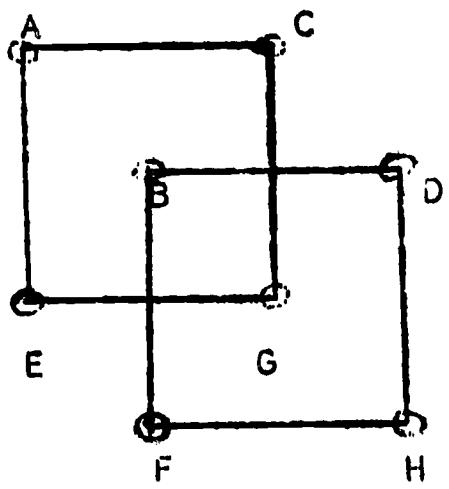
In order to make it more life-like, draw it as follows:-



(a) draw the back wall



(b) Draw the front wall over the back wall.



(c) Connect with a line points A+B

" " " " " C+D

" " " " " E+F

" " " " " G+H

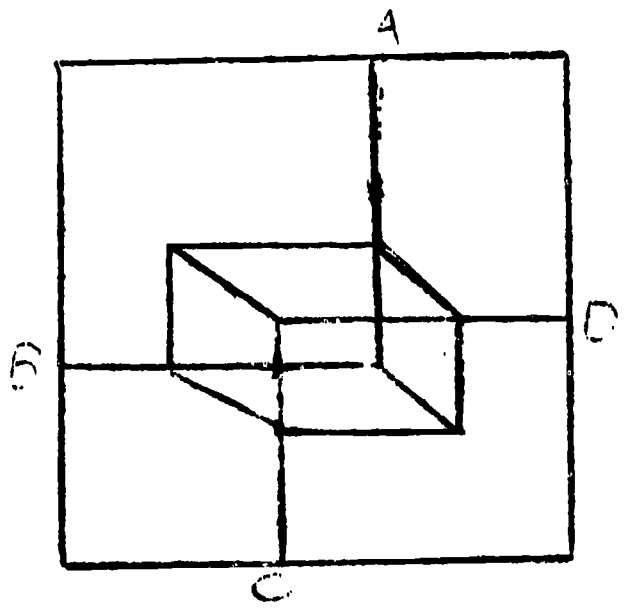
S T O P

CLOSE YOUR BOOKS

DRAWING LESSON FOUR

HIDE THE BOX

As you saw in the previous lesson, it was very difficult to hide the box by filling in the sides of it with various patterns and designs. On the next two pages you will find our boxes again, but this time we will try to hide the box by drawing the patterns on the outside of these boxes.



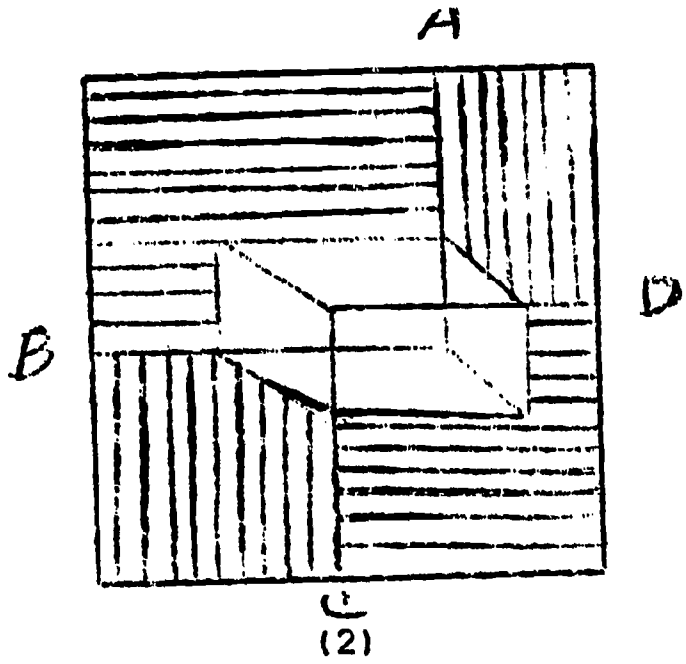
(1)

We have taken our box shape and have drawn lines A, B, C and D to the edges of our picture.

Can you still see the box?

GO ON TO THE NEXT PAGE

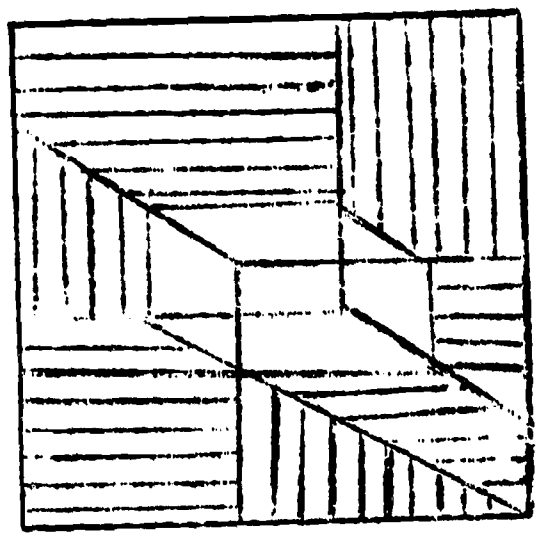
Fill in this box with some patterns.



(2)

Can you still see the box?

Now, let us change some of the lines.



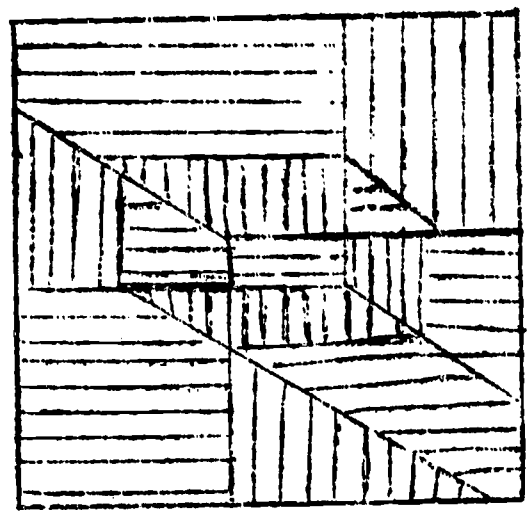
(3)

With your pencil trace over those lines that we changed.

Can you still see the box?

GO ON TO THE NEXT PAGE

Let us add some more lines.



(4)

Can you still see the box?

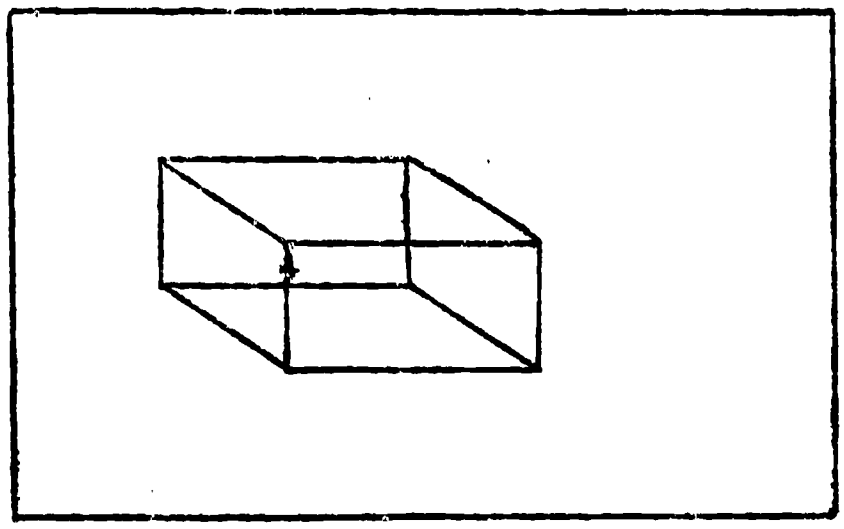
In this last picture we had to fill in both the space around the box and the spaces within the box with patterns in order to hide the shape of the box.

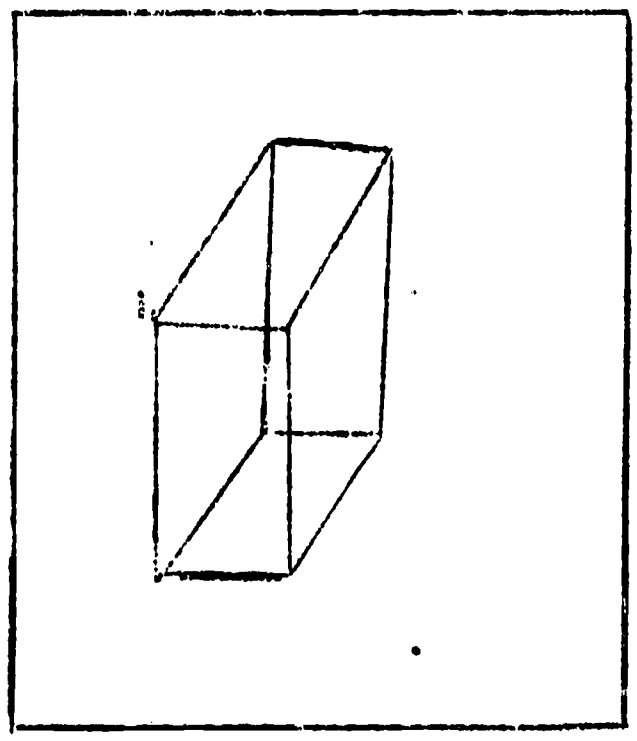
In this lesson we have tried to show you how much VISUAL INFORMATION is necessary to add in order to hide the shape of the box.

