A study to determine the relationship between intelligence and artistic ability of first-grade pupils of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955

Sara Cody Tubbs
Atlanta University

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A STUDY TO DETERMINE THE RELATIONSHIP BETWEEN INTELLIGENCE AND ARTISTIC ABILITY OF FIRST-GRADE PUPILS OF THE DOLOMITE JUNIOR HIGH SCHOOL, DOLOMITE, ALABAMA, 1954-1956

A THESIS
SUBMITTED TO THE FACULTY OF THE SCHOOL OF EDUCATION, ATLANTA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS

BY
SARA CODY TUBBS

SCHOOL OF EDUCATION

ATLANTA UNIVERSITY
AUGUST, 1955

R = .81 P < .01
DEDICATION

To My Husband and Daughter
Charlie Tubbs and Eleanor Victoria Tubbs
For Their Loving Care and Kindness
and to
My Mother
Sara Blanton Cody
and to
My Uncle
Dr. James Robert Blanton
For Their Inspiration, Encouragement,
and Assistance All During My Life.

S. C. T.
ACKNOWLEDGEMENTS

The writer wishes to express sincere appreciation to all of those who have assisted in making possible the completion of this research. Directly, she wishes to express her deep thanks: to the thirty first-grade pupils of the Dolomite Junior High School, Dolomite, Alabama, who were the subjects of this research; to Mrs. Laura Hudson, Art Coordinator, Birmingham Public Schools, to Mrs. Blanche Ardis, Special Art Teacher, to Mrs. Fannie Crosby, Special Art Teacher, and to Mrs. Laura Hill, Third-Grade Teacher, who comprised the panel of judges who appraised the quality of the original paintings of the subjects; to Mrs. Lois Odum, Supervisor of Art, Jefferson County Public Schools; Dr. Eula P. Egan, Director of Guidance and Testing and Research, Jefferson County Public Schools; and to Dr. Lawrence E. Boyd and Dr. Lynette Saine Bickers, Advisor and Co-advisor, School of Education, Atlanta University, for their guidance and direction throughout the period of this research.

S. C. T.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. INTRODUCTION</strong></td>
<td>1</td>
</tr>
<tr>
<td>Rationale</td>
<td>1</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>2</td>
</tr>
<tr>
<td>Limitations of the Study</td>
<td>3</td>
</tr>
<tr>
<td>Purpose of the Study</td>
<td>3</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>4</td>
</tr>
<tr>
<td>Locale of the Study</td>
<td>4</td>
</tr>
<tr>
<td>Method of Research</td>
<td>5</td>
</tr>
<tr>
<td>Description of the Subjects</td>
<td>5</td>
</tr>
<tr>
<td>Description of the Instruments</td>
<td>5</td>
</tr>
<tr>
<td>Selection of the Judges</td>
<td>8</td>
</tr>
<tr>
<td>Procedure</td>
<td>8</td>
</tr>
<tr>
<td>Experimental Design and Methodology</td>
<td>9</td>
</tr>
<tr>
<td>Value of the Study</td>
<td>14</td>
</tr>
<tr>
<td><strong>II. RELATED LITERATURE</strong></td>
<td>15</td>
</tr>
<tr>
<td>Introductory Statement</td>
<td>15</td>
</tr>
<tr>
<td>The Theories of Intelligence</td>
<td>15</td>
</tr>
<tr>
<td>Measurement of Intelligence</td>
<td>17</td>
</tr>
<tr>
<td>Theories of Art</td>
<td>20</td>
</tr>
<tr>
<td>Measurement of Art Ability</td>
<td>25</td>
</tr>
<tr>
<td>Relationship Between Intelligence and Artistic Ability</td>
<td>32</td>
</tr>
<tr>
<td>Research Studies</td>
<td>35</td>
</tr>
<tr>
<td>Summary of Related Literature</td>
<td>39</td>
</tr>
<tr>
<td><strong>III. PRESENTATION, ANALYSIS, AND INTERPRETATION OF THE DATA</strong></td>
<td>46</td>
</tr>
<tr>
<td>Introduction</td>
<td>46</td>
</tr>
<tr>
<td>Statistical Techniques Used in Computing the Data</td>
<td>46</td>
</tr>
<tr>
<td>Significant Age-Levels</td>
<td>47</td>
</tr>
<tr>
<td>Chronological Ages</td>
<td>47</td>
</tr>
<tr>
<td>Age Levels Relative to Human Figure</td>
<td>48</td>
</tr>
<tr>
<td>Age Levels Relative to Color</td>
<td>49</td>
</tr>
<tr>
<td>Age Levels Relative to Space</td>
<td>49</td>
</tr>
<tr>
<td>Age Levels Relative to Design</td>
<td>50</td>
</tr>
<tr>
<td>Basic Distribution of Tests</td>
<td>52</td>
</tr>
<tr>
<td>Results on the California Test of Mental Maturity (Total Score)</td>
<td>52</td>
</tr>
<tr>
<td>T-Score Equivalents on the California Test of Mental Maturity</td>
<td>52</td>
</tr>
<tr>
<td>Results on the Goodenough Draw-A-Man Test (Total Score)</td>
<td>55</td>
</tr>
</tbody>
</table>
### III. PRESENTATION, ANALYSIS, AND INTERPRETATION OF THE DATA

(Continued)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-Score Equivalents on the Goodenough Draw-A-Man Test (Total Score)</td>
<td>55</td>
</tr>
<tr>
<td>Results on the Original Painting Test (Total Score)</td>
<td>55</td>
</tr>
<tr>
<td>T-Score Equivalents on the Original Painting Test (Total Score)</td>
<td>59</td>
</tr>
<tr>
<td>Significant Differences on the Tests</td>
<td>59</td>
</tr>
<tr>
<td>California and Goodenough Tests: Comparative Data and &quot;t&quot; Ratio</td>
<td>59</td>
</tr>
<tr>
<td>California and Original Painting Tests: Comparative Data and &quot;t&quot; Ratio</td>
<td>62</td>
</tr>
<tr>
<td>Goodenough and Original Painting Tests: Comparative Data and &quot;t&quot; Ratio</td>
<td>63</td>
</tr>
<tr>
<td>Significant Correlations (r's) Among the Test Variables</td>
<td>64</td>
</tr>
<tr>
<td>Introductory Statement</td>
<td>64</td>
</tr>
<tr>
<td>The &quot;r&quot; between Total Factors of Intelligence and Artistic Ability</td>
<td>65</td>
</tr>
<tr>
<td>Comparative &quot;t&quot; Ratio's for the Differences Between the &quot;r's&quot; for the Three Tests</td>
<td>67</td>
</tr>
<tr>
<td>Interpretative Summaries</td>
<td>69</td>
</tr>
</tbody>
</table>

### IV. SUMMARY AND CONCLUSIONS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement of the Problem</td>
<td>73</td>
</tr>
<tr>
<td>Summary of the Limitations of the Study</td>
<td>73</td>
</tr>
<tr>
<td>Purpose of the Study</td>
<td>73</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>74</td>
</tr>
<tr>
<td>Locale and Design of Research</td>
<td>75</td>
</tr>
<tr>
<td>Summary of the Related Literature</td>
<td>76</td>
</tr>
<tr>
<td>Basic Findings Summation</td>
<td>82</td>
</tr>
<tr>
<td>Summary Table of Basic Data</td>
<td>83a</td>
</tr>
<tr>
<td>Conclusions</td>
<td>93</td>
</tr>
<tr>
<td>Implications</td>
<td>94</td>
</tr>
<tr>
<td>Recommendations</td>
<td>94</td>
</tr>
</tbody>
</table>

BIBLIOGRAPHY

APPENDIX

Characteristic Patterns Found in Pupils Paintings Indicative of Age-Levels According to Viktor Lowenfeld Rating Scale For Children's Paintings Specimen of California Test of Mental Maturity
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Distribution of the Chronological Ages of the Thirty First-Grade Pupils of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955</td>
<td>43</td>
</tr>
<tr>
<td>2.</td>
<td>Age Levels with Reference to the Human Figure as Measured by the Viktor Lowenfeld Scale for the Thirty First-Graders of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955</td>
<td>49</td>
</tr>
<tr>
<td>3.</td>
<td>Age Levels with Reference to Color as Measured by the Viktor Lowenfeld Scale for the Thirty First-Graders of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955</td>
<td>50</td>
</tr>
<tr>
<td>4.</td>
<td>Age Levels with Reference to Space as Measured by the Viktor Lowenfeld Scale for the Thirty First-Graders of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955</td>
<td>51</td>
</tr>
<tr>
<td>5.</td>
<td>Age Levels with Reference to Design as Measured by the Viktor Lowenfeld Scale for the Thirty First-Graders of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955</td>
<td>51</td>
</tr>
<tr>
<td>6.</td>
<td>Distribution of the Raw Scores on the California Test of Mental Maturity as obtained by the Thirty First-Grade Pupils of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955</td>
<td>53</td>
</tr>
<tr>
<td>7.</td>
<td>Distribution of the T-Score Equivalents of the Raw Scores on the California Test of Mental Maturity as obtained by the Thirty First-Grade Pupils of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955</td>
<td>54</td>
</tr>
<tr>
<td>10.</td>
<td>Distribution of the Raw Scores on the Numerical Ratings of Pupil Paintings as obtained by the Thirty First-Grade Pupils of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955</td>
<td>58</td>
</tr>
<tr>
<td>Table</td>
<td>Page</td>
<td></td>
</tr>
<tr>
<td>----------------------------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>11. Distribution of the T-Score Equivalents of the Raw Scores on the Numerical Ratings of Pupil's Paintings as obtained by the Thirty First-Grade Pupils of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>12. Significant Differences on the California Test of Mental Maturity (Total Scores) and the Goodenough Draw-A-Man Test as obtained by the Thirty First-Grade Pupils Enrolled in the Dolomite Junior High School, Dolomite, Alabama, 1954-1955</td>
<td>61</td>
<td></td>
</tr>
<tr>
<td>13. Significant Differences on the California Test of Mental Maturity (Total Scores) and Numerical Indices of Original Paintings as obtained by the Thirty First-Grade Pupils Enrolled in the Dolomite Junior High School, Dolomite, Alabama, 1954-1955</td>
<td>63</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

Rationale—Art, broadly conceived, is an inseparable aspect of rich and satisfying human life. Since education is, above all, the instrument for extending culture, any consideration of the validity of educational procedure must of necessity involve the art factor.

Art in a school program which is planned to meet the needs of boys and girls is but a series of experiences which may help to solve problems of everyday living; to communicate thoughts, ideas and actions creatively; and to develop sensitivity, appreciation and social understanding. Art is significant for all as well as those with special talents. It is important because of the urge of every human being for creative expression and because of the potentialities of every boy and girl for creative achievements. Art differs from other activities only in selective and creative qualities. Pupils who engage continuously in the creation of art forms for use in their own lives, in the classroom, and in the community will most likely recognize art as an everyday necessity, not only for serving their emotional needs, but also for the development of environments in which people may live and grow in aesthetic perception and spiritual awareness.

For a long time, according to educators, public school art courses have been inadequate in that they have failed to enable the individual to meet with intelligence the art problems which confront him.

Educators agree that the changed conception of art training has brought
to the teacher of young children the problem of how to evaluate their early expressions as a means to further growth.