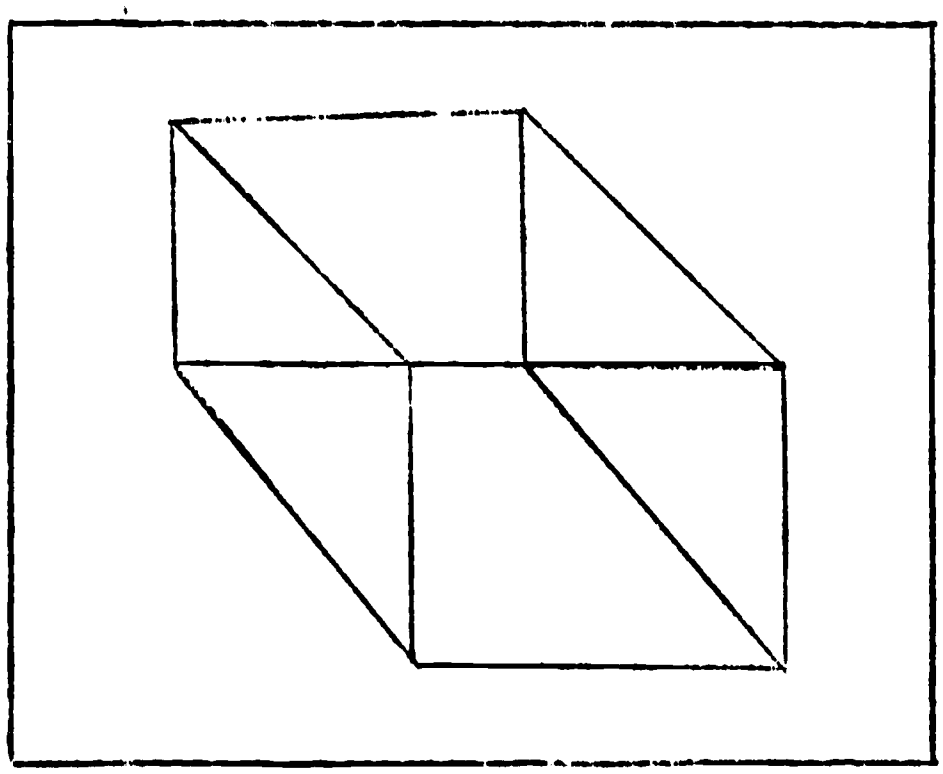
GO ON TO THE NEXT PAGE

TRY TO HIDE THESE BOXES AS WE DID THOSE ON THE LAST PAGE

(you may add whatever patterns you wish)







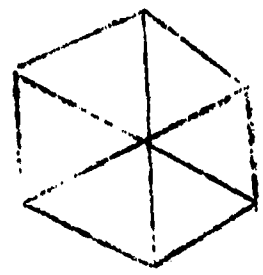
GO ON TO THE NEXT PAGE

LESSON FIVE

CHANGE THE BOX

THE BASIC IDEA OF THIS LESSON WILL BE TO SEE THAT -

If you change one part of a design or shape you will change the rest of that design or shape. We are going to draw boxes again as we did in the previous lessons. We are going to add VISUAL INFORMATION which will change the look of our box.

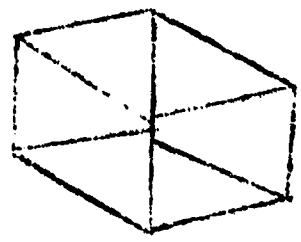


(1)

Look at the first shape, (1) it is drawn so that all of the lines are of an equal distance from the center of the design.

Can you see this shape as a box?

LOOK AT OUR NEXT SHAPE



(2)

In figure (2) some of the lines from our first shape have been made longer. The lines are no longer drawn so that they are of an equal distance from the center of the shape.

WITH YOUR PENCIL TRACE OVER THE LINES THAT HAVE CHANGED THEIR LENGTH

GO ON TO THE NEXT PAGE

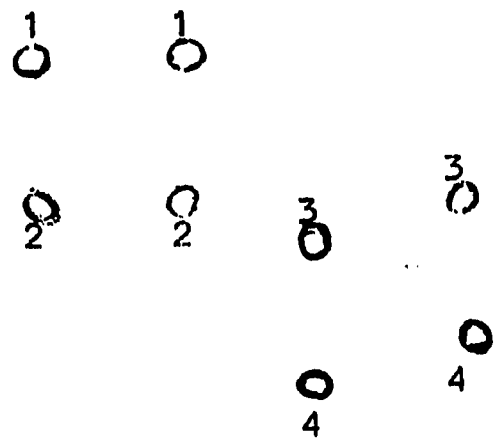
(36)

Can you see the shape of a box in figure (2)?

_____

Finish the design below (3) by connecting the ○'s with lines. In order to draw the box you must connect the ○'s in the following manner:

1. connect the two ○'s with a 1 above.
2. connect the two ○'s with a 2 above.
3. connect the two ○'s with a 3 above.
4. connect the two ○'s with a 4 above.
5. connect all of the ○'s with each other.



(3)

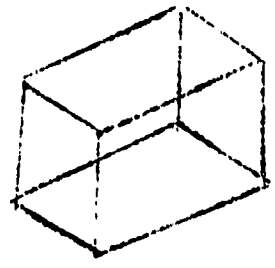
Can you find the box in the above shape?

_____

If yes, trace over the outline of this box with your pencil.

GO ON TO THE NEXT PAGE

HERE IS ANOTHER BOX



(4)

Look closely because there is a trick to this picture. There are two views of the box in the same drawing. You can look down upon the top of one box and you can look up at the bottom of the other box.

(a) WITH YOUR PENCIL TRACE OVER THE LINES OF THE BOX THAT YOU ARE LOOKING DOWN UPON.

(b) WITH YOUR PENCIL TRACE OVER THE LINES OF THE BOX THAT YOU ARE LOOKING UP AT.

also

(c) COLOR THE TOP OF THE FIRST BOX RED

(d) COLOR THE BOTTOM OF THE SECOND BOX BLUE

GO ON TO THE NEXT PAGE

You will now be given a paper plate, some toothpicks, and some balls of plasticene clay. Do the following:

1. First build some boxes using the toothpicks and the balls of clay. (The paper plate is to put beneath your boxes.)
2. The balls of clay are your ○ 's and your toothpicks are your lines. These are the items of visual information to be added to your basic shapes which you will build.
3. Change the shapes of your boxes by having the lines grow longer (the toothpicks) and by adding more ○ 's (balls of clay).

S T O P

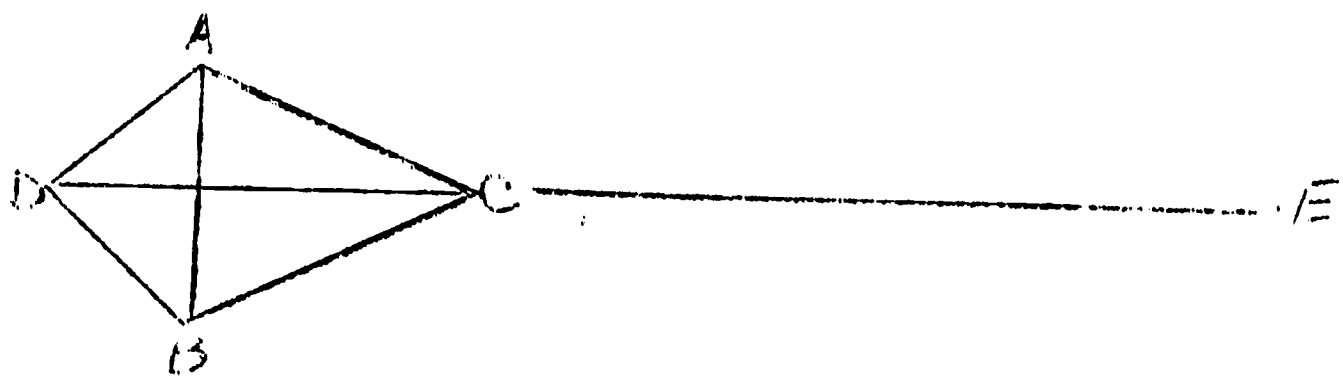
CLOSE YOUR EXERCISE BOOK

LESSON SIX

MAKE IT MOVE

The basic idea of this lesson is that by changing one or several of the basic elements in our shape, the effect of motion may be achieved in the following manner.

HERE IS OUR BASIC SHAPE

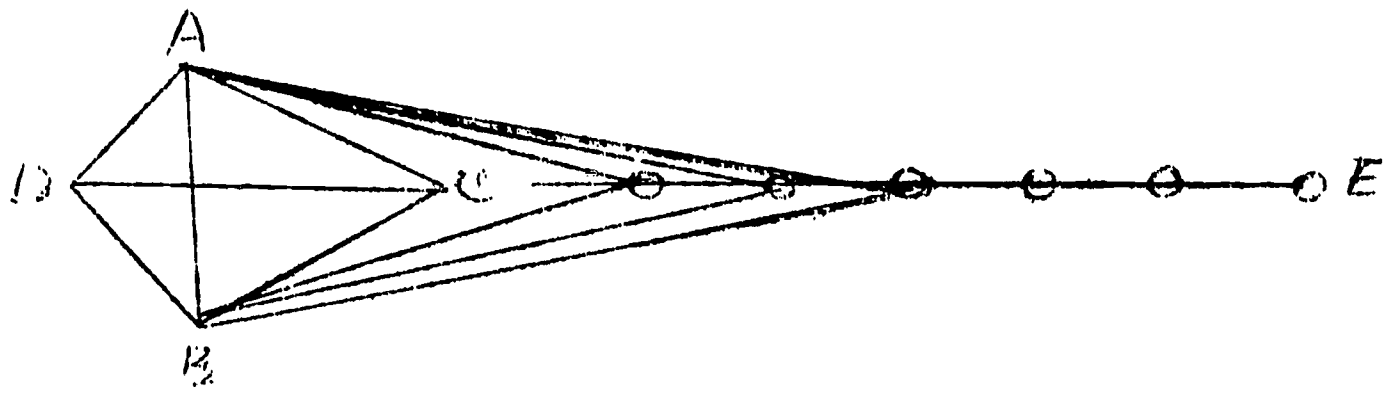


(1)

We will try to achieve an effect of motion by:

(a) adding ○'s to the outside of the design along line C____E

(b) drawing lines from these ○'s to points A and B in the figure



(2) Complete the last three sections.

Does this shape appear to be moving? _____

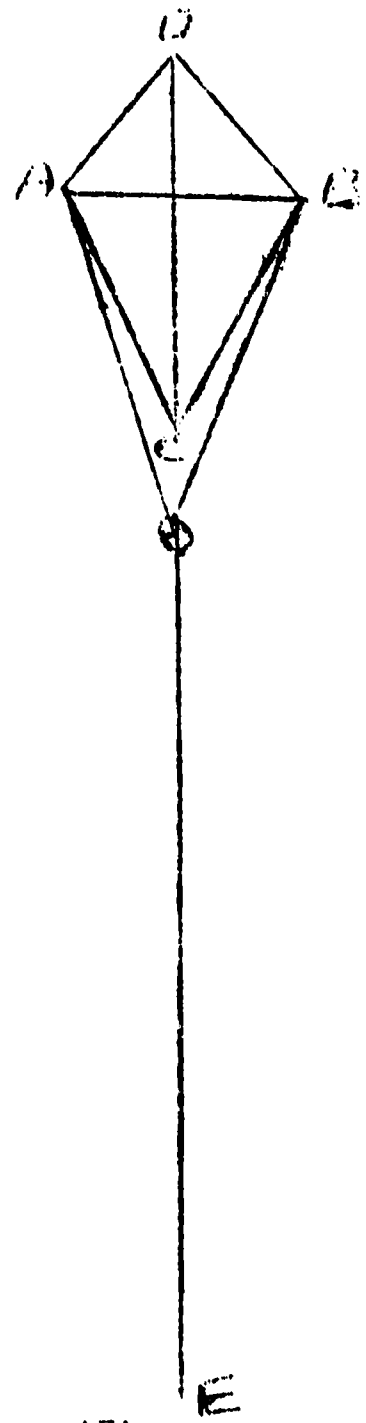
If yes, what does it look like?