Art experiences involved in copying the works of others have been supplanted by experiences involving the interpretation of pupil's activities, interests and growth. The educational value derived by the pupil from his work with art consists of activities which help him to develop the ability for making expressions through lines, color and form.

Lowenfeld says the concept of art for the child is different from that of art for the adult. Hence, boys and girls must work on their respective levels of ability. This level of ability depends on maturation; therefore, the principles of child growth and development should be a guide in determining materials, tools, and the amount of time used in art experiences at the various age levels.

The writer is of the opinion that if there is a need for evaluating the artistic expressions of young children, there is a need for developing valid criteria for evaluation. Further, the writer believes that if this is done, the teacher will have more direct channels in which to plan her work for effective teaching.

Statement of the Problem—The problem involved in this study was to determine the relationship, if any, between intelligence and artistic abilities among first-grade pupils of the Dolomite Junior High School, Dolomite, Alabama for the school year of 1954-1955.

1 Leon L. Winslow, Art In Elementary Education (New York, 1942), p. 38.
Limitations of the Study.-- This study of the artistic ability of first-graders at the Dolomite Junior High School, Dolomite, Alabama was focused primarily on the area of the original paintings of these children and does not include other media of creative expression. The following limitations should be recognized:

1. The art experience was limited to drawing and painting.

2. This study was primarily concerned with the relationship of intelligence to artistic abilities.
   (a) The level of intelligence as measured by the California Test of Mental Maturity.¹
   (b) The level of drawing intelligence as measured by the Goodenough Draw-A-Man Test.²
   (c) The level of artistic ability as measured by the Lowenfeld Scale.³

Purpose of the Study.-- The major purpose of this study was to determine the relationship, if any, between intelligence and artistic abilities of first-grade pupils of Dolomite Junior High School, Dolomite, Alabama. More specifically, the purposes of this study were as characterized below:

1. To determine the general patterns which characterize the intelligence of first-grade pupils at Dolomite Junior High School, Dolomite, Alabama.

2. To determine the general patterns which characterize the artistic ability of first-grade pupils of the Dolomite Junior High School, Dolomite, Alabama.

¹ Willis W. Clark, Elizabeth T. Sullivan, and Ernest W. Teigs, California Test of Mental Maturity Manual, for Pre-Primary and Grade One (Los Angeles, 1950).
³ Viktor Lowenfeld, Creative and Mental Growth (New York, 1951), pp. 20, 35, 71.
3. To determine the difference, if any, between the intelligence and artistic abilities of first-grade pupils of the Dolomite Junior High School, Dolomite Alabama.

4. To determine the relationship, if any, between intelligence and artistic abilities of first-grade pupils of Dolomite Junior High School, Dolomite, Alabama.

5. To determine the difference, if any, between the correlations of intelligence and artistic abilities of the first-grade pupils of Dolomite Junior High School, Dolomite, Alabama.

6. To formulate whatever implications, if any, for educational theory and practice as derived from the analysis and the interpretation of the data collected in this study.

Definition of Terms.— The significant terms which were used throughout this research are characterized in the following statements:

1. The term, "intelligence", as used in this study refers to mental traits as measured by the California Test of Mental Maturity¹ and the Goodenough Draw-A-Man Test."²

2. The term, "artistic ability", as used in this study refers to the traits as measured by the Goodenough Draw-A-Man Test³ and the judges appraisal of pupil's drawing based upon the Viktor Lowenfeld Scale.⁴

3. The term, "creative ability", as used in this study refers to individuality and originality used to portray an idea which comes from the self. It is used synonymously with self-expression.

4. The term, "design", as used in this study refers to the sum total use made of color, space, and perspective which were to be characteristic of the paintings.

Locale of the Study.— The Dolomite Junior High School is located in

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¹ Willis W. Clark, Elizabeth T. Sullivan and Ernest W. Twigg, California Test of Mental Maturity, for Pre-Primary and Grade One, (Los Angeles, 1950).
² Florence L. Goodenough, Goodenough Intelligence Test, for Kindergartens and Primary Grades, (New York, 1926).
³ Ibid.
⁴ Viktor Lowenfeld, Creative and Mental Growth (New York, 1951), pp. 20, 35, 71.
Dolomite, Alabama, Jefferson County, a suburb of Birmingham, Alabama. It has a total enrollment of 364 pupils, and a staff of nine teachers. The program of the school provides for instruction for grades One through Eight. The school plant proper is a frame structure consisting of nine classrooms and an auditorium, and is provided with the modern facilities of lighting and sanitation. All of the teachers are graduates of standard colleges, with the principal holding a master's degree, and three others are now working towards the master's degree. The economic pattern of the community served by the school is predominantly a coal and iron mining industry; for it is in the center of the Iron and Steel production of the South.

Method of Research.-- The Descriptive-Survey Method of research, employing the techniques of testing and original drawing and paintings of first-graders, was used to gather the necessary data for this research.

Description of the Subjects.-- The subjects involved in this research were the thirty first-graders (nineteen girls and eleven boys) enrolled in the Dolomite Junior High School, Dolomite, Alabama, during the school year of 1954-1955. The ages of these subjects ranged from a low of 6 years and 5 months to a high of 7 years and 4 months, for a range of one year and one month. The mean age of the subjects was 7.0; their median age was 6.73.

Description of the Instruments.-- In order to fulfill the purposes of this study the California Test of Mental Maturity, Pre-Primary, was used to measure the intelligence, the Goodenough Draw-A-Man Test was used to measure drawing intelligence, and the original paintings were used to measure the artistic abilities of the subjects.
1. The California Test of Mental Maturity, Pre-Primary, is an eleven page booklet which includes test-components of Memory, Spatial Relationship, Logical Reasoning, Numerical Reasoning and Verbal Concepts. The California Test of Mental Maturity, Pre-Primary, is characterized by its validity of Contents, Adequacy of Standardization and Ease of Interpretation of the score obtained. The Pre-Primary Grades, Kindergarten, and First Grade Battery is divided into two sections: the Language Factors and Non-Language Factors.

2. The Goodenough Draw-A-Man Test is concerned with the intellectual factors involved in the spontaneous drawing of young children and consists of a scale to be used in the measurement of these factors. This scale is based on drawings of the human figure.

The Goodenough scale consists of fifty-one points or units of measurements. According to the author, the points were derived by means of (a) observation of differences which appeared to be characteristic of the performances of children at successive ages or school grades; (b) the formulation of objective definition or descriptions of these differences; and (c) their statistical validation based on a comparison between the performances of children of different ages, and also between the performances of children who were accelerated in school and those who were retarded.

3. The Art Test used in this study was similar to one used by Viktor

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1 Willis W. Clark, Elizabeth T. Sullivan and Ernest W. Tiegs, California Test of Mental Maturity, for Pre-Primary and Grade One, (Los Angeles, 1950).

Lowenfeld when testing a group of first-grade children. An "all-embracing theme" was used which took into consideration certain factors that should more definitely reveal the art ability of the pupils. A theme was formulated with the purpose of incorporating the following factors:

a. The human figure and objects
b. Interrelations of space
c. The use of color
d. Design

These factors were evaluated on the basis of representation and creative expression. According to art educators, the types of experiences that generate expressions from the primary child in art are those that center around the self, pets, toys, clothing materials and tools. The test was worded as follows: "I was playing on the playground at recess time." Following this the items self, see-saw, swing, and sliding board were emphasized to activate the children's passive knowledge.

4. The Lowenfeld Scale was developed from summaries of Chapters Two, Three, and Four of his Creative and Mental Growth. The chapters listed in order are: "The First Stages of Self-Expression," "The First Representational Attempts," and "The Achievement of a Form Concept." Listed in the summary of these chapters are the characteristic patterns which are to be found in children's drawing and are used as indices of probable age levels. The four aspects of the children's drawing considered were as follows: (a)

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1 Viktor Lowenfeld, Creative and Mental Growth (New York, 1951), p. 32.
2 Ibid.
the human figure and objects, (b) the use of color, (c) the use of space and (d) the use of design.

Selection of Judges. — The judges were selected on the basis of training and experience with children and children's art expression. The judges were: Judge I, Supervisor of Art, Jefferson County Schools, Birmingham, Alabama; Judge II, the art Co-ordinator in charge of art workshop for Birmingham Public Schools, Birmingham, Alabama; Judge III, an art teacher in the Parker High School, Birmingham, Alabama; and Judge IV, an art teacher in the Shields Elementary School, Birmingham, Alabama.

Procedure. — The steps followed in conducting this study were as follows:

1. The related literature pertinent to this research was reviewed, summarized and presented in the thesis.

2. The California Test of Mental Maturity, Grade One (Primary Form) was given to determine the level of intelligence.

3. The Goodenough Draw-A-Man Test was given to determine the level of drawing intelligence.

4. The original paintings of the subjects were used to determine the level of art ability.

5. Samples of the original paintings of the subjects were scored and evaluated by the judges.

6. The original paintings were evaluated in terms of Lowenfeld's scale.

7. The group was given an opportunity for original painting, using the forty-five minutes period designated for Creative Expression by the Jefferson County Board of Education.

8. Numerical value was attached to the criteria in order to analyze the findings on paintings.

9. Statistical measures best suited for the purposes of this study were used. The following measures were found to be most expedient:
(a) The mean  
(b) The median  
(c) The standard deviation  
(d) The standard error of the mean  
(e) The standard error of the difference between the two means  
(f) Fisher's "t"  
(g) The "r"  
(h) The difference between the two "r's"

10. Obtained data were assembled, presented and analyzed in Chapter Three of the thesis.

11. Findings are summarized; implications and recommendations are discussed in Chapter Four of the thesis.

Experimental Design and Methodology

Introduction.-- The description of the group and of the elaboration of the procedures which were used in conducting this study are discussed as follows: (1) Re-statement of the Problem, (2) Basic Hypothesis, (3) Background for Operation of the Experiment, (4) Descriptive Content of the Group, and (5) the Procedure.

Statement of the Problem.-- The problem involved in this study was to determine the relationship, if any, between intelligence and artistic ability of first-grade pupils.

Hypothesis.-- The hypothesis used in this study was as follows: that the intelligence and artistic abilities are correlated with experience and performance in creative ability.

Background for the Operation of the Experiment.-- In an effort to formulate procedural steps of the experiment:

1. Great effort was made to provide a pleasant atmosphere where testing experiences were being carried on.

2. Special effort was made to leave the pupil entirely free to create but the choice of the theme for expression resulted from pre-planning by the experimenter and the pupils.
3. Precaution was taken to make no critical and/or corrective demonstration of the art product while the experience was being carried on.

4. Sufficient materials were always available for the group.

5. In order to permit greater freedom, large size crayons and large sheets of paper were used, which according to Lowenfeld are the best materials suited for this age level.

6. There was no time limit for performance on the original paintings. Each pupil was permitted to work at his own rate of speed which is in accord with Winslow2 who believes that to hurry the young child involved in creative activity kills the vitality of his work.

Descriptive Content of the Group.— In consideration of the purposes relative to artistic ability set forth in this study, it was necessary to follow these principles in conducting the art experiences in the group:

1. To encourage the pupils through positive appraisals at all times.

2. To provide a vicarious experience that would activate their passive knowledge.

3. To provide art materials that were suitable for first grade pupils.

Procedures.— In order to fulfill the proposed purposes of the study, it was necessary that the following tests be given: The California Test of Mental Maturity, The Goodenough Draw-A-Man Test and original paintings constituting the Art Test.

Psychologic Climate.— The thirty pupils enrolled in the first grade comprised the subjects used in this study.

1. The experimenter was precautious to avoid coaching.

1 Viktor Lowenfeld, Creative and Mental Growth (New York, 1951), p. 33.

2. The time element for the California Test of Mental Maturity was closely observed.

3. There were no time limits for the Goodenough Draw-A-Man Test or the original paintings.

   No effort was made to assist the subjects in their expression through color, form, space or design.

4. Special care was taken to encourage those who replied they could not draw.

5. In order not to hurry anyone, each subject was allowed to work until the product was finished.

   No suggestions were made in manipulating the art tools. The pupils were very cheerful and seemed to have enjoyed their experience sufficiently.

Procedures with the California Test.-- The following steps were taken in the administration of the California Test of Mental Maturity.

1. The thirty pupils who comprised the first grade of the Dolomite Junior High School were the subjects used.

2. The suggested time allotment given in the California Test of Mental Maturity Manual was closely observed. Thirty minutes was allowed for the Non-Language Section and twenty minutes was allowed for the Language Section.

3. The necessary materials required for the administration of the test were available. These included a pencil with an eraser, a test booklet and a marker, a stop watch and an extra test booklet for demonstration.

4. Each pupil was given a test booklet with his name on it, a pencil and a sheet of paper which was used as a marker.

5. A demonstration of the proper use of the test booklet and the marker was given.

6. After making sure each pupil understood clearly the manner in which he was to make his responses, precaution was taken against coaxing.

On Monday, February 21, 1955 from 8:30 until 9:00 a.m., fifteen pupils were given the Non-Language Section of the test. From 10:00 until 10:30 the Language Section of the test was administered.
On Tuesday, February 22, 1955 from 8:30 to 9:00 a.m. the Non-Language Section of the test was administered to the remaining fifteen pupils. From 10:00 until 10:30 the Language Section of the test was administered.

Procedures with the Goodenough Test—On Wednesday, February 23, 1955 at 8:30 a.m. the Goodenough Draw-A-Man Test was administered to the thirty subjects. Each child was provided with a pencil and test blank. The following instructions were given.

"On these papers I want you to make a picture of a man. Make the very best picture that you can. Take your time and work very carefully. I want to see whether the boys and girls in Dolomite School can do as well as those in other schools. Try very hard and see what good pictures you can make."

As the drawings were being made, the examiner:

1. Took care to see that all pictures and books were put away to prevent copying.

2. Offered encouragement by judicious praise. "These Drawings are fine."

3. Never made adverse comments or criticisms.

4. Answered all questions by replying, "Do it whatever way you think best."

5. The children were not permitted to hold up their drawings until the test was finished.

6. There was no time limit for the Draw-A-Man Test. Most of the children finished their drawings within ten minutes. Papers were collected as the drawings were finished.

Procedure with Original Art Test—On Wednesday, February 23, 1955 at 10:00 a.m. the group of thirty first-graders were administered the Art Test, which consisted of original paintings titled: "I Was Playing On The Playground at Recess Time." The group was given two types of stimulation. The action and the verbal type of art stimulation preceded the test.
At 9:30 a.m. the pupils were on the playground playing ball, running or engaged in play at the Gym Set. Purposely, the pupils were asked if they were enjoying their recess. The reply was "yes". Two pupils who were sitting under a tree were encouraged to participate in the play.

At 10:10 the Art test of original paintings was ready to begin. The verbal type of stimulation which was used prior to this test-situation is described below. "Did you have a good time playing at recess time?" "Yes" was the unanimous answer. "What did you play?" There were various answers, "I played in the swings," "I played on the see-saw," I played ball included the different actions expressed. "Now, would you like to show me how you were playing?" The children answered "yes". A short demonstration was given. This individual experience activated their passive knowledge. It was the purpose of the experimenter that the general atmosphere be characterized by where and when. The "what" followed the general atmosphere and the how.

Now let us draw "I Was Playing on the Playground at Recess Time."

After the theme of the Art Test was announced to the children, the following steps included:

1. Each pupil was given a sheet of white drawing paper, size 12" by 18" and a box of Kindergarten-Primary size crayons containing eight colors.

2. Three pupils occupied a table. There were ten tables used.

3. The theme of the test, "I Was Playing on the Playground at Recess Time" was repeated three times for clarification.

4. The pupils were encouraged by judicious praise.

5. No critical observation or suggestion was made to any pupil relative to the form, color, and design of their art product.

Scores made by the subjects on the California Test of Mental Maturity
were those obtained in Language Factors and Non-Language Factors combined. These scores were tabulated and computed for the mean, median, and the standard error of the mean.

The Goodenough Draw-A-Man Test was evaluated according to rules for scoring set forth by Goodenough in her book *Measurement of Intelligence by Drawings*. The findings were tabulated, assembled in appropriate tables, and the statistics of the mean, median, standard deviation, and the standard error of the mean were computed.

The Original Paintings were assembled and presented to the judges along with evaluation sheets for scoring. The evaluation by the judges was accorded numerical value, and the findings were tabulated, assembled in appropriate tables, and the statistics of the mean, median, standard deviation, and standard error of the mean were computed.

**Value of the Study.**—The writer believes that this study will prove valuable in that it will help elementary teachers:

1. To add specific evidence of observable relationships between intelligence and artistic ability.

2. To suggest how curricular materials may be adapted to the mental ability of the school child.

3. To develop a valid criterion for evaluating artistic abilities of first-grade children.

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CHAPTER II

RELATED LITERATURE

Introductory Statement.-- In this chapter, the Related Literature pertinent to this area of research is here reviewed under the following captions, to wit:

1. The Theories of Intelligence.
2. The Measurement of Intelligence.
3. The Theory of Art.
5. The Relationship Between Intelligence and Artistic Ability.
7. The Summary of the Related Literature in the Field.

Significant abstracted statements from the writings of the authorities in these fields will be cited in support of basic assumptions and procedures used as the "frame-of-reference" for each of the conceptual areas.

The Theories of Intelligence.-- Theories concerning the nature of ability or intelligence go back as far as the earliest times when thinkers were wanting to make inquiry into the nature of reality. This section will point our several of the more significant theories about the nature of intelligence.

1

According to Green et al., the Faculty Psychology theory held that:

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Intelligence involves a number of relatively independent and largely correlated and specialized abilities of various types, such as memory, imagination, honesty, and language ability, to name a few. The closely related theory of formal discipline held that these faculties could be developed individually by means of general mental exercise. However, the theory of formal discipline was disapproved and the transfer of training concept directed attention to the fact that the faculties named above are neither psychological entities nor subject to general training. Hence, the faculty theory was forced into discard as an explanation of mental abilities.

1 Munn had this to say concerning Spearman's Two-Factor Theory:

Spearman announced in 1904 his original theory. He proposed a general factor, \( g \), which enters into all performances, and many specific factors, \( s \), which combine with \( g \) to determine total activity. Later he added a third factor, called group factors which represent the overlap among \( s \) factors. Hence, according to his theory a \( g \) factor might be called energy; group factors, such as number ability and mechanical ability; and many \( s \) factors constitute ability.

The work of Spearman may be considered a forerunner of the present factor analysis. Among the Factor Analysts is Thurstone who maintained that:

Intelligence is composed of nine "primary mental abilities", which include (1) visual or spatial ability, (2) perceptual ability, (3) numerical ability, (4) logical or verbal relations ability, (5) fluency in dealing with words, (6) memory, (7) inductive ability, (8) deductive ability, and (9) ability to restrict the solution of a problem.

Goodenough says that intelligence is a composite or organization of abilities to learn, to grasp broad and subtle ideas with alertness and accuracy, to exercise mental control, and display flexibility and ingenuity in seeking the solution to problems.

2 Louis Thurstone, "Primary Mental Abilities," Psychometric Monograph Series, Number 1, (Chicago, 1938).
Gates et al., observe in their book, Educational Psychology, that for a long time, individuals have differed in the ability to learn, to adjust to novel situations. This could be accepted as a definition of intelligence. Most educators agree fundamentally that intelligence can be measured according to the degree with which an individual adjusts himself to his environment.

2 Calvin points out that intelligence is the ability of the individual to learn to adjust himself to his environment.

3 Dearborn describes intelligence as "... the capacity to learn or to profit by experience."

4 Pinter believes that intelligence may be described as one's ability to adapt himself adequately to relatively new situations in life.

Measurement of Intelligence. -- The measurement of intelligence has been given much consideration by authorities. According to psychologists, psychological concept accepts as intelligence the types of behavior which are measured by intelligence tests.

5 Binet conceived the idea that if his test items differentiate rather clearly between the two groups, they would be useful for determining those of high and low mental ability from an unknown group. Sensory tests,

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2 Symposium, "Intelligence and Its Measurement," Journal of Educational Psychology, XII (March and April, 1921), 123-46, 159-216.
3 Ibid.
spatial discrimination tests, memory-for-design tests and the like were included among his preliminary efforts. He found that some of the tests that had been proposed for measures for intelligence did not differentiate the two groups, while in the case of others a clear differentiation between bright and dull children was evident.

The first scale of intelligence was developed by Binet and Simon who wished "simply to show that it is possible to determine in a precise and truly scientific way the mental level of an intelligence, to compare the level with a normal level, and consequently to determine by how many years a child is retarded." The scale was comprised of tests arranged from the simplest to the most complex.

Terman and Kuhlman and others worked out other modifications in the scale as it was left by Binet and succeeded in correcting a number of its weak points. Terman extended it upward for adult level and Kuhlman added tests for very young children and infants.

William Stern proposed the use of the intelligence quotient to show the relationship between a child's mental age and his chronological age.

Jersild states "there is a relatively high degree of consistency in intelligence test ratings from year to year at the school age and beyond. Individuals tend to keep about the same rank or relative position from age to age."

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3. Ibid.
Recent findings of intelligence tests have revealed a steadily expanding mental difference between children of the same chronological age. Various aspects of understanding, imagination and reasoning of the young child have been described as follows:

1 Fox et al., propose the following characteristic patterns of intelligence as identifiable in young children:

1. Between the ages of seven and eleven, intellectual capacities are closely related.
2. The power of discrimination in sight and hearing improves.
3. Muscular sense shows a steady improvement; and the speed of movements, in such finer muscles as the fingers, increases.
4. Singular fondness for mechanical repetition, not only is indirect in words, but in action.
5. The capacity for memory is high.
6. Rely on their visual images.
7. The scope of attention is limited.
8. Common relations of space, number, granting differences, and contrast can all be grasped in greater or lesser degrees.

Gates et al., refer to additional patterns which characterize the intelligence of the young child:

1. He uses visual terms to denote meanings that are not primarily visual in nature, such as "I see" when he means "I know or I understand."

2. He displays ability to act in terms of recollections from the past and anticipation of the future.

3. He possesses ability, not only to respond to symbols, but to manipulate such symbols himself.

1 Charles Fox et al., Educational Psychology (New York, 1951), pp. 543-46.
4. He is interested in vicarious and melodramatic adventures.

5. He uses simple sentences predominantly.

6. He is restricted to smaller groupings within the class while he is in the early grades so far as social orientation in his friendships, his loyalties are concerned.