_____ _____ _____

GO ON TO THE NEXT PAGE

We will now turn our first figure on its side to make it look like a kite.

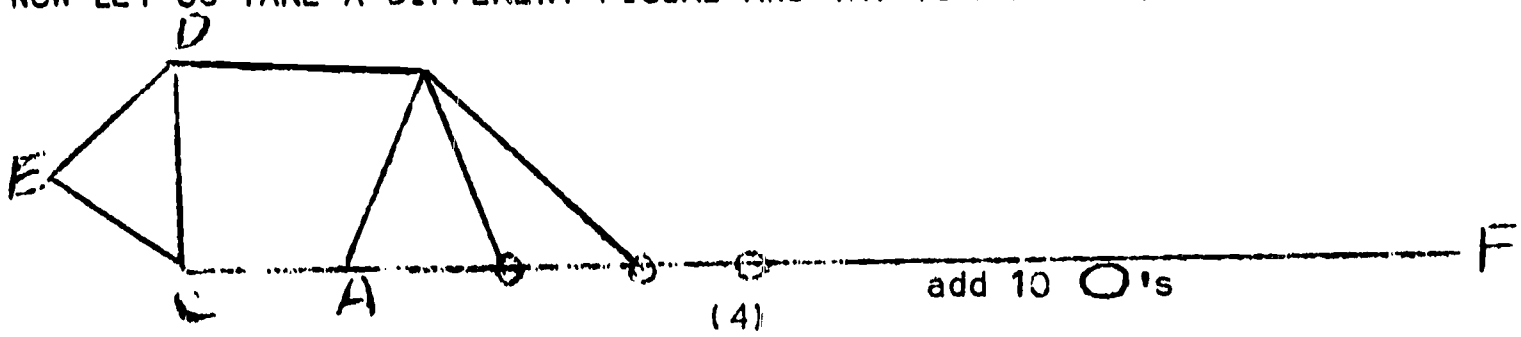
Make this figure move by adding ten O's. These O's should be placed at equal distances from each other along the line drawn from point C to point E.



(3)

Next, draw lines from points A and B to these O's.

NOW LET US TAKE A DIFFERENT FIGURE AND TRY TO MAKE IT MOVE!



(4)

GO ON TO THE NEXT PAGE

In figure (4) on the previous page do the following:

(a) Draw lines from point B to the 10 O's.

Does the figure appear to be moving?

_____

If yes, what does the figure look like to you?

_____

_____

_____

GO ON TO THE NEXT PAGE

You will now be given a sheet of 18 x 24 drawing paper.

On the table at the front of the room are some blocks of wood of various shapes and sizes. Pretend that these blocks of wood are buildings in a large city. Draw these buildings as if the city were having an earthquake and the buildings appeared to be moving.

You may use pencils or colors.

TRY TO MAKE THEM MOVE

S T O P

CLOSE YOUR EXERCISE BOOK

LESSON SIX

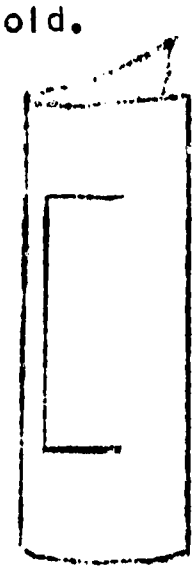
DRAW THE WINDOWS

1. Take the sheet of paper attached to this page and fold it in half.

2. Make a slot along the fold.

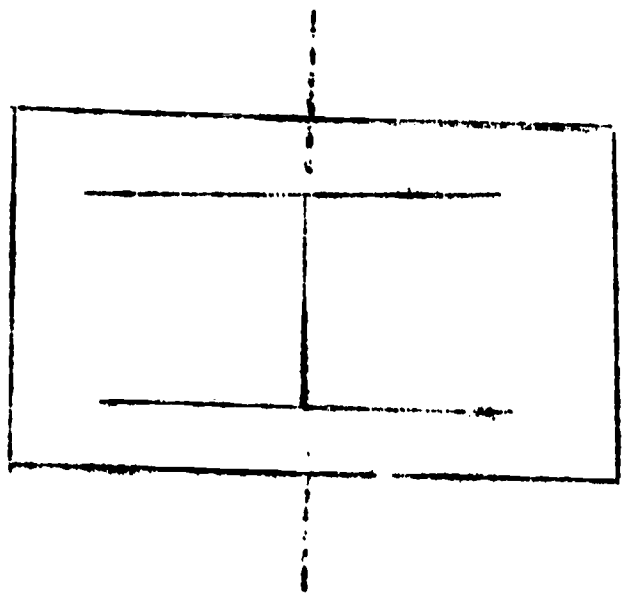
the slot to

be cut



Your paper folded

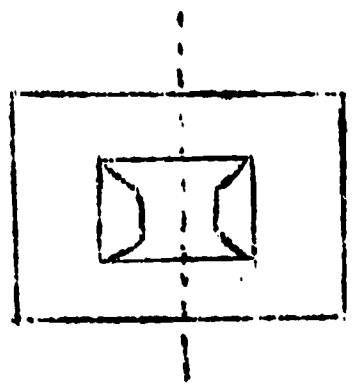
3. Cut along the lines



GO ON TO THE NEXT PAGE

4. Imagine that your piece of paper is a wall. You have just cut a window in it. Set your wall up before you.

Fold the windows back and draw it.

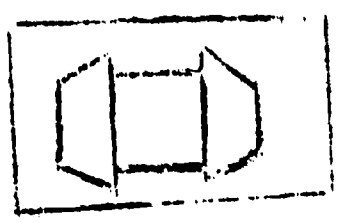


Your wall

MAKE YOUR DRAWING HERE

GO ON TO THE NEXT PAGE

5. Now fold the window outwards and draw it.



Your window

MAKE YOUR DRAWING HERE

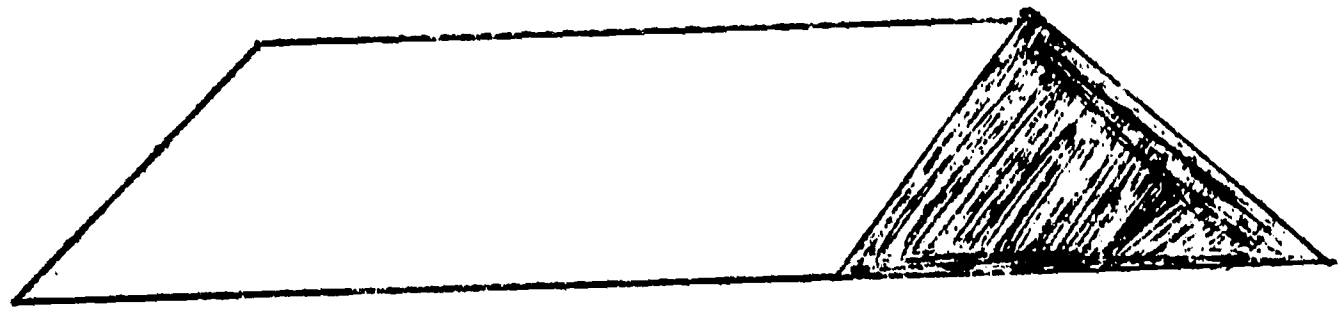
STOP

CLOSE YOUR BOOKS

LESSON SEVEN

LET'S MAKE A TENT

Fold the sheet of paper attached to this page to make a tent



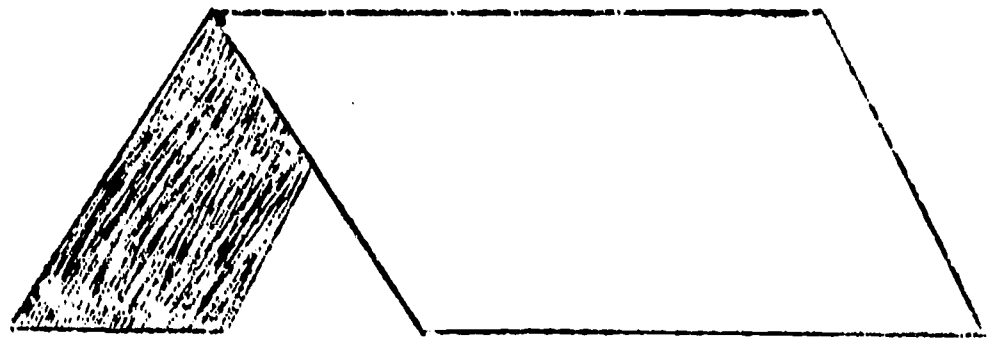
Your tent should look like this.

USE YOUR TENT AS A MODEL

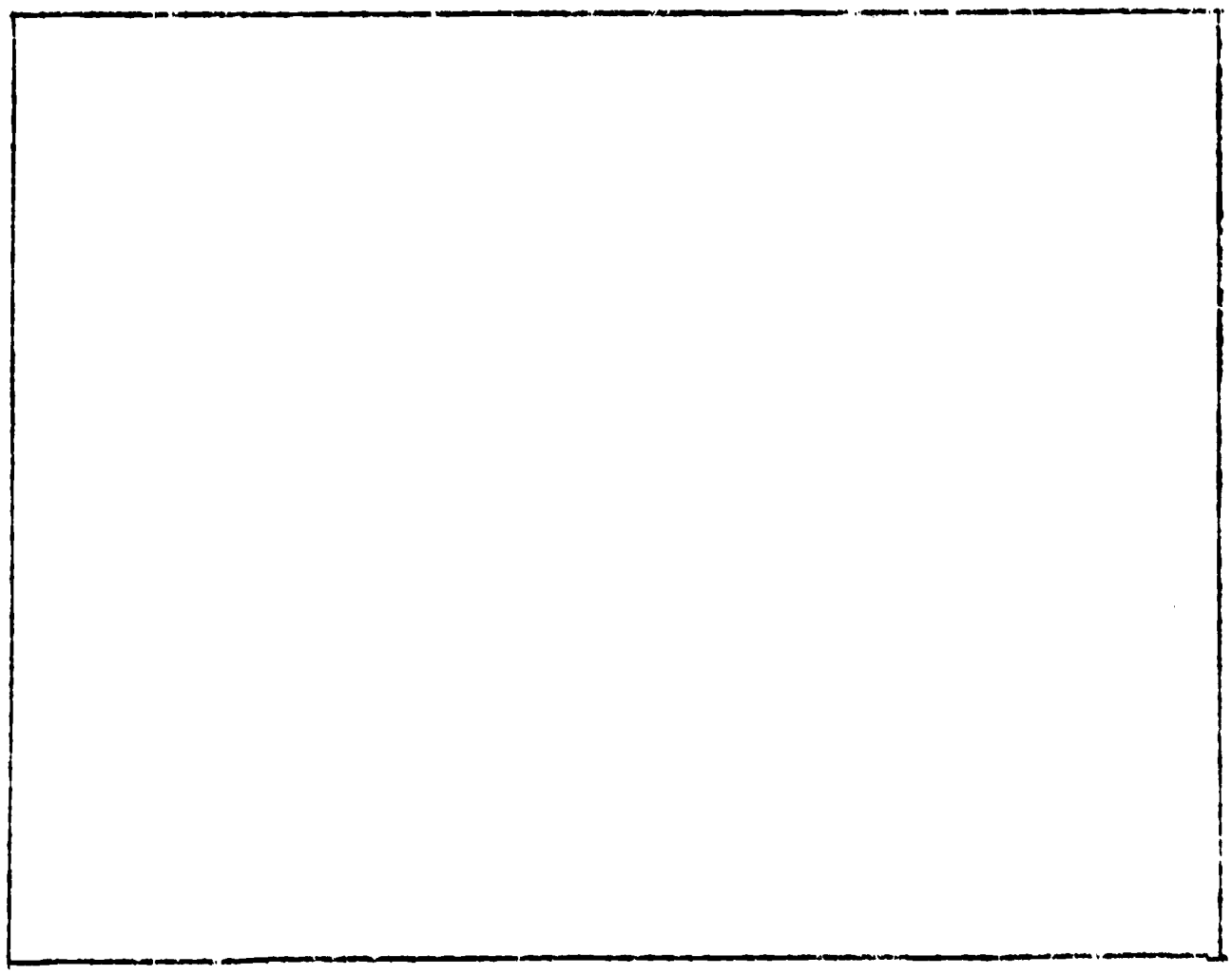
DRAW A PICTURE OF PEOPLE ON A CAMPING TRIP