The Theory of Art. -- The theory of art is concerned with the educational values most often ascribed to Art instruction in school which is concerned with individual growth in the control of the materials of a continuously changing environment. In the interest of meeting the needs of this research, art as defined by authorities is presented in this section as well as the theories of art.

The Alabama Course of Study states that:

Art is a series of experiences which may help in solving problems of everyday living, to communicate ideas, thoughts and actions creatively, to develop sensitivity, appreciation and social understanding.

Lee and Lee refer to Art as "an interpretation of experiencing and feeling."

Winslow refers to art as being educational experiences dealing with the meeting of human needs as efficiently as possible through the use of materials. He believes art embraces experiences with information and with feelings as well as with activity.

Herbert Read emphasizes the role of art in increasing social understand-

standing and integration when he says:

As individuals we create in order to communicate and our creation is a pictorial language developed from color and line. He further states that art is a band which should not be the exclusive privilege of a class but should include the mass.

1

Hopkins et al., consider the integrating value of art for the individual. He states that integrating value depends upon a comprehensive idea of unity and that the vision of the possibility of such unity is a factor which motivates creative art strongly. "Wholeness," he believes, "permeates the activity, the experience and the product when full creativeness is carried on."

2

Dewey points out the importance of art as an experience. He believes "an experience" to be a total pattern of material experience running its course to fulfillment, and mere happenings or what is commonly termed experience. As experience approximates a complete unity. The motivation, the doing, the product, and the purpose complement each other.

3

Raup's theory of complacency is to Dewey's definition of an experience. He believes that life to be meaningful necessarily consists of succession of patterns comprised of disturbance, and return to complacency. He states that a "disturbance is not enjoyed for its own sake neither is there complete satisfaction in the state of complacency." According to Raup's theory, satisfaction comes from relieving the disturbance.

4

Landis points out that:

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4 Ibid.
The theory of an experience translated into practical terms for the classroom seems to show the necessity of providing the child with the possibility of art creativity that is meaningful to him. It places emphasis upon the art process as well as upon the art product and upon the relationship of process and product.

1 Whitford gives a broad summation of art talents and states:

Art talent may deal with observation, selective memory, creative or inventive ability, originality, constructive ability, and the freedom and accuracy of expression.

Although the definitions of art and its relationship to the child's total life have remained relatively consistent, art objectives and procedures have changed from time to time. However, there seems to be a carry-over of objectives and methods from one period to the other.

2 Hillpert lists these objectives of Art experiences:

1. "Art for Art's Sake" emphasizes art as a product for its own sake without utilitarian, social, or moral purposes. This art training gave very little consideration to experimental procedures and originality, having as its major result the development of skills and techniques.

2. Art, with appreciation as an objective, was a reaction against the limitations of the "Art for Art's Sake" movement. The emphasis gradually shifted toward appreciation which Winslow describes as "the act of evaluating, understanding and experiencing art or any expression of art through sensitive awareness of design and perception of worth or value ... there are ... emotional appreciation based upon the pleasure and satisfaction derived from beauty of design, color and tone ... an intellectual appreciation resulting from the understanding of aesthetic principles and artistic techniques ..."

3. Art for Creative Self-Expression. Hillpert states that to enrich experience, especially in the lower grades the emphasis

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3 Leon L. Winslow, Art in Elementary Education (New York, 1942), p. 49.
on creative self-expression has been justified on the basis of joy in the activity of exploring a wide variety of media.

The child then, thinking independently, expresses his own ideas and thoughts through whatever means seem best to him. Naturally, there are various stages of self-expression through which a child goes. These stages have been summarized by leading art authorities.

1. Lowenfeld et al. have listed the stages of self-expression in the primary child in the following manner: (1) Scribbling stage, (2) First representational attempts or the preschematic stage, (3) The achievement of a form concept or the Schematic stage.

2. "Correlation of art" is referred to by Winslow who says that the importance of correlation lies in the fact of bringing art into mutual or reciprocal relationship with all the other school subjects. He further states that the correlation of art has provided many pupils with an opportunity to experience art activities not otherwise provided in the school program.

3. The Industrial Art, says Hillpert was introduced originally in education programs as a reaction against art experiences limited to fine arts. He states that this activity of making things stimulated by the topic of interest afforded the child an opportunity to plan, execute, and evaluate his work with esthetic as well as functional values.

The psychology of art has attempted to provide suggestions to such problems as the following: (1) Does the young child, as in nursery school and the early grades, use crayon or other material for purposes other than play or self-expression? (2) What may account for the observed variability in the interests of different children handled? (3) Why does there seem to be in later grades a gradual withdrawal of most children from art activities? (4) Is there some ascertainable hereditary factor operative that makes it difficult, if not impossible to get, even with

What is involved in the creative process, and what, if anything, can education do to encourage its furtherance in more and more children?

Mott found that the child draws best that which is interrelated.

Green says that "matter", "form", and "content" are prior artistic categories. Some artistic categories, he states, are more basic than others since they refer to characteristics which every work of art must, by definition, possess. Hence, "matter", "form", and "content" are categories of this type in the sense of being necessarily applicable by definition, to every work of art in any medium.

Four main methods of art education today may be widely observed in classroom practice today. These methods are listed by Landis as follows:

Four approaches to art education:

1. The Directing Method which represents that practice in which the child is required to follow certain prescribed rules and directions. These include measuring and making geometric designs, tracing around pattern figures, copying pictures; making accurate pictures; using colors according to accurate specifications; and drawing according to definite specifications.

2. The "Free-Expression" method instead of setting forth definite tasks to be accomplished, as does the Directing Method allows a maximum of freedom. Choice of subjects, materials, and ways of using materials is left entirely in the hands of the child.

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3. The Eclectic Method is an attempt to compromise between the Directing Method and the Free-Expression Method. A certain amount of freedom is allowed, but that freedom is interspersed with definite directions, in the hope of developing skills and techniques along with expression.

4. Meaningful Method is concerned with this "new direction." The underlying principles of this approach to art education, (1) that purpose is essential, (2) that there be some "relation of means to consequences," are now general educational theory.

The Measurement of Art Ability.— This section of the review of the related literature will point up what has been done to develop valid measurement of art ability wherever found.

According to Garrison, three types of tests may be distinguished in the field of art education:

1. The Lewenz Test in Fundamental Abilities covers subject-vocabulary and observational and analytic abilities in proportion, light and shade, and perspective.

2. The Cattell-Reynolds Test of Artistic Aptitude presents materials for the evaluation of memory and discrimination of color, sense of color harmony, appreciation of composition, and motor ability in drawing.

3. The Art Ability by Knauber and Pressley is a performance test designed to measure the various components of art such as memory, observation, imagination, design, and sensitivity.

Heir and McCloy constructed a novel apparatus by means of which compositions could be produced at will by manipulating colored light on gray-green colored figures and backgrounds. The apparatus offered the advantage of being suitable for subjects of all ages, regardless of training and skill in handling the media of art.

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The Kline-Carey Drawing Scale consists of series of samples for measuring (1) representation and (2) design and composition. The first series uses such subject matter as a house, a tree in silhouette, a running boy, and a rabbit in scales having 14 samples; the second uses the themes of illustrations, posters, structural designs, and borders.

The Meir Art Judgement Test, which may be given as a group or individual test in which the pupil is confronted with 100 pairs of artistic specimens adapted from many sources. A consideration of the complete series of paired specimens insures a comprehensive sampling of the various elements which enter into aesthetic judgement.

Thomas Munro concludes that any formal test of children's creative ability in art should be of the work-sample type. It must not merely call for reference, true-false answers, or even completion of incomplete forms. It must give the child a chance to construct a complete, independent form of his own since his power to do this is precisely what we are interested in.

Grimes and Borden at Ohio State University in an effort to avoid stereotyped courses proposed a check-list for evaluation in art which includes: (a) initiative, (b) concentration, interest and motivation, (c) 

2 Ibid.
3 Mary Ernestine Banks, "Two Approaches to Teaching of Art to Two Selected Groups of Sixth Grade Pupils." Unpublished M. A. Thesis, School of Education, Atlanta University, Atlanta, Georgia, (1954), p. 12.
judgement, and cooperation. They believe, that having in mind, the very important, less easily measured esthetic values, the informal subject type of evaluation should also be employed. The habit of appraising the results of each unit of work on the basis of the specific objectives may be of greater value than any elaborate system of tests with scoring.

Vaughn believes that one of the best methods of evaluating the pupil's art work, is that of keeping cumulative records from week to week, and year to year. He believes also, if with this can be careful case-histories, including interests, attitudes and achievements, there will be a rich source for studying not only the ranking within a group, and the progress of an individual over a period of years, but also the degree of success in the teaching of art.

It is common agreement that just as children follow a normal pattern of psychological and physiological growth they also proceed in a relatively normal pattern of aesthetic development. The unique of their individual expression shines more clearly. What then are the similarities to be found in the developmental pattern of young children engaged in artistic pursuits?

As a result of test results and research, patterns which characterize general growth in art have been indicated to be the following.

Schiebe experimenting with children between the ages of 4 and 13 by having the subjects draw a tree to suggest states of feeling. This

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experiment demonstrated that the specific tone of feelings and their co-
gnate conditions or qualities of consciousness are determined and governed
by empirical motor characteristics.

1

Korperth-Tippel, studying the reactions of children of 3 to 14 years,
found that while rudiments of esthetic expression could be detected even
among the youngest subjects, the attention of the typical child was up to
the eighth year primarily upon the object of the picture.

2

Anastasi and Foley found that drawings of children between the ages
of 6 and 12 disclosed that intercultural differences appear in the draw-
ings, and that there was a general correspondence between the subject
matter and details of the drawings and concrete cultural factors present
where the drawing was produced.

3

Markey found that individual differences are disclosed even at a
very young age - differences attributed to such factors as more imaginative
behavior and association with older children. He found that imaginative
play of children of lower socio-economic status was somewhat more prosaic
than the play of higher status.

4

Lowenfeld observed that normal vision is by no means essential for
artistic production; that it tends to handicap rather than facilitate

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1 G. Schiebe, "Erlebnisnotorik and Zeichnerischer (Physiognomischer)
Ausdruck bei Kindern und Jugendlichen," Zur Psychogenese der Ausdrucks
Gestaltung, XLIII (1934), 383, as cited in Art In American Life and
Education.

2 A. Anastasi et al., "An Analysis of Spontaneous Drawings By Children
in Different Cultures," Journal of Applied Psychology, XX (1936), 669-726.

3 F. V. Markey, "Imaginative Behavior of Young Children," Child
Development Monograph, 1935, Number 18.

4 Viktor Lowenfeld, The Nature of Creative Ability (New York, 1939),
as cited in Fortieth Yearbook, Art In American Life and Education.
expressive work. Complete dependence upon visual impressions tends to limit the work essentially to a reproductive character.

1 Gesell, experimenting with young children's drawings, found that the ability to draw follows a more or less definite pattern of development. Gesell found that the drawings of six-year olds show improvement in precision and detail over those of five-year olds.

2 In 1918 Waddle listed four stages in the development of drawing. (1) the scribble stage, from two to five years, when the child's drawing is random and suggests an object which the child later names, (2) the artistic illusion stage, from five to twelve years of noncritical drawings, (3) imaginative stage in which a child can depict what is in his mind, and (4) the final stage, the rebirth of artistic ability.

3 In 1934 McCarty experimented with 30,000 kindergarten and first-grade children, asking them to draw anything they wished, the most popular object was the human figure. Next in popularity were houses, trees and furniture.

4 Hurlock and Thomas in 1934 asked kindergarten, and first- and second-grade children, ranging in age from 4½ to 8½ years to draw pictures of eight objects, a man, tree, girl, house, dog, flower, automobile and boat. They were allowed to use crayons or pencils. Crayons took preference. The younger children expressed a preference for crayons and the older children

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2 Ibid.
3 S. A. McCarty, _Children's Drawings: A Study of Interests and Abilities_ (Baltimore, 1924).
said they used it because they thought it appropriate. There was, in
the use of background, such as waves surrounding the trees and boats,
an increase in accuracy of number and details, with increase in age.

In a study of the paintings of young children, Beach and Bressler,
in 1944 noted five developmental phases:

1. Relatively uncoordinated scribbling, sweeping, and spreading
color on the page. This is an exploratory phase, in which the
child's body movements are random and the results are usually
chaotic.

2. Accidentally attained design.

3. Consciously sought design.

4. Representation such as a horse or a man. This is seen in the
paintings of six and seven year-olds.

5. Full realization of representation and design, in which there
is a more highly developed communication of feeling and idea.
Perspective is used but the work need not be realistic.

In 1931 Knauber found that children in the first, second, and third
grades preferred to draw things for which they had learned patterns. They
showed a preference for their natural surroundings, such as people, trees,
flowers, or houses or things they have learned to imitate. As the child
grows older, the subject of their art product is influenced by environment
and recent happenings. Marked individual differences are revealed.

Gesell defined the developmental pattern in crayoning for children
from four to six years of age thusly:

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1. Beach and M. H. Bressler, "Phases in the Development of Children's
Paintings," Journal of Experimental Education, XIII (1944), 1-4, as cited

2. A. J. Knauber, "A Study of the Art Ability Found in Very Young

3. Gesell and L. B. Ames, "The Development of Directionality in
1. Copies a cross.
2. Copies a square.
3. Draws a recognizable man.
4. Begins to differentiate between square and oblique cross drawn from model.

The use of water color paints follows shortly after the use of crayons.

Blum and Dragositz from a study in 1947 found that the younger the child the more pronounced is the preference for bright colors. Pastel shade and hues are conceived as ugly by young children.

Dashiell noted preferences for certain color combinations are indefinite; however, red-green and red-blue combinations are the favored ones, while orange-green is the least favored.

Lowenfeld has defined certain characteristic patterns for the young child in creative expression in the following wise:

1. Scribbling - an uncontrollable longitudinal or circular motion.
2. First Representational Attempts or Preschematic Stage - a stage when relationship with reality has been achieved.
3. The Achievement of a Form Concept or Schematic Stage - expression of the child's longing after a long search for a definite concept of man and environment.

Gaitskell in agreement with Lowenfeld describes the developmental patterns in this wise:

1. Scribbled - Almost every child begins his art career by manipulating his materials. He does not start by painting pictures; he scribbles in paint. As time passes, the scribbles produced become more organized and the marks within them become more differentiated as the child develops skill by means of practice with the media engaging his attention.

2. Controlled Manipulation - The next common stage of development occurs when from his random marks or forms, the child produces a crude symbol which represents some object in his environment. Most children first make a symbol for a human being, although symbols for other objects may occur.

3. Symbolic Communication - Once the child establishes a symbol he is usually quick to add significant details to it, and in this differentiation he makes his pictorial intention clearer to us.

4. Schematic Stage - Next children arrive at the "schematic stage". Various symbols are related to one another and these symbols are placed within their pictorial setting. Base lines and sky lines appear, as do curious pictorial compositions known as "X-ray" series and "fold over" pictures.

Lowenfeld described additional patterns as follows:

Repetition is a certain escape pattern in which the child withdraws whenever he cannot do justice to a situation or there may be a specific interest. Tantrum is an emotional pattern, also a repeated action which is used whenever the child cannot adjust to a given situation.

Hiner found that children in the first grade are (1) imaginative and free, (2) manipulative and trusting, (3) naturally creative and constructive, (4) experience joy and continue to develop through being allowed to follow their own free choice, (5) reliant on a complete understanding of his creations by those adults closest to him, namely, his parents and his teachers.

The Relationship Between Intelligence and Artistic Ability. — In reviewing the literature on the relationship between intelligence and

1 Viktor Lowenfeld, "Virginia Always Draws the Same Thing," School Arts Journal, LIII (June, 1954), 7.
2 Leon L. Winslow, Art In Elementary Schools (New York, 1942), p. 18.
artistic ability, the writer found that this subject has interested art educators for a long time. Hence, art instruction has been called upon to consider more nearly the mentality and interests of the child. Basic viewpoints are presented as follows:

1. Garrison states that the relationship between intelligence and artistic ability has been revealed in connection with the development, analysis, and interpretation of intelligence tests. There are certain phases of art ability that are dependent upon a clustering of certain specific abilities. The dependency of art ability on insight creative thinking, and associational thought are all closely identified with intelligence and have been identified in a number of studies.

2. Gaitskell states that "art education has considerable significance with regard to the general education of slow learners." A child who is adversely deficient in one area of his personality is likely to be adversely deficient in other areas. It is reasonable to suppose that this process may operate in reverse, and that a mentally retarded child who profits from art activities might undergo desirable changes in his personality.

3. Viktor Lowenfeld has defined certain characteristic patterns in creative expressions as being indicative of mental or emotional disturbances.

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Florence Goodenough reported that a close relationship is apparent between concept development as shown in drawing and general intelligence.  

Korschenstein and Ivanoff found marked sex differences, usually in favor of the boys.

Winslow found that the pupils who ranked high in intelligence were artistically superior.

Goodenough disclosed that "children of inferior mental ability sometimes copy well, but they rarely do good original work in drawing. Conversely the child who shows real creative ability in art is likely to rank higher in general mental ability."

Winslow believes children's habits, attitudes, skill and knowledge will be brought about through investigating and creating. Thinking and performing are both aspects of art as experience. He feels it is necessary to make provisions for individual differences since it is recognized that children's activities and interests vary according to their social and mental development.

Christensen and Karwoski emphasized the point that art tests "bring out a special phase of mental activity which is not reached by intelligence tests."

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2 Ibid., p. 5.
5 Leon L. Winslow, *Art In Elementary Education* (New York, 1942), p. 52.
Anna Dunser concluded that mental growth goes from information to action, from impression to expression. Information is assimilated and becomes a part of the child before it can come forth again as expression. The self expression leads naturally to a desire to know more and more and so the mental growth continues.

The writer is of the opinion that there is need for the child to create meaningfully, that he must have something to say; he must know how to use the tools and materials for his age level and aptitude.

Research Studies—The last section of the review of the Related Literature is concerned with studies which attempt to throw some light on the relationship between intelligence and artistic ability. Recent research has greatly enlarged the understanding of the probable relationship of factors involved in determining artistic talent. Hence, the major ideas expressed in these studies are presented here in support of the writer's viewpoint.

Sterinzinger held that artistic aptitude consists of first, certain general abilities, such as "sensory concentration, ability to recall, patience and perseverance; and second, some specific function-complex expressed as to ability to conceive and perceive form, to interpret, to approach relationships and harmony of color and line, as well as to imagine. The latter ability is characterized by precision in imagining and facility in enlarging, multiplying and fusing images."

In 1907 Claperede proposed a study of the developmental stages of drawing for the purpose of ascertaining what relationship, if any, exists between aptitude in drawing and general intellectual ability as shown by school work. Claperede's plan was adopted by Ivanoff. Ivanoff worked out a plan of scoring the drawings according to a six-point scale which considered: (a) sense of proportion, (b) imaginative conception, and (c) technical and artistic value, comparing the obtained values with teacher's rating for general ability, standing in each school subject, and certain moral and social traits.

In 1937 Lark-Horovitz, experimenting in order to discover reasons for aesthetic perceptions, found the reasons for liking certain pictures were (1) the subject of or content of the picture, and (2) the color or qualities. Children of average intelligence emphasized the subject itself, the reality in presentation, and the colors. Gifted children were influenced more by design and color of the picture and the knowledge, through analysis which it was gathered from. Their appreciation demonstrated a more emotional and imaginary character than the children of average intelligence.

In 1938 Lark-Horovitz found that the attributes of pictures, not the facial expression of the person shown in the picture, are of primary interest to children. They concluded that the type of pictures that appeals to children is dependent partly upon the ages and intelligence of the child.

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In 1939 the influence of intelligence or aesthetic perception was noted by Lark-Horovitz. She found that gifted children select patterned textiles on the basis of technique, line and shape, texture and originality. Children of average intelligence make their choices in terms of general, personal and associative qualities.

Drought proved in 1929 that children's responses to pictures shows that sensitivity to good art increases with education and general training. He found a positive correlation in nearly all instances.

In 1926 Goodenough reported sex differences in children's drawings which revealed the way they represent the human figure. Boys are found to be better at representing the bodily proportions more correctly than are girls. Girls like to add ornamentation. She found that the intellectual level of the child influences drawing. Bright children at every age are superior in their drawing skills, to children of average or below average intelligence.

In 1931 Goodenough reported a high correlation between her drawing scale of intelligence and the Stanford Binet I. Q. scores, using 334 children between the ages of three and eleven.

In 1936 Mier and Tiebout found that measures of artistic composition

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4 Ibid., p. 82.
and verbal tests of intelligence are usually higher in the first grade. Their findings indicated that persons who produce artistic works are slightly superior in verbal intelligence test scores, but that artistic ability is not dependent upon such intellectual capacity.

Carroll and Eurich found mentally gifted children to be superior to borderline and feeble minded children in art judgment ability but not so superior in abstract intelligence. They concluded that abstract intelligence at the extreme seems to affect art judgment ability.

Hirsh on the basis of research which extended over a period of ten years found that artistic ability depends upon six factors: (1) mechanical ability, (2) energy preservation, (3) intelligence, (4) creative imagination, (5) perceptual facility, and (6) aesthetic judgment.

Tiebout experimented with eleven artistically superior children (ages 5 years through 10). Tiebout's data showed that the following factors seemed to differentiate these individuals: (a) completeness and accuracy of observation, (b) recall of observed materials after an interval of ten days to six months, (c) uniqueness in imaginal construction of objects and situations from meaningless forms, (d) from discrimination or apprehensions of the main form of objects, (e) feature discrimination involving observation and comparisons to determine variant items in a series of visual stimuli.


Stephen and Miller experimented with talented pupils at Carnegie Institute and concluded that there is a close relationship between intelligence and artistic ability. They found that the child whose intelligence level was above normal had a 50-50 chance of being rated "good" or "superior" on the basis of these same criteria.

Summary of the Related Literature.— The summation of the findings of the literature in this area of research has been organized under these captions: (a) The Theories of Intelligence, (b) The Measurement of Intelligence; (c) The Theories of Art, (d) The Measurement of Art Ability, (e) The Relationship Between Intelligence and Artistic Ability, and (f) The Research Studies in the Field.

Theories of Intelligence

The following are statements on theories of intelligence which the writer regards as being significant.

Intelligence consists of a number of relatively independent and largely correlated, specialized abilities of various types such as memory, imagination, honesty, and language ability.

Intelligence is composed of general factor which is present always and of specific factors which combine with the general factor to determine total activity.