GO ON TO THE NEXT PAGE

Now plan your tent so that you can see both ends.



Do another drawing of the tent, show people in front and behind the tent.



S T O P

You will now be given some bottles to draw once again. Draw them as well as you can.

GO ON TO THE NEXT PAGE

You will now be given toothpicks and some clay.

1. Make a group of figures.
2. Draw them on the sheet of 12 x 18 drawing paper which you have been given.

S T O P

CLOSE YOUR BOOK

223

On this page do a drawing of a human figure.

You will be given 5 minutes.

S T O P

On this page draw a house and a tree, you will have 10 minutes.

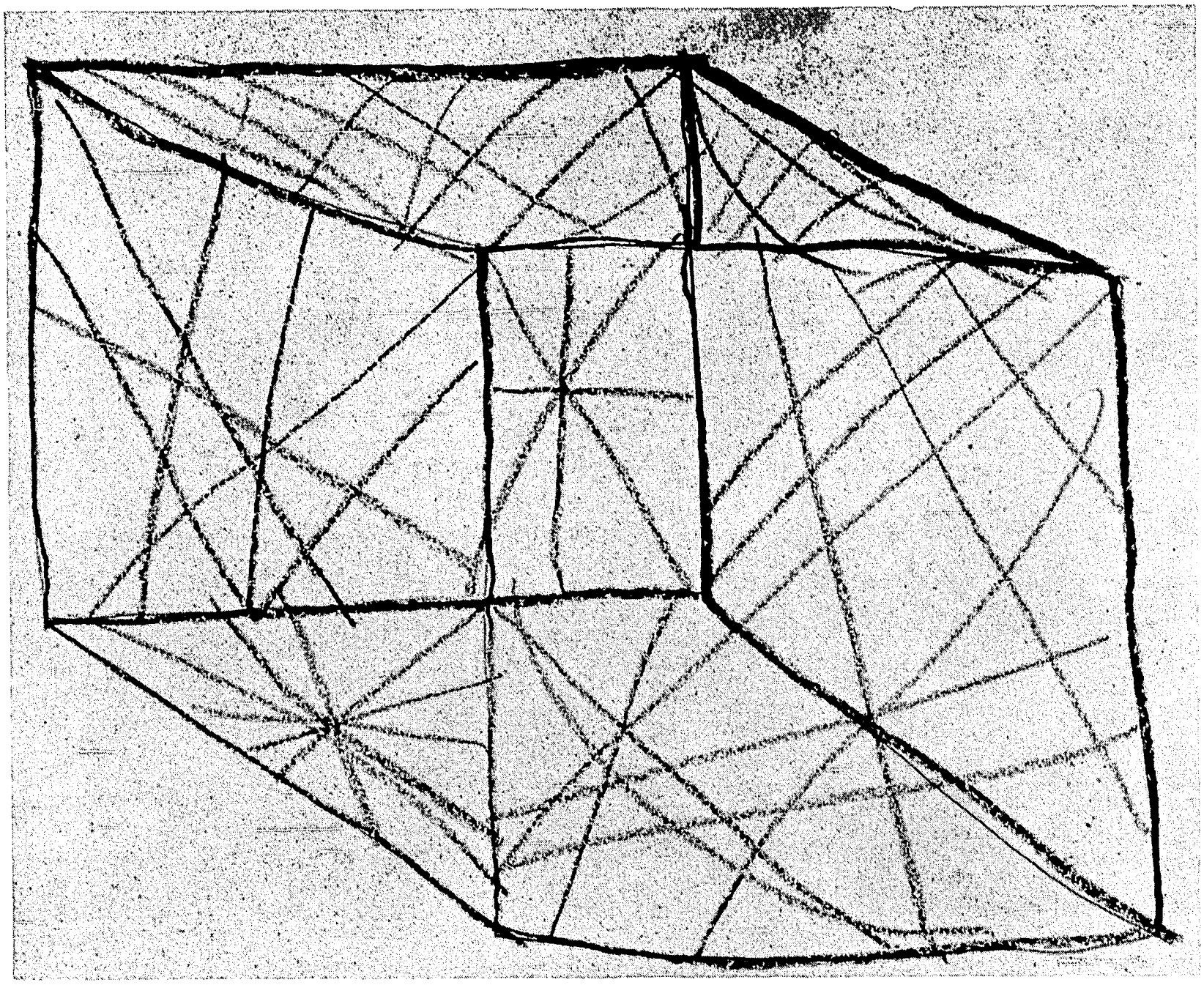
STOP

Appendix 11

Photographs of

Children's

Art Work

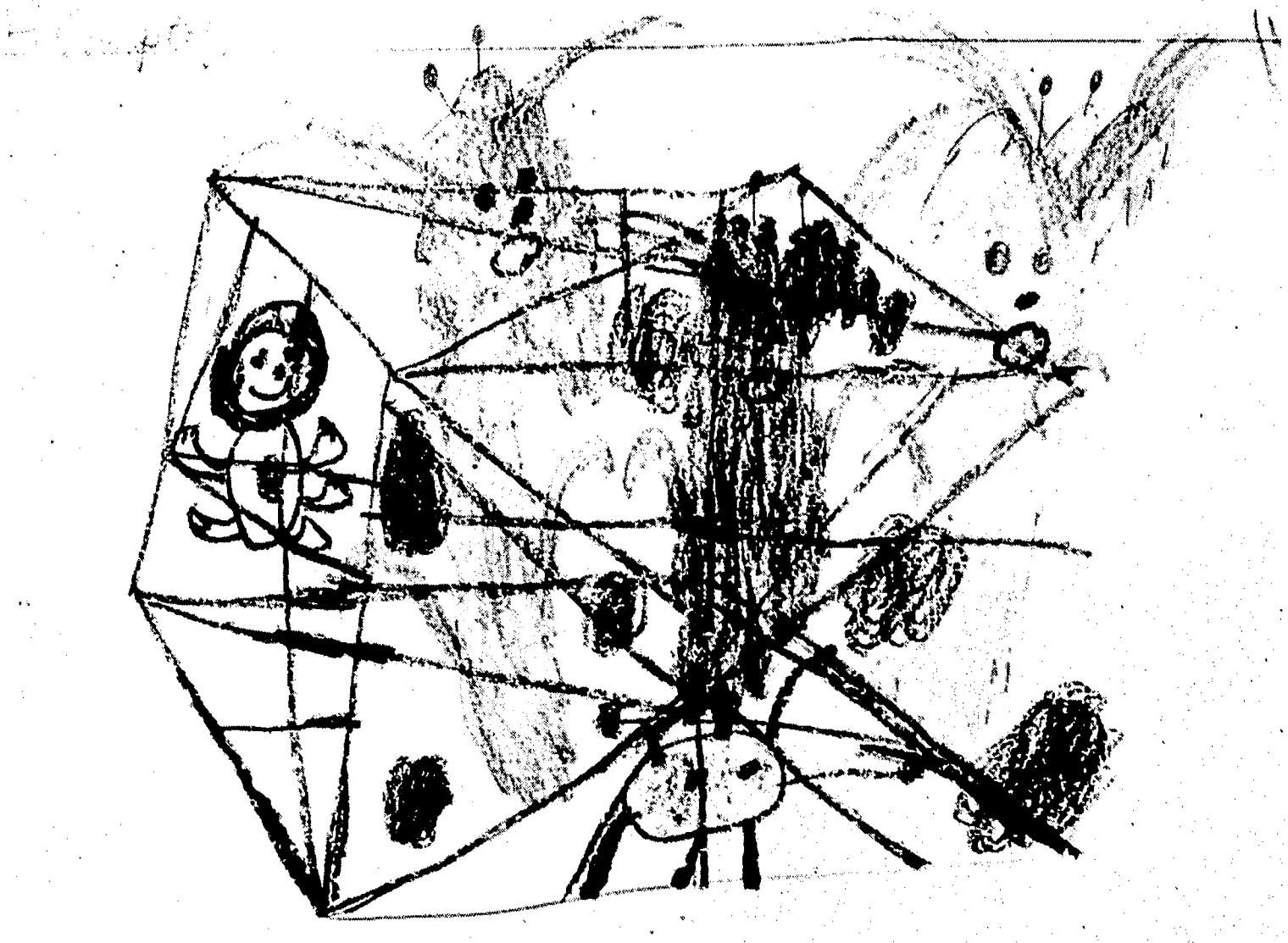


Problem I

"The Cage"

This problem consisted of drawing from a 3 dimensional open box the sides of which were filled in with colored strings. The children made drawings of the 3 dimensional box and were encouraged to fill the box with whatever they wished. They worked with crayons or pencils.