Intelligence is composed of nine primary mental abilities (a) visual or spatial ability, (b) perceptual ability, (c) numerical ability, (d) logical or verbal relations ability, (e) fluency in dealing with words.

(f) memory, (g) inductive ability, (h) deductive ability, (i) ability to restrict the solution of a problem.

Intelligence is the organization of abilities to learn, to grasp facts with alertness and accuracy.

Individuals differ in the ability to learn, to adjust to novel situations and to manage things, people and ideas, may be considered a definition of intelligence.

Intelligence is the ability of the individual to learn to adjust himself to his environment.

Intelligence is the capacity to learn or to profit by experience.

Intelligence is the ability of the individual to adapt himself adequately to relatively new situations.

Intelligence is one's ability to carry on abstract thinking.

Measurement of Intelligence

Binet and Simon developed the first scale of intelligence with the purpose of proving that it is possible to determine in a precise and scientific way the mental level of intelligence.

Stern proposed the use of the intelligence quotient to show the relationship between a child's mental age and his chronological age.

Jersild states that there is a high consistency in intelligence test ratings from year to year at the school age and beyond.

Fox et al., propose characteristic patterns of intelligence which are identifiable in young children.

Theories of Art

According to the Alabama Course of Study, Art is a series of experiences
which may help in solving problems of everyday living.

To Lee and Lee, Art is an interpretation of feeling and experiencing.

According to Winslow, Art is an organized body of educational experiences dealing with the meeting of human needs as efficiently as possible through the use of materials.

Read states that individuals create in order to communicate and their creations is a pictorial language developed from color and line.

Hopkins asserts that the integrating value of art depends upon a comprehensive idea of unity and the vision of the possibility is a factor which motivates creative art strongly.

Dewey states that an art experience approximates a complete unity, the motivation, the doing, the product and the purpose compliment each other.

Landis states that emphasis must be placed upon the art process as well as upon the art product and upon the relationship of process and product.

Measurement of Art Ability

Meir and McCloy constructed a novel apparatus for revealing art ability by means of which compositions could be produced at will by manipulating colored light on gray-green colored figures and background.

Kline-Carey developed a drawing scale which consists of series of samples for measuring (1) representation and (2) design and composition. The first series used such subject matter as a house, a tree in silhouette, a running boy, and a rabbit in scales having 14 samples; the second uses the themes of illustrations, posters, structural designs and borders.
Meir developed an Art Judgement Test which may be used as a group or individual test in which the pupil is confronted with 100 pairs of artistic specimens adopted from many sources.

Munro concludes that any formal test of children's creative ability in art should be of the work-sample type, providing the child a chance to construct a complete, independent form of his own since his power to do this is precisely what we are interested in.

Grimes and Borden proposed a check-list for evaluation in art which includes: (a) initiative, (b) concentration, (c) interest and (d) motivation.

Vaughn believes one of the best methods of evaluating a pupil's work is that of keeping cumulative records from week to week, and year to year.

As a result of tests and research, patterns which characterize general growth in art have been indicated and are presented in the paragraphs to follow.

Korperth-Tippel says the attention of the typical child was up to the eighth year primarily upon the object of the picture.

Anastasi and Foley state that the drawings of children between the ages of 6 and 12 reveal intercultural differences, and there is a factor present when drawing is produced.

McCarthy found that when it comes to drawing, the most popular figure for the first-grade child is the human figure. Next in popularity were houses, trees, and furniture.

Beach and Bressler have noted that the patterns of young children's paintings are indicated by five developmental phases which are as follows: (1) relatively uncoordinated scribbling, sweeping, and spreading color on
the page, (2) accidentally attained design, (3) consciously sought design, (4) representation such as a horse or a man and (5) full realization of representation and design, in which there is a more highly developed communication of feeling and idea.

Gesell defines the developmental pattern in crayoning for children from 4-6 years as follows: (1) copies a cross, (2) copies a square, (3) draws a recognizable man and (4) begins to differentiate between square and oblique cross drawn from model.

Lowenfeld states that normal vision is by no means essential for artistic production; that it tends to handicap rather than facilitate expressive work.

Lowenfeld has defined certain characteristic patterns in creative expression as (1) Scribbling, 2 to 4 years, (2) Representational Attempt, 4-6 years, and (3) the Achievement of a Form Concept, 7-9 years.

Gaitskell says that almost every child begins his art career by manipulating his materials.

Relationship Between Intelligence and Artistic Abilities

The statements which follow are pertinent to the relationships which have been observed between intelligence and artistic abilities.

Garrison states that the relationship between intelligence and artistic ability has been revealed in connection with the development, analysis, and interpretation of intelligence tests.

Gaitskell says that art education has considerable significance with regard to the general education of slow learners.

Lowenfeld states that characteristic patterns in creative expressions
are indicative of mental or emotional disturbances.

Winslow states that thinking and performing are both aspects of art as experience.

Goodenough reports that "children of inferior mental ability sometimes copy well, but they rarely do good original work in drawing. Conversely the child who shows real creative ability in art is likely to rank higher in general mental ability."

Christensen and Karwoski emphasize the point that art tests bring out a special phase of mental activity which is not reached by intelligence, energy preservation, creative imagination, perceptual facility and aesthetic tests.

Research Studies

Lork-Harovitz found that gifted children's reasons for aesthetic perception is influenced more by design and color of the picture and the knowledge, through analysis of which it is gathered from. Their choice demonstrates a more emotional and imaginary character than the children of average intelligence.

Drought proved that children's response to pictures shows that sensitivity to good art increases with education and general training.

Goodenough found that the intellectual level of the child influences drawing. Bright children at every age are superior, in their drawing skills, to children of average or below-average intelligence.

Mier and Tiebout found that measures of artistic composition and verbal tests of intelligence are usually higher in the first-grade; that persons who produce artistic works are slightly superior in verbal
intelligence, but that artistic ability is not dependent upon such intellectual capacity.

Carroll and Durich concluded that abstract intelligence at the extreme seems to affect art judgement ability.

Mier on the basis of a ten-year study found that artistic ability depends upon six factors: (1) mechanical ability, (2) energy preservation, (3) intelligence, (4) creative imagination, (5) perceptual facility, and (6) aesthetic judgement.

Stephen and Miller concluded that there is a close relationship between intelligence and artistic ability and that the child whose intelligence level is above normal has a 50-50 chance of being rated "good" or "superior" on the basis of these same criteria.
CHAPTER III

PRESENTATION, ANALYSIS, AND INTERPRETATION OF THE DATA

Introduction.— The first and second chapters of this study delineated the procedural steps involved in ascertaining the relationship, if any, between intelligence and artistic ability. The group used for study was thirty first-grade pupils at the Dolomite Junior High School, Dolomite, Alabama. Briefly stated the steps included: (1) selection and administering a valid test; (2) selection and administering of a drawing test; (3) administering an original painting test; (4) computation of the statistics pertinent to the problem involved in the study; (5) analysis of the data secured in the study; and (6) interpretation of the results which were obtained.

It is the purpose, then, of this chapter to explain how the group was evaluated and the ratings which the pupils received.

Statistical Techniques Used in Computing the Data.— In order that the answer to the problem could be obtained, the following statistical measures were put into operation in the study: (1) the range was used to indicate the difference between the highest and the lowest score made on the test and also to facilitate the determination of the class-intervals which were used in constructing the tables, (2) the mean was used as an arithmetic average of the group, (3) the median indicated the point at which fifty per cent of the cases fell above and below, (4) the standard deviation was used as a measure of dispersion, (5) the standard error was used as a
measure of score accuracy in estimating test reliability, (6) the standard error of the difference between the means was used as a ratio as a difference between the two means in order to establish the "t" ratio of significance, and (7) Fisher's "t" was used to determine the significance of the scores made on the various tests in order to accept or reject the null hypothesis of the study to wit:

That no real difference exists between intelligence and artistic abilities of children in the primary grades.

The performances of the group as scored on the various tests and as rated on the age-level instrument are in the data which are shown in Tables 1 through 18. The report of these findings is presented in categorical arrangement in accordance to the following order:

(a) Significant Age-Levels
(b) Basic Distribution of Tests
(c) Significant Differences on the Tests
(d) Significant Correlations (r's) Among the Test Variables

Significant Age-Levels

Chronological Ages.-- The data on the Chronological Ages for the thirty first-graders of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955 are presented in Table 1, page 48.

The chronological ages ranged from a low of six years and five months or 6.5 to a high of seven years and six months or 7.6, with a mean age of 7.0, and a median age of 6.73.

Sixteen or 53.33 per cent of the chronological ages were above the mean, twelve or 40.00 per cent of them were below the mean, and two or 6.66 per cent of the pupil's chronological ages were within the mean class-
TABLE 1


<table>
<thead>
<tr>
<th>Age</th>
<th>Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.4 - 7.6</td>
<td>6</td>
<td>20.00</td>
</tr>
<tr>
<td>7.1 - 7.3</td>
<td>10</td>
<td>33.33</td>
</tr>
<tr>
<td>6.8 - 7.0</td>
<td>11</td>
<td>36.67</td>
</tr>
<tr>
<td>6.5 - 6.7</td>
<td>3</td>
<td>10.00</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Mean: 7.0  
Median: 6.75

interval.

Age Levels Relative to Human Figure.--- The data on the Age-Levels, with reference to the aspect of drawing the Human Figure as measured by the Viktor Lowenfeld Scale for the thirty first-graders of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955 are presented in Table 2, page 49. These data indicated that 4 or 13.3 per cent of the pupils ranked in the highest age-level of maturity within the 7-9 year range; that the largest number of pupils in the group, which was 20 or 66.7 ranked within
TABLE 2

Age Levels with Reference to the Human Figure as Measured by the Viktor Lowenfeld Scale for the Thirty First-Graders of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955

<table>
<thead>
<tr>
<th>Age Level</th>
<th>Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-9</td>
<td>4</td>
<td>13.3</td>
</tr>
<tr>
<td>4-6</td>
<td>20</td>
<td>66.7</td>
</tr>
<tr>
<td>2-4</td>
<td>6</td>
<td>20.0</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The 4-6 age-level of maturity and 6 or 20.0 per cent ranked within the 2-4 age-level of maturity.

Age Levels Relative to Color.-- The data on the Age-Levels, with reference to the aspect of Color as measured by the Viktor Lowenfeld Scale for the thirty first-graders of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955 are presented in Table 3, page 50. These data indicated that 3 or 10 per cent of the pupils ranked in the highest age-level of maturity within the 7-9 year range; that the largest number of pupils in the group, which was 21 or 70 per cent ranked within the 4-6 age-level of maturity; and 6 or 20 per cent ranked within the lowest age-level of maturity, the 2-4 year range.

Age Levels Relative to Space.-- The data on the Age-Levels, with reference to the use of Space as measured by the Viktor Lowenfeld Scale
# TABLE 3

**Age Levels with Reference to Color as Measured by the Viktor Lowenfeld Scale for the Thirty First-Graders of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955**

<table>
<thead>
<tr>
<th>Age Level</th>
<th>Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-9</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>4-6</td>
<td>21</td>
<td>70</td>
</tr>
<tr>
<td>2-4</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

For the thirty first-graders of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955 are presented in Table 4, page 51.

These data indicated that 2 or 6.67 per cent of the pupils ranked in the highest age-level of maturity within the 7-9 year range; that the largest number of pupils in the group, which was 20 or 66.67 per cent ranked within the 4-6 age-level of maturity; and 8 or 26.66 per cent ranked within the lowest age-level of maturity, the 2-4 year range.