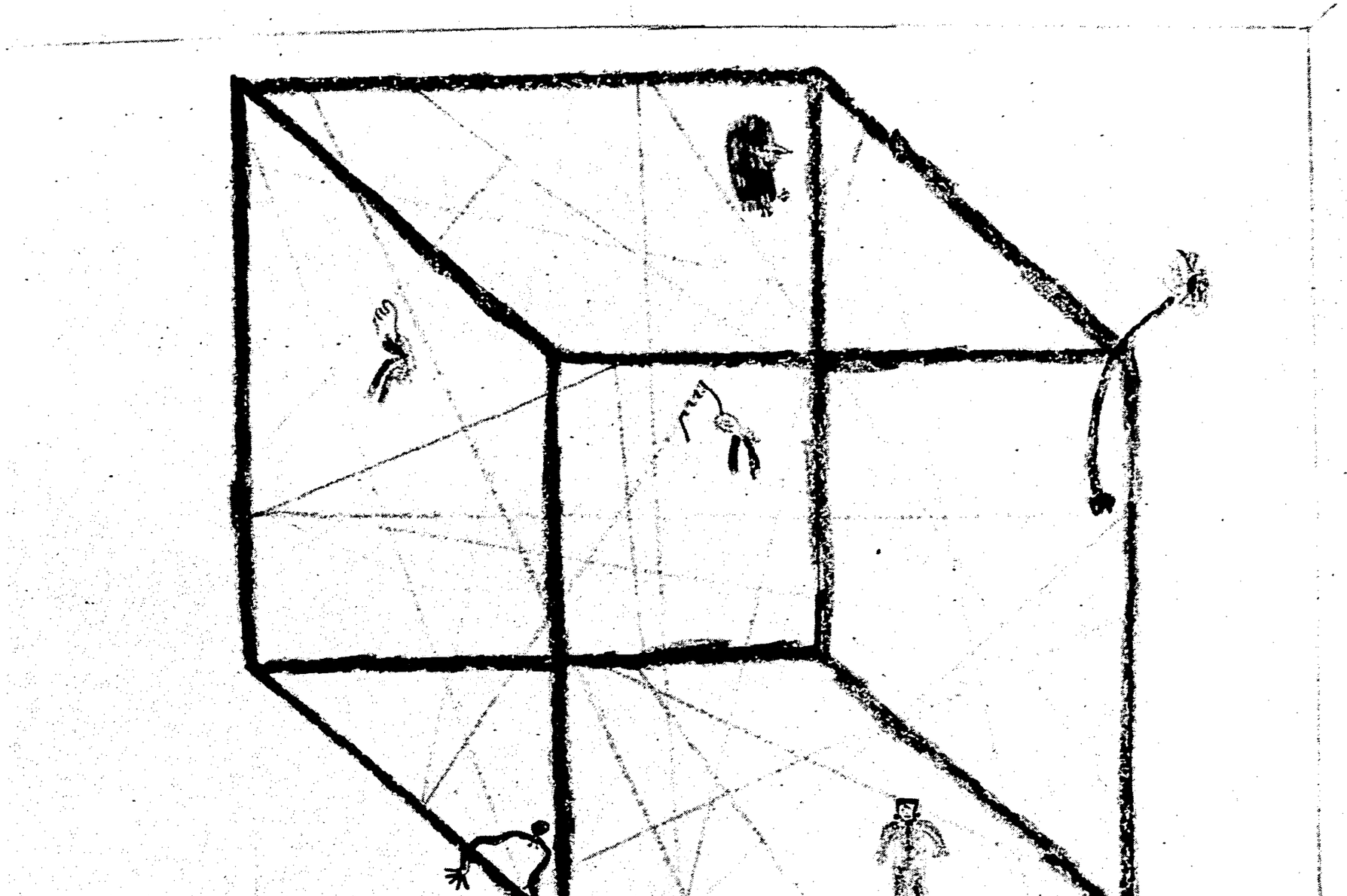
Fourth Grade Drawing



C2

Drawing shows imaginative use of subject matter but the child was not able to control the perspective required to draw the box.

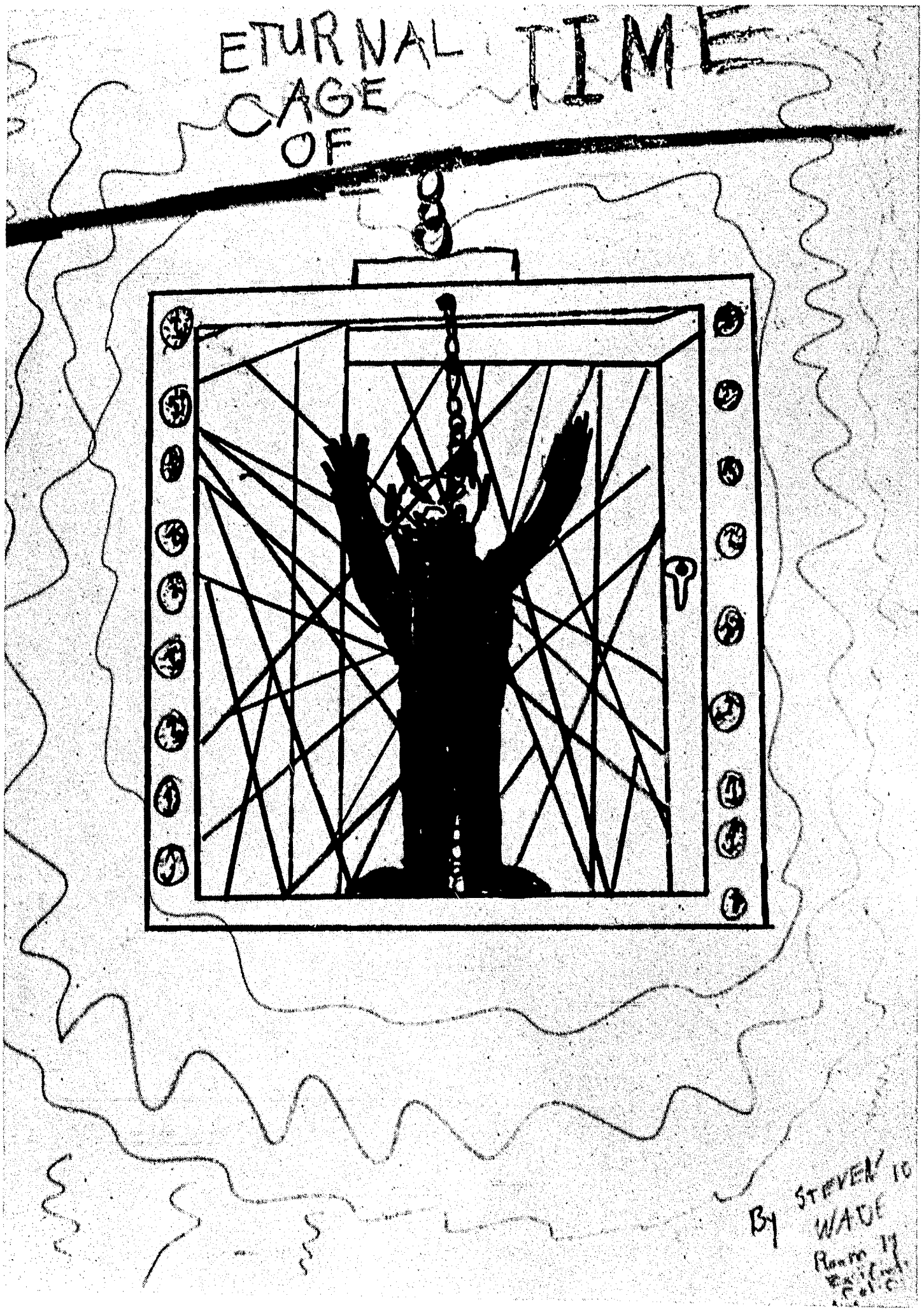
Fourth Grade Drawing



C3

This drawing demonstrates excellent control in the box drawing problem.

Fourth Grade Drawing



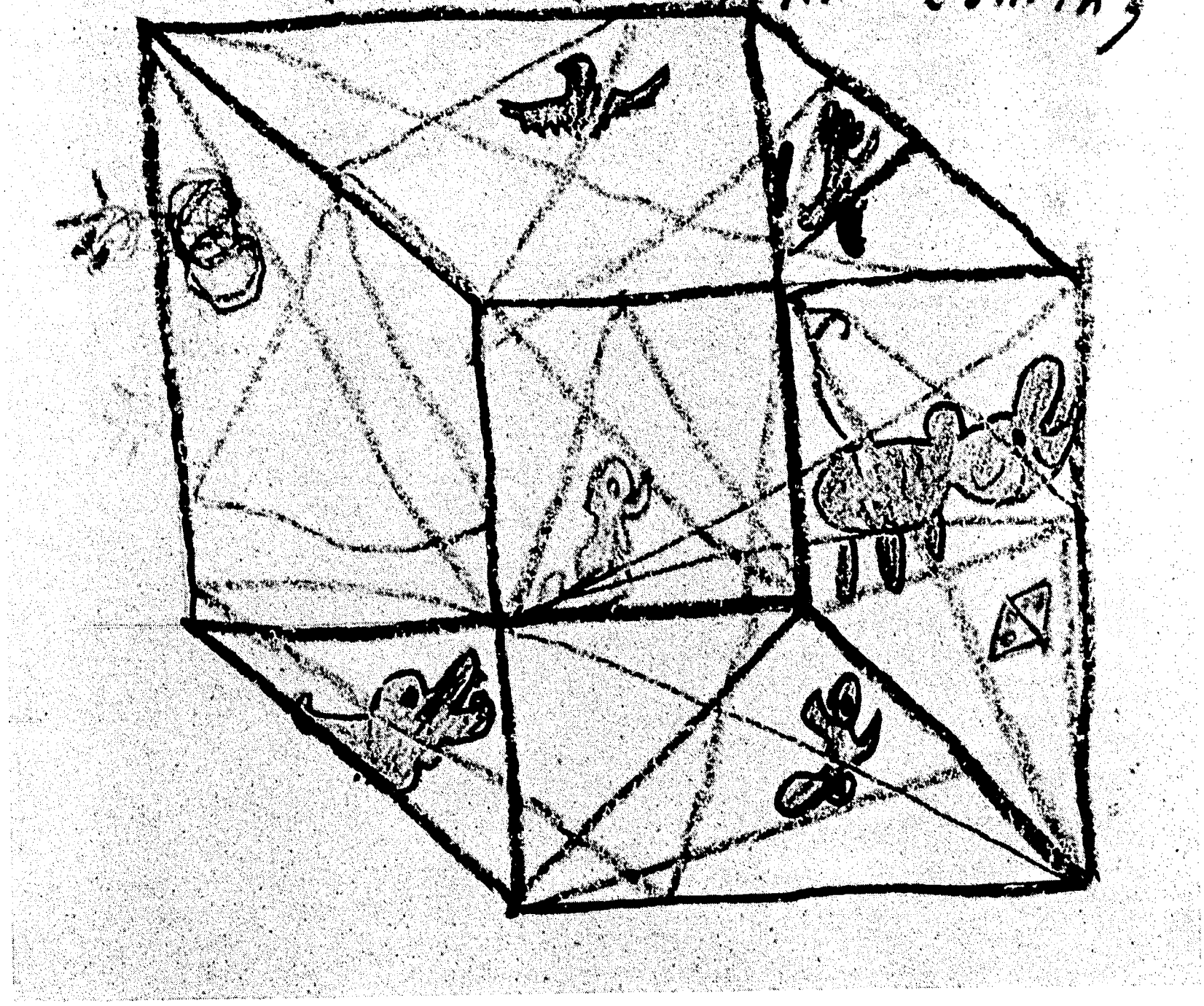
C4

This example demonstrates both control of basic box shape as well as imaginative part of problem.