**Age Levels Relative to Design.**—The data on the Age-Levels, with reference to Design as measured by the Viktor Lowenfeld Scale for the thirty first-graders of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955 are presented in Table 5, page 51. The data with reference to the use of Design by the thirty first-graders indicated that 4 or 13.3 per cent of the pupils ranked in the highest age-level of...
### TABLE 4

**Age Levels with Reference to Space as Measured by the Viktor Lowenfeld Scale for the Thirty First-Graders of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955**

<table>
<thead>
<tr>
<th>Age Level</th>
<th>Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-9</td>
<td>2</td>
<td>6.67</td>
</tr>
<tr>
<td>4-6</td>
<td>20</td>
<td>66.67</td>
</tr>
<tr>
<td>2-4</td>
<td>8</td>
<td>26.66</td>
</tr>
</tbody>
</table>

Total 30 100.00

### TABLE 5

**Age Levels with Reference to Design as Measured by the Viktor Lowenfeld Scale for the Thirty First-Graders of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955**

<table>
<thead>
<tr>
<th>Age Level</th>
<th>Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-9</td>
<td>4</td>
<td>13.33</td>
</tr>
<tr>
<td>4-6</td>
<td>17</td>
<td>56.67</td>
</tr>
<tr>
<td>2-4</td>
<td>9</td>
<td>30.00</td>
</tr>
</tbody>
</table>

Total 30 100.0
maturity within the 7-9 year range; that the largest number of pupils in the group, which was 17 or 56.7 per cent ranked within the 4-6 age-level of maturity; and 9 or 30.0 per cent ranked within the lowest age-level of maturity, the 2-4 year range.

Basic Distribution of Tests

Results on the California Test of Mental Maturity (Total Score).—The data on the Total Mental Factors component of the California Test of Mental Maturity as revealed by the raw scores obtained by the thirty first-grade pupils of the Dolomite Junior High School, Dolomite, Alabama, are presented in Table 6, page 53.

The raw scores ranged from a low of 34 to a high of 81, with a mean score of 62.09, a median score of 65.00, a standard error of the mean of 2.27, and a standard deviation of 12.24. The mean score of 62.09 was equivalent to a grade-placement of 1.3.

Sixteen or 53.34 per cent of the pupils scored above the mean, 12 or 43.33 per cent of them scored below the mean, and 1 or 3.33 per cent of the pupils scored within the mean class-interval.

T-Score Equivalents on the California Test of Mental Maturity.—The data on the T-score equivalents of the raw scores on the California Test of Mental Maturity as obtained by the thirty first-grade pupils of the Dolomite Junior High School, Dolomite, Alabama are presented in Table 7, page 54.

The T-score equivalents ranged from a low of 29 to a high of 85, with a mean score of 49.34, a median score of 49.66, a standard error of the mean of 1.30, and a standard deviation of 7.06. The mean score of 49.34
TABLE 6

<table>
<thead>
<tr>
<th>Scores</th>
<th>Number</th>
<th>Per Cent</th>
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<tbody>
<tr>
<td>79-81</td>
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<tr>
<td>76-78</td>
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<tr>
<td>73-75</td>
<td>4</td>
<td>13.34</td>
</tr>
<tr>
<td>70-72</td>
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<tr>
<td>43-45</td>
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<td>0.00</td>
</tr>
<tr>
<td>40-42</td>
<td>1</td>
<td>3.33</td>
</tr>
<tr>
<td>37-39</td>
<td>1</td>
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<tr>
<td>34-36</td>
<td>2</td>
<td>6.67</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>30</td>
</tr>
</tbody>
</table>

Mean \[ 62.09 \]
Median \[ 65.00 \]
S. D. \[ 12.24 \]
S. E. M. \[ 2.27 \]
Cr. Pl. \[ 1.3 \]
TABLE 7

<table>
<thead>
<tr>
<th>Scores</th>
<th>Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>64-66</td>
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<tr>
<td>61-63</td>
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<td>28-30</td>
<td>3</td>
<td>10.00</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.00</td>
</tr>
</tbody>
</table>

**Mean** 49.34  **Median** 49.66  **S. D.** 7.06  **S. E. M.** 1.30  **Gr. Pl.** 1.3
was equivalent to a grade-placement of 1.3. Thirteen or 43.30 per cent of the pupils scored above the mean, fourteen or 46.70 per cent of them scored below the mean, and 3 or 10.00 per cent of the pupils scored within the mean class-interval.

**Results on the Goodenough Draw-A-Man Test (Total Score).**—The data on the Goodenough Draw-A-Man Test as revealed by the raw scores obtained by the thirty first-grade pupils of the Dolomite Junior High School, Dolomite, Alabama are presented in Table 8, page 56.

The raw scores ranged from a low of 4 to a high of 19, with a mean of 13.1, a median score of 13.33, a standard error of the mean of .573, and a standard deviation of 3.09. The mean score of 13.1 was equivalent to an age-placement of 6.3.

Seven or 23.33 per cent of the pupils scored above the mean, 14 or 46.67 per cent scored below the mean, and 9 or 30.00 per cent scored within the mean class-interval.

**T-Score Equivalents on the Goodenough Draw-A-Man Test (Total Score).**—The data on the T-score equivalents of the raw scores on the Goodenough Draw-A-Man Test as obtained by the thirty first-grade pupils of the Dolomite Junior High School, Dolomite, Alabama are presented in Table 9, page 57.

The T-score equivalents ranged from a low of 21 to a high of 75, with a mean score of 50.27, a median score of 49.67, a standard error of the mean of 1.16, and a standard deviation of 6.26. The mean score of 50.27 was equivalent to an age-placement of 6.3.

**Results on the Original Painting Test (Total Score).**—The data on the Total Factors Component of the Original Painting Test as revealed by
TABLE 8


<table>
<thead>
<tr>
<th>Scores</th>
<th>Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>19-21</td>
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<td>3.33</td>
</tr>
<tr>
<td>16-18</td>
<td>6</td>
<td>20.00</td>
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<tr>
<td>13-15</td>
<td>9</td>
<td>30.00</td>
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<td>10-12</td>
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<td>40.00</td>
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<tr>
<td>7-9</td>
<td>1</td>
<td>3.33</td>
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<tr>
<td>4-6</td>
<td>1</td>
<td>3.33</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>99.99</td>
</tr>
</tbody>
</table>

Mean 13.1  
Median 13.33  
S. D. 3.09  
S. E. M. .573  
Age-Pl. 6.3

The raw scores obtained by the thirty first-grade pupils of the Dolomite Junior High School, Dolomite, Alabama, are presented in Table 10, page 58.
### Table 9

**Distribution of the T-Score Equivalents of the Raw Scores on the Goodenough Draw-a-Man Test as Obtained by the Thirty First-Grade Pupils of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955**

<table>
<thead>
<tr>
<th>Scores</th>
<th>Number</th>
<th>Per Cent</th>
</tr>
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<tbody>
<tr>
<td>67-69</td>
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<td>3.33</td>
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<tr>
<td>64-66</td>
<td>1</td>
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<td>61-63</td>
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<td>40-42</td>
<td>2</td>
<td>6.67</td>
</tr>
<tr>
<td>37-39</td>
<td>1</td>
<td>3.33</td>
</tr>
<tr>
<td>34-36</td>
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<td>0.00</td>
</tr>
<tr>
<td>31-33</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>28-30</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>25-27</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>22-24</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>19-21</td>
<td>1</td>
<td>3.33</td>
</tr>
</tbody>
</table>

**Total** 30 100.00

**Mean** 50.27  
**Median** 49.87  
**S. D.** 6.26  
**S. E. M.** 1.16  
**Age-Pl.** 6.3
TABLE 10

<table>
<thead>
<tr>
<th>Scores</th>
<th>Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-16</td>
<td>3</td>
<td>10.00</td>
</tr>
<tr>
<td>13-14</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>11-12</td>
<td>4</td>
<td>13.33</td>
</tr>
<tr>
<td>9-10</td>
<td>7</td>
<td>23.33</td>
</tr>
<tr>
<td>7-8</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>5-6</td>
<td>7</td>
<td>23.33</td>
</tr>
<tr>
<td>3-4</td>
<td>9</td>
<td>30.00</td>
</tr>
</tbody>
</table>

Total 30 99.99

Mean 11.37
Median 6.71
S. D. 3.90
S. E. M. .7235
Age-Level 4-6
The raw scores ranged from a low of 3 to a high of 15, with a mean score of 11.37, a median score of 6.71, a standard error of the mean of .7235 and a standard deviation of 3.90. The mean score of 11.37 was equivalent to an age-level placement of the 4-6 age range, with reference to the Viktor Lowenfeld Scale.

Seven or 23.33 per cent of the pupils scored above the mean, 23 or 76.70 per cent scored below the mean and 0 or 0.00 per cent scored within the mean class-interval.

**T-Score Equivalents on the Original Painting Test (Total Score).**—The data on the T-score equivalents of the raw scores on the Original Painting Test as obtained by thirty first-grade pupils of the Dolomite Junior High School, Dolomite, Alabama are presented in Table 11, page 60.

The T-score equivalents ranged from a low of 29 to a high of 88, with a mean score of 46.28, a median score of 35.71, a standard error of the mean of 2.06, and a standard deviation of 11.12. The mean score of 46.28 was equivalent to an age-level placement of 4-6.

**Significant Differences on the Tests**

**California and Goodenough Tests: Comparative Data and "t" Ratio.**—As indicated in Table 12, page 61, the T-score data for the thirty first-graders of the Dolomite Junior High School, Dolomite, Alabama, were as follows: the mean T-score on the California Test of Mental Maturity was 49.34 and on the Goodenough Draw-A-Man Test the mean T-score was 50.27, with a difference of 0.93 in favor of the Goodenough Test. The median T-score on the California Test was 49.66 and on the Goodenough Test the median T-score was 49.67, with a difference in favor of the Goodenough
TABLE II

DISTRIBUTION OF THE T-SCORE EQUIVALENTS OF THE RAW SCORES OF THE
NUMERICAL RATINGS OF PUPIL'S PAINTING AS OBTAINED BY THE
THIRTY FIRST-GRADE PUPILS OF THE DOLOMITE JUNIOR
HIGH SCHOOL, DOLOMITE, ALABAMA, 1954-1955

<table>
<thead>
<tr>
<th>Scores</th>
<th>Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>85-87</td>
<td>3</td>
<td>10.00</td>
</tr>
<tr>
<td>82-84</td>
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<td>0.00</td>
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<tr>
<td>79-81</td>
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<td>76-78</td>
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<td>73-75</td>
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<tr>
<td>70-72</td>
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<td>0.00</td>
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<tr>
<td>67-69</td>
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<td>64-66</td>
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<td>55-57</td>
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<td>52-54</td>
<td>1</td>
<td>3.33</td>
</tr>
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<td>49-51</td>
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<tr>
<td>46-48</td>
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<tr>
<td>43-45</td>
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<td>10.00</td>
</tr>
<tr>
<td>40-42</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>37-39</td>
<td>7</td>
<td>23.33</td>
</tr>
<tr>
<td>34-36</td>
<td>1</td>
<td>3.33</td>
</tr>
<tr>
<td>31-33</td>
<td>8</td>
<td>26.67</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30</strong></td>
<td><strong>99.39</strong></td>
</tr>
</tbody>
</table>

Mean 46.28
Median 35.71
S. D. 11.12
S. E. M. 2.06
Age-Level 4-6
### TABLE 12

**Significant Differences on the California Test of Mental Maturity (Total Scores) and the Goodenough Draw-A-Man Test as Obtained by the Thirty First Grade Pupils Enrolled in the Dolomite Junior High School, Dolomite, Alabama, 1954-1955**

<table>
<thead>
<tr>
<th>Tests</th>
<th>Number</th>
<th>Mean</th>
<th>Median</th>
<th>S. D. of Mean</th>
<th>S. E. of Mean</th>
<th>S. E. of Diff</th>
<th>( t )</th>
</tr>
</thead>
<tbody>
<tr>
<td>California Test of Mental Maturity</td>
<td>30</td>
<td>49.34</td>
<td>49.66</td>
<td>7.06</td>
<td>1.30</td>
<td></td>
<td>1.74</td>
</tr>
<tr>
<td>and Goodenough Draw-A-Man Test</td>
<td>30</td>
<td>50.27</td>
<td>49.66</td>
<td>6.26</td>
<td>1.16</td>
<td></td>
<td>0.33</td>
</tr>
</tbody>
</table>

The standard deviation for the T-scores on the California Test was 7.06 and on the Goodenough Test the standard deviation of the T-scores was 6.26, with a difference of 0.80 in favor of the California Test. The standard error of the mean T-scores was 1.30 and 1.16 for the California and Goodenough Tests, respectively, with a standard error of the difference between the two mean T-scores of 1.74.