Fifth Grade Drawing

LuAnn Prather

the animals are coming



C5

This drawing demonstrates on the sixth grade level both control of perceptual and imaginative parts of this drawing problem.

Sixth Grade Girl

C6

Drawings from Out-of-focus slides:-

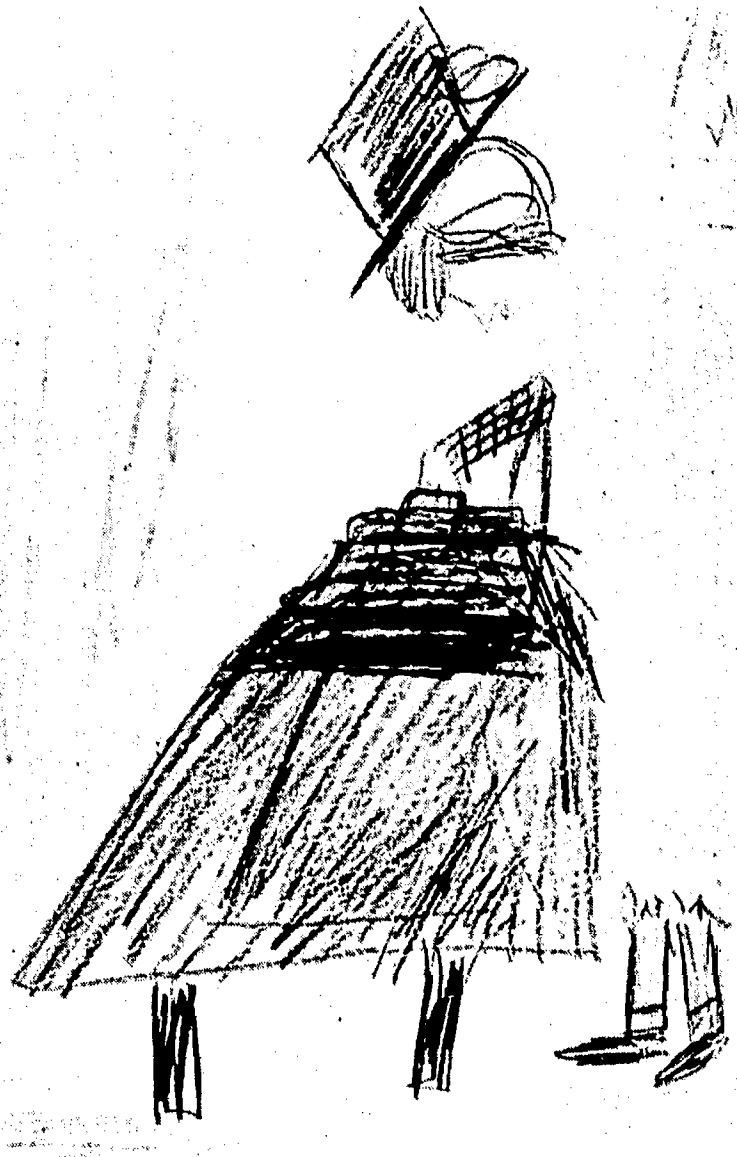
The problem here was to draw from a colored slide projected out of focus upon a screen. As the child draws from the slide, the image is gradually brought into sharper focus.

The stimulus used in these examples was Daumier - "The Print Collector".

"The Print Collector"
Fourth Grade Boy

C7

"The Print Collector"
Fifth Grade Girl

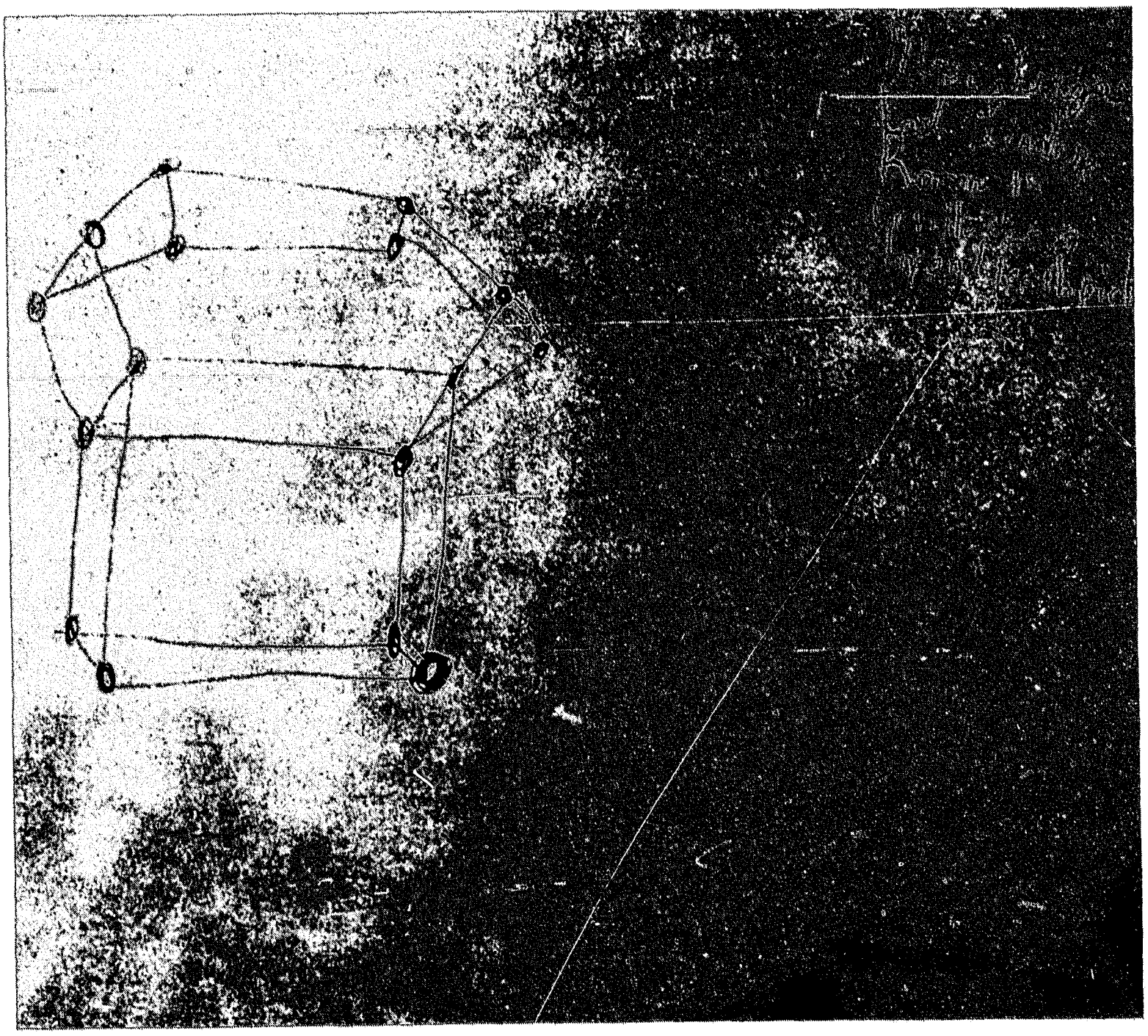


C8

"The Print Collector"
Sixth Grade Girl

C9

"The Print Collector"
Sixth Grade Example

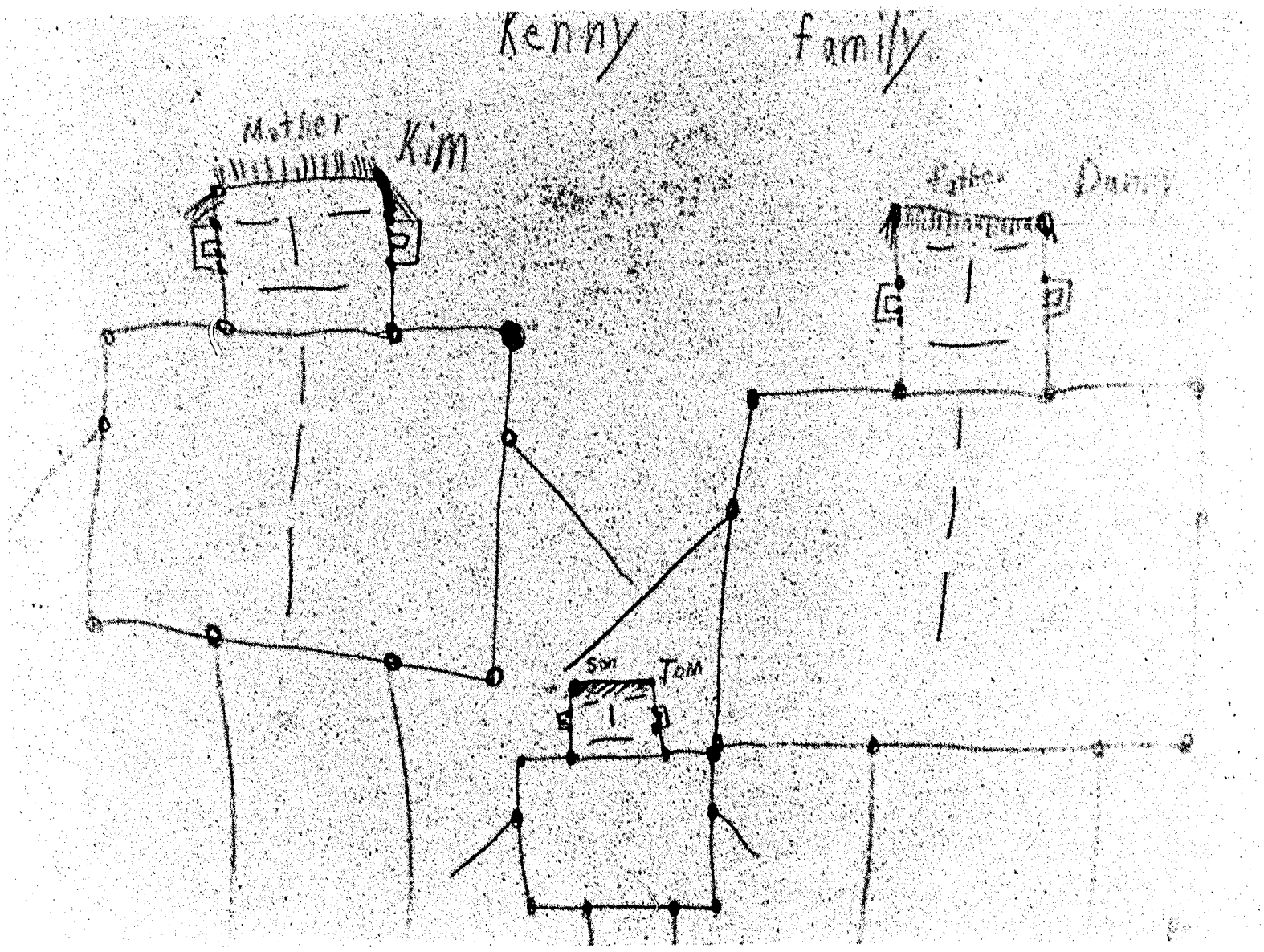


C10

Clay and Toothpick Drawing I

The children were given some toothpicks and a quantity of plasticene clay and instructed to build a three dimensional object. They started with a box-like shape as base. There were told to think of their clay balls as points of visual information (Attneave). They were then given paper on which to draw their construction.

Fifth Grade Drawing

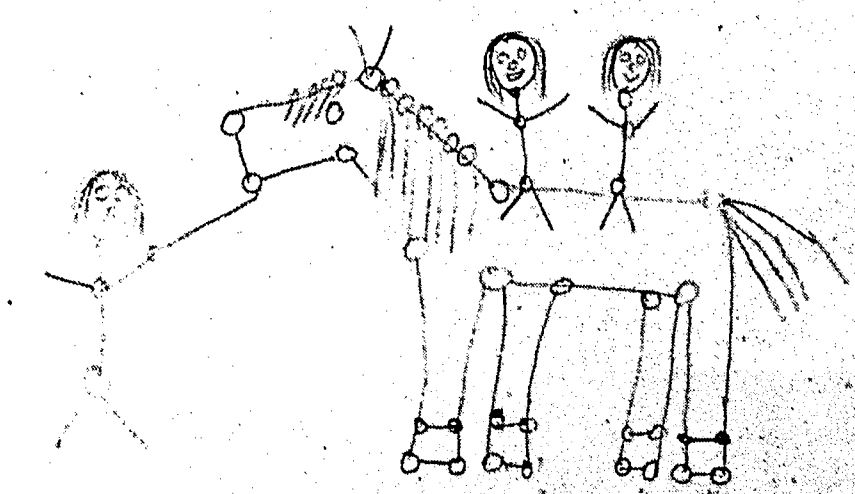


C11

Clay and Toothpick Problem II

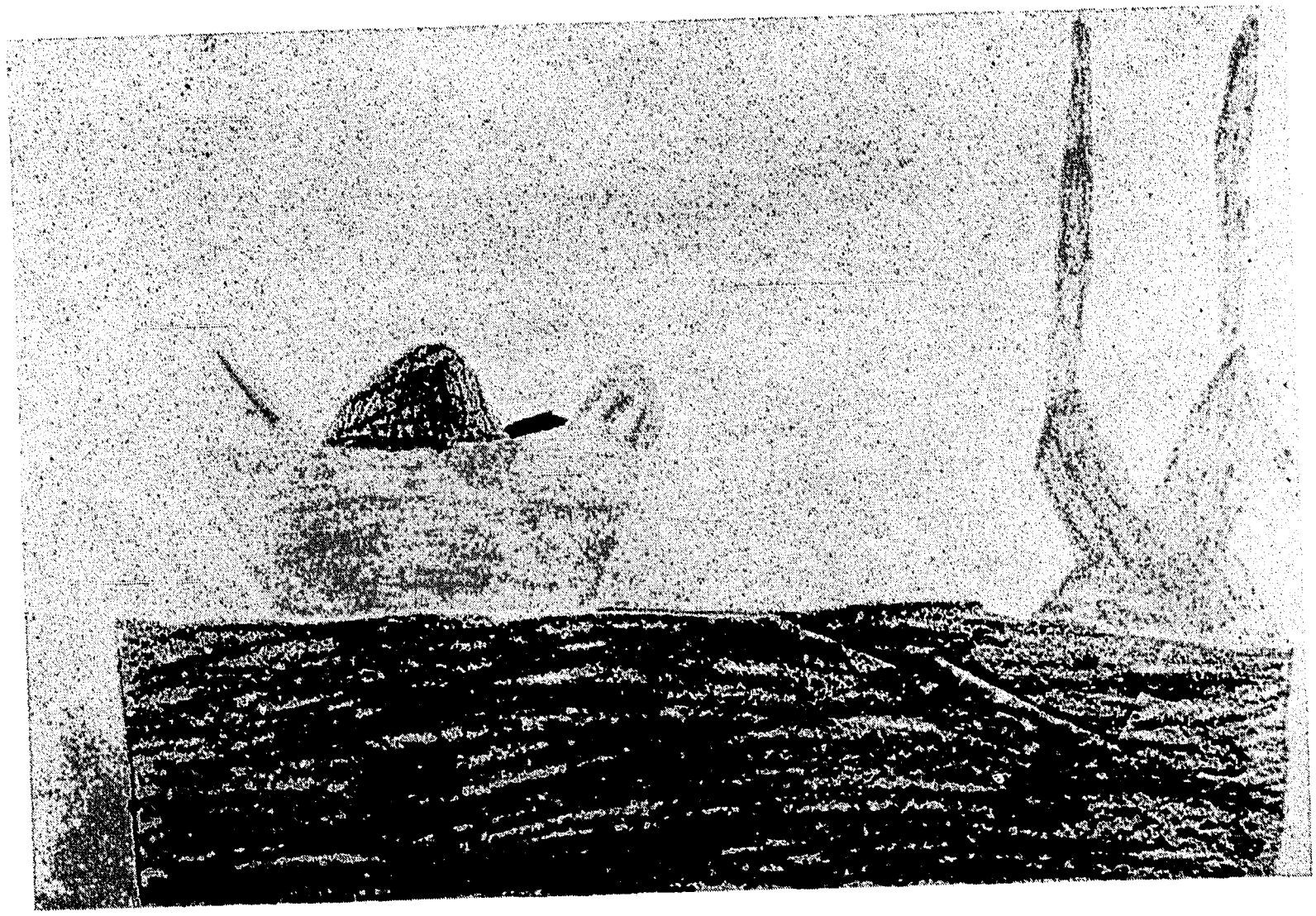
The children were told to make 3 dimensional people out of clay and toothpicks. After they constructed their people, they were told to draw them.

Pam Harless.



C12

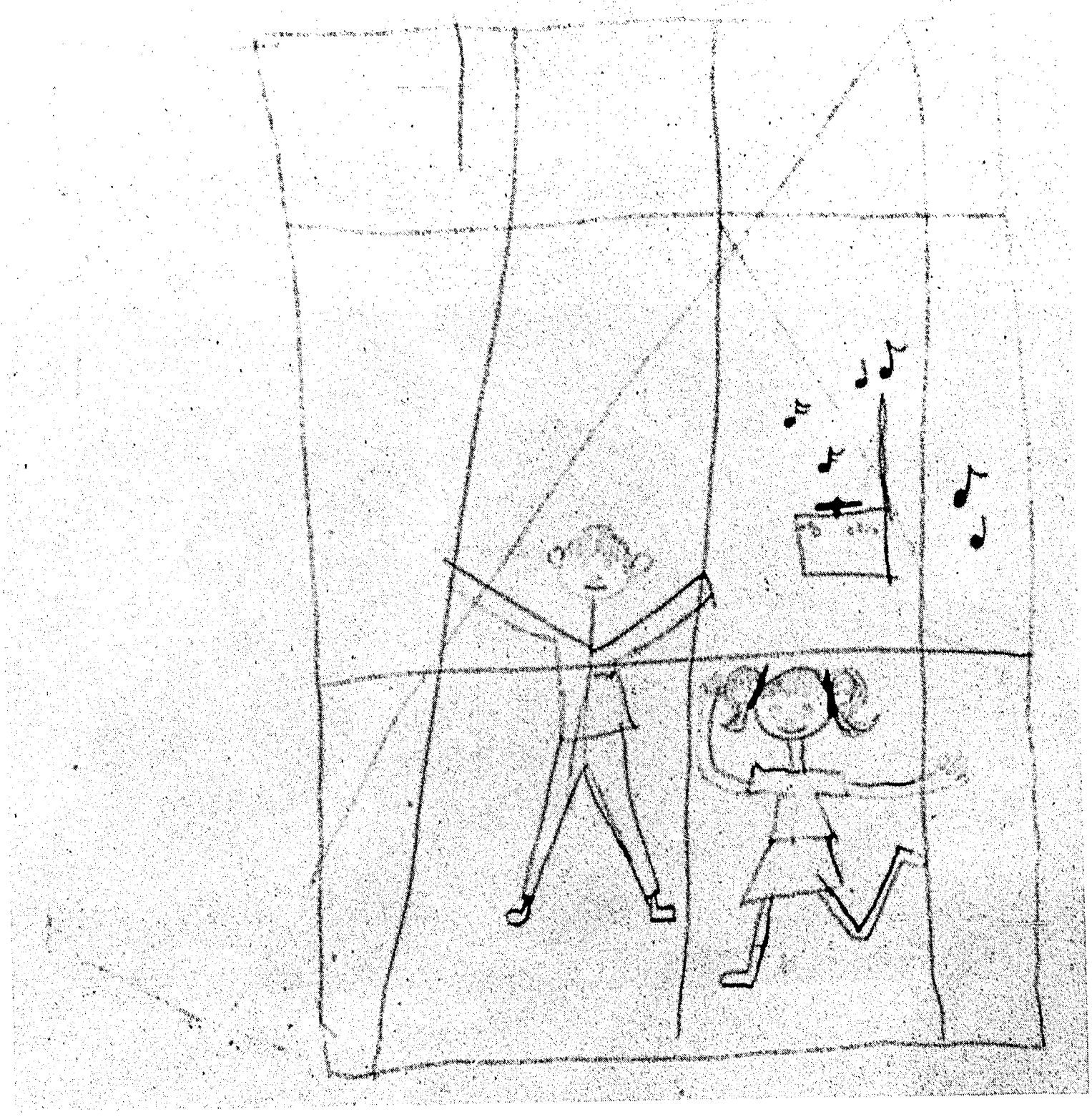
People on a Horse.



C13

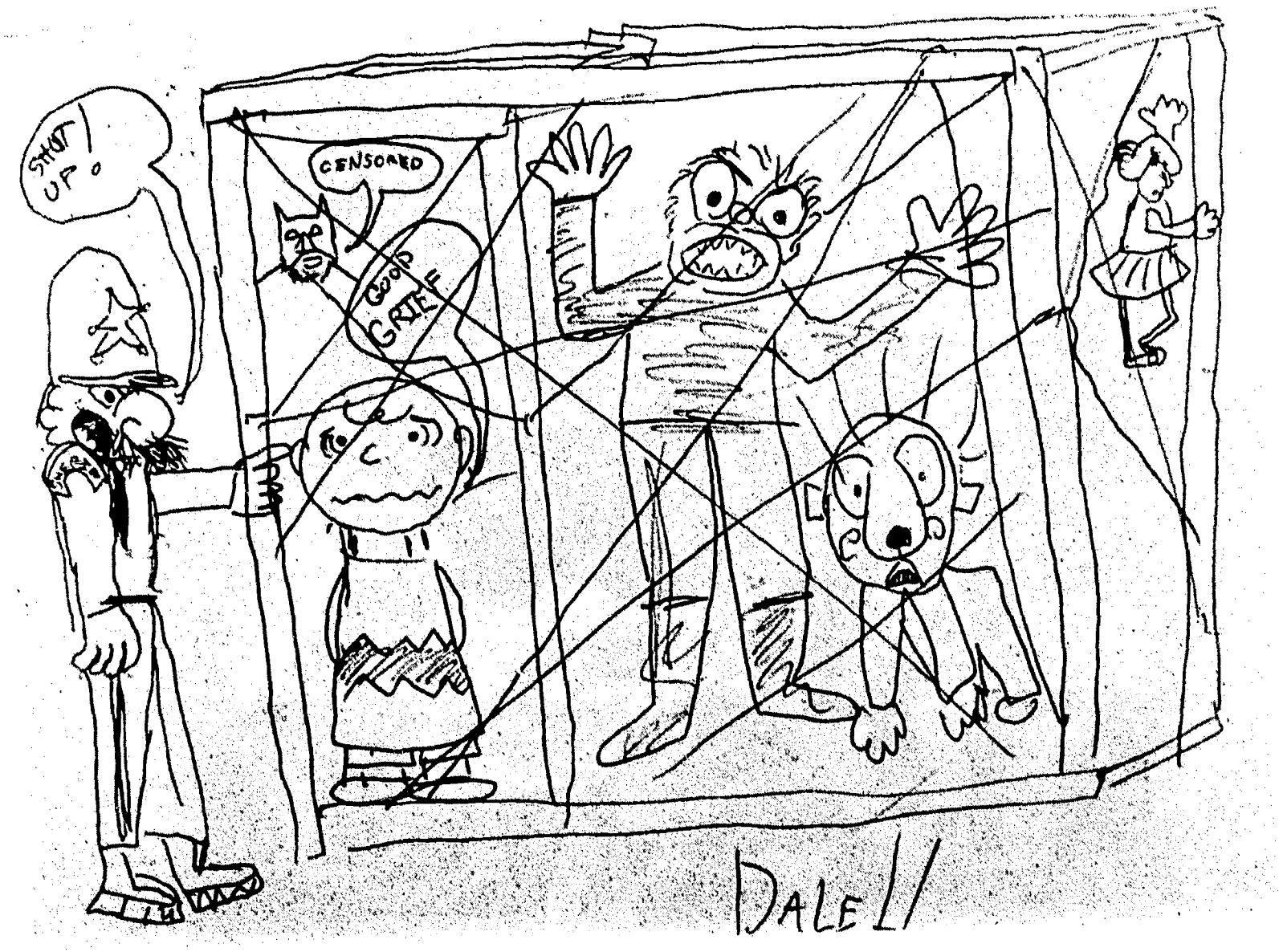
Newspaper Collage Drawing

The children were given a still life to draw. They began their compositions by tearing some shapes out of newspapers. After they pasted these shapes onto their paper, they drew with crayon or charcoal the shapes of the still life.



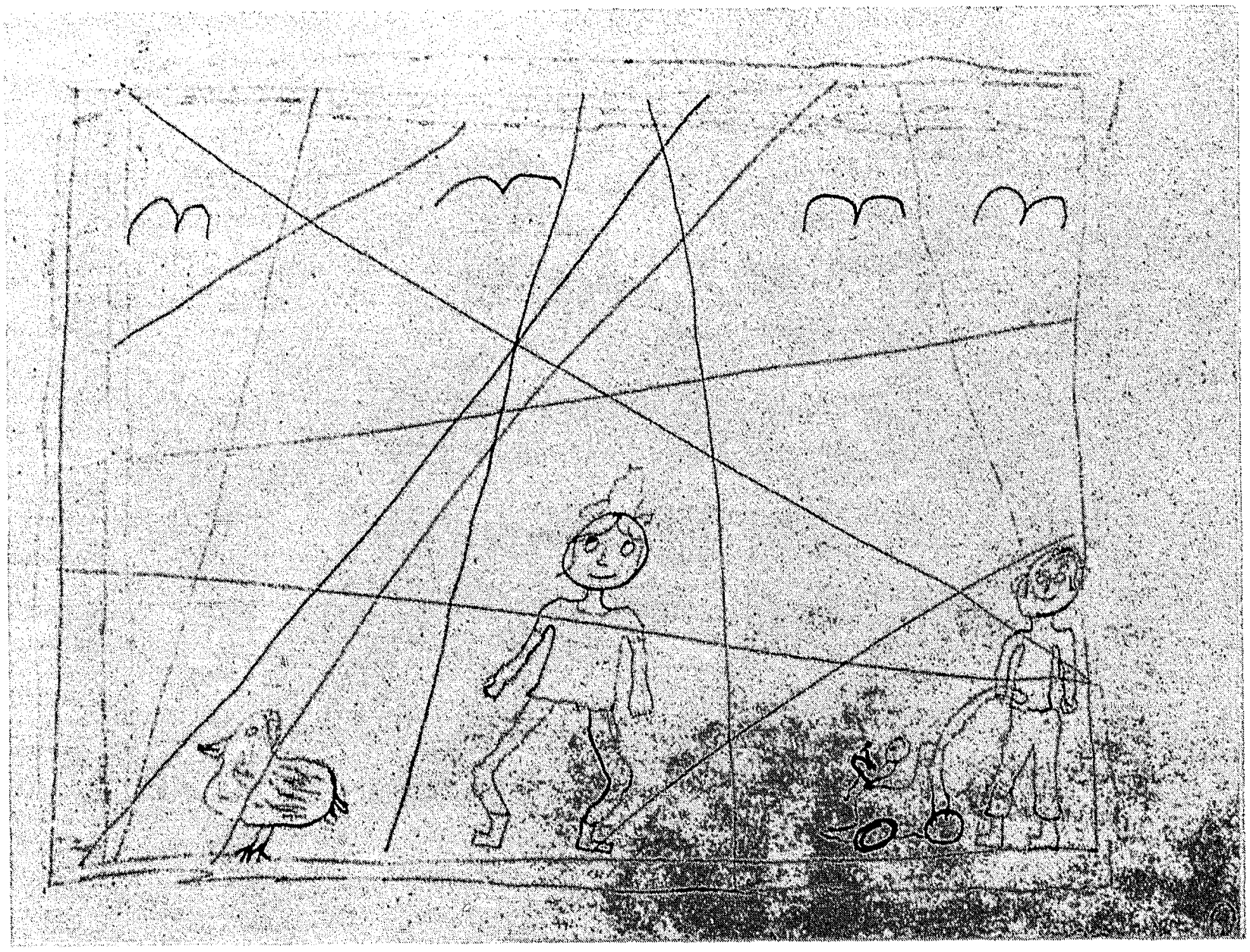
"Trap Them in a Cage"

4th Grade



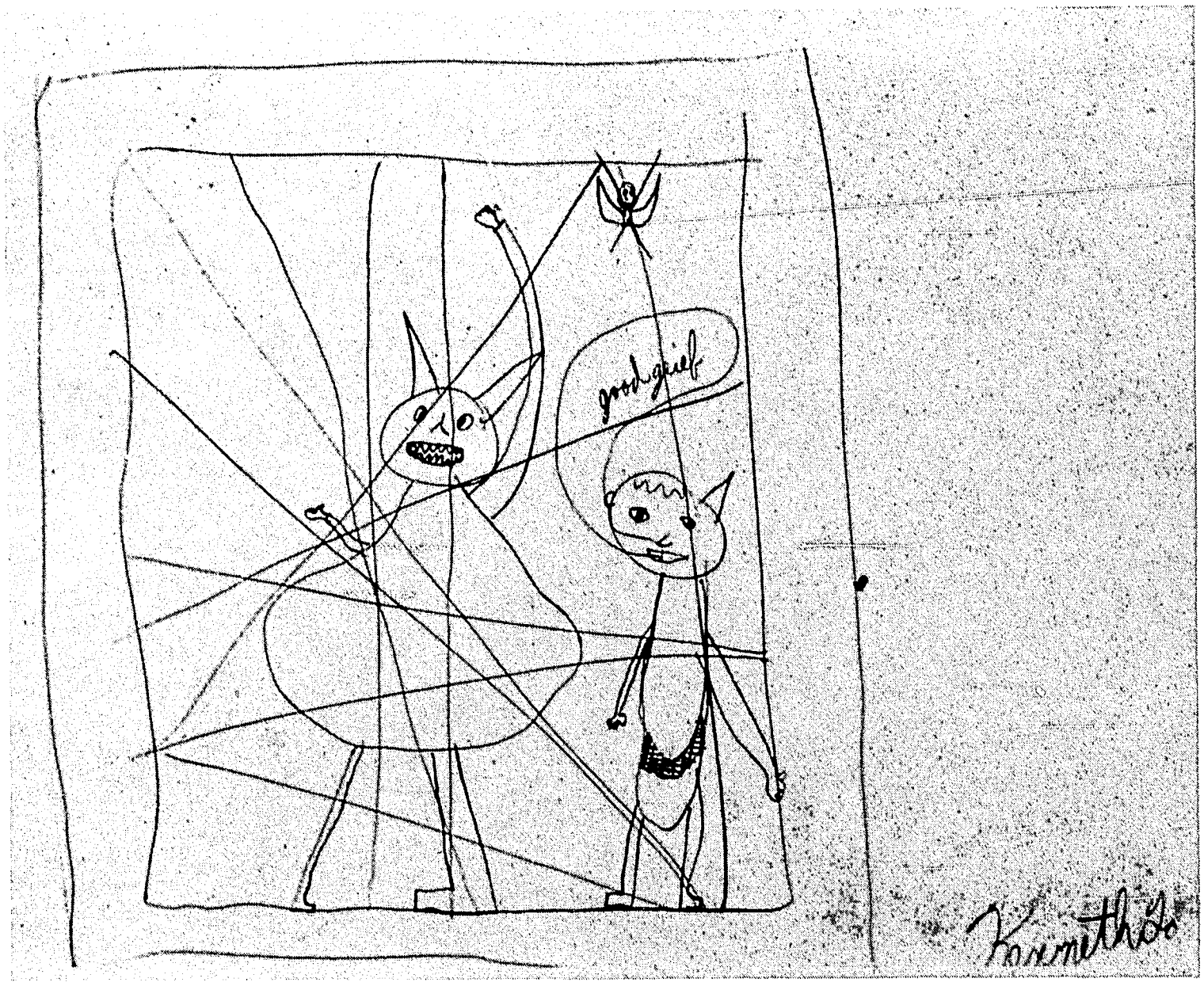
"Trap Them in a Cage"

6th Grade



Cage Drawing

4th Grade



Cage Drawing

5th Grade