The "t" for these data was 0.54, which was not significant for it was not equal to nor more than 2.58 at the one per cent level of confidence. Therefore, the difference in intelligence of these thirty first-graders as measured by the California and the Goodenough Tests of Intelligence was not significant.

Further, the data would appear to indicate the conclusion that the
California and Goodenough Tests of Intelligence tend to measure the same or similar traits that enter into the general constellation of traits and/or factors that constitute what is considered as "intelligence".

Califorina and Original Painting Tests: Comparative Data and "t" Ratio.---

As indicated in Table 13, page 63, the T-score data for the thirty first-graders of the Dolomite Junior High School, Dolomite, Alabama were as follows: the mean T-score on the California Test of Mental Maturity was 49.34, and on the Original Painting Test was 46.28, with a difference of 3.06, in favor of the California Test. The median T-score on the California Test was 49.66 and on the Original Painting Test was 35.71, with a difference of 13.95 in favor of the California Test. The standard deviation for the T-scores on the California Test of Mental Maturity was 7.06 and on the Original Painting Test was 11.12, with a difference of 4.06 in favor of the Original Painting Test. The standard error of the mean T-scores was 1.30 and 2.06 for the California Test and the Original Painting Tests, respectively, with a standard error of the difference between the two mean T-scores of 2.44.

The "t" for these data was 1.21 which was not significant for it was not equal to nor more than 2.58 at the one per cent level of confidence. Therefore, the difference in intelligence of these thirty first-graders as measured by the California and the Original Painting Tests was not significant.

Further, the data would appear to indicate the conclusion that the California Test and the Original Painting Test tend to measure the same or similar traits that enter into the general constellation of traits and/or factors that constitute what is considered as "intelligence".
TABLE 13

SIGNIFICANT DIFFERENCES ON THE CALIFORNIA TEST OF MENTAL MATURITY (TOTAL SCORES) AND NUMERICAL INDICES OF ORIGINAL PAINTINGS AS OBTAINED BY THE THIRTY FIRST-GRADE PUPILS ENROLLED IN THE DOLOMITE JUNIOR HIGH SCHOOL, DOLOMITE, ALABAMA, 1954-1955

<table>
<thead>
<tr>
<th>Tests</th>
<th>Number</th>
<th>Mean</th>
<th>Median</th>
<th>S. D.</th>
<th>&quot;t&quot; S. E.</th>
<th>Mean</th>
<th>D. of</th>
<th>&quot;t&quot; S. E.</th>
<th>D. of</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>California Test of Mental Maturity</td>
<td>30</td>
<td>49.34</td>
<td>49.66</td>
<td>7.06</td>
<td>1.30</td>
<td>2.44</td>
<td>3.06</td>
<td>1.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Original Painting Test</td>
<td>30</td>
<td>46.28</td>
<td>35.71</td>
<td>11.12</td>
<td>2.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Goodenough and Original Painting Tests: Comparative Data and "t" Ratio

As indicated in Table 14, page 64, the T-score data for the thirty first-graders of the Dolomite Junior High School, Dolomite, Alabama were as follows: the mean T-score on the Goodenough Draw-A-Man Test was 50.27 and on the Original Painting Test was 46.28, with a difference of 3.99 in favor of the Goodenough Test. The median T-score on the Goodenough Test was 49.66 and on the Original Painting Test was 35.71 with a difference of 13.96 in favor of the Goodenough Test. The standard deviation for the T-scores on the Goodenough Test was 6.26 and on the Original Painting Test was 11.12, with a difference of 4.56 in favor of the Original Painting Test. The standard error of the mean T-scores was 1.16 and 2.06 for the Goodenough and the Original Painting Tests, respectively, with a standard
TABLE 14


<table>
<thead>
<tr>
<th>Tests</th>
<th>Number</th>
<th>Mean</th>
<th>Median</th>
<th>S. D.</th>
<th>S. E.</th>
<th>S. E.</th>
<th>Diff. Mean</th>
<th>Diff.</th>
<th>&quot;t&quot;</th>
<th>Mean</th>
<th>Mean</th>
<th>W₁-M₂</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goodenough Draw-A-Man Test</td>
<td>30</td>
<td>50.27</td>
<td>49.66</td>
<td>6.76</td>
<td>1.16</td>
<td>2.36</td>
<td>3.99</td>
<td>1.69</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.36</td>
<td>3.99</td>
<td>1.69</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Original Painting Test</td>
<td>30</td>
<td>46.28</td>
<td>35.71</td>
<td>11.12</td>
<td>2.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

eerror of the difference between the two mean T-scores of 2.36.

The "t" for these data was 1.69, which was not significant for it was not equal to nor more than 2.58 at the one per cent level of confidence. Therefore, the difference in intelligence of these thirty first-graders as measured by the Goodenough and the Original Painting Tests was not significant.

Further, the data would appear to indicate the conclusion that the Goodenough Test and the Original Painting Test tend to measure the same or similar traits that enter into the general constellation of traits and/or factors that constitute what is considered as "intelligence".

Significant Correlations (r's) Among the Test Variables

Introductory Statement.— There were three basic or primary objectives
involved in this research, to wit: (a) to determine the general patterns
which characterize the intelligence and artistic ability of first-grade
pupils, (b) to determine the significant differences, if any, between the
scores on intelligence and the ratings of artistic ability of first-grade
pupils, and (c) to determine the significant correlations, if any, between
arrays of scores of intelligence and the array of ratings of artistic
ability of first-grade pupils enrolled in the Dolomite Junior High School,

This section of the report of this research will, therefore, present
a series of the three correlations (r's) between the paired variables of
the tests of intelligence and the ratings of artistic ability as predicted
upon the scale of Viktor Lowenfeld.

Further, the significance of the difference between the correlations
(r's) for the paired variables of the tests and the ratings, respectively,
for intelligence and artistic ability has been presented.

The criterion of reliability for the significance of the correlations
(r's) was established as a "t" of 2.77 at the one per cent level of confi-
dence, with reference to 23 degrees of freedom.

The "r" between Total Factors of Intelligence and Artistic Ability.—
Table 15, page 66 shows the data on the "r" between the scores obtained
on the California Test of Mental Maturity, Goodenough Draw-A-Man Test of
Intelligence, and the Test of Artistic Ability based on the Viktor
Lowenfeld Scale, for the thirty first-grade pupils of the Dolomite Junior

The "r's" were found to be as follows: For the paired variables of
the California Test of Mental Maturity and the Goodenough Draw-A-Man Test
TABLE 15


<table>
<thead>
<tr>
<th>Paired Tests</th>
<th>Number</th>
<th>r</th>
<th>S.E.r</th>
<th>&quot;t&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>California Test of Mental Maturity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and</td>
<td>30</td>
<td>.38</td>
<td>0.20</td>
<td>2.3</td>
</tr>
<tr>
<td>Goodenough Draw-A-Man Test</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>California Test of Mental Maturity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and</td>
<td>30</td>
<td>.80</td>
<td>0.20</td>
<td>3.5</td>
</tr>
<tr>
<td>Numerical Ratings of Pupils' Original Paintings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goodenough Draw-A-Man Test</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and</td>
<td>30</td>
<td>.59</td>
<td>0.20</td>
<td>1.4</td>
</tr>
</tbody>
</table>
the "r" of 0.38, with a z-score equivalent of 0.40, a standard error of "r" of 0.20, with a "t" of 2.3, which was not significant at the one per cent level of confidence. For the paired variables of the California Test of Mental Maturity and the Numerical Ratings of Pupils' Paintings the "r" of 0.30, with a z-score equivalent of 1.10, a standard error of "r" of 0.20, with a "t" of 3.5, which was significant at the one per cent level of confidence. For the Goodenough Draw-A-Man Test and the Numerical Ratings of Pupils' Paintings the "r" of 0.59, with a z-score equivalent of 0.68, a standard error of "r" of 0.20, with a "t" of 1.4, which was not significant at the one per cent level of confidence.

A summary of the data in Table 15 reveals that the high degree of correlation for the California Test of Mental Maturity and the Numerical Ratings of Original Paintings of 0.80 would appear to indicate that the two tests in a large measure tend to measure the same thing or possess a common variable or variables. It is of interest to note that the low "r" of 0.59 for the Goodenough Draw-A-Man Test and the Numerical Ratings of the Original Paintings might well indicate that the two tests do not markedly tend to measure the same or common factors, although the two tests are basically concerned with the operation of drawing and/or painting.

Comparative "t" Ratio's for the Difference Between the "r's" for the Three Tests. The data on the significance of the differences between the "r's" established for the three paired variables of the California Test of Mental Maturity, the Goodenough Draw-A-Man Test, and the Test of Artistic Ability based on the Lowenfeld Scale, for the thirty first-grade pupils of the Dolomite Junior High School, Dolomite, Alabama, 1954-1955 are presented in Table 16, page 68. The difference between the "r's" with
TABLE 16


<table>
<thead>
<tr>
<th>Paired Tests</th>
<th>Number</th>
<th>r</th>
<th>z-score</th>
<th>S. E. of z of r</th>
<th>S. E. of z 1-2</th>
<th>&quot;t&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>California Test of Mental Maturity and Goodenough Draw-A-Man Test</td>
<td>30</td>
<td>.38</td>
<td>.40</td>
<td>.20</td>
<td></td>
<td></td>
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<tr>
<td>and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.272</td>
</tr>
<tr>
<td>California Test of Mental Maturity and Numerical Ratings of Pupils' Original Paintings</td>
<td>30</td>
<td>.80</td>
<td>1.10</td>
<td>.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.272</td>
</tr>
<tr>
<td>Goodenough Draw-A-Man Test and Numerical Ratings of Pupils' Original Paintings</td>
<td>30</td>
<td>.59</td>
<td>.68</td>
<td>.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>California Test of Mental Maturity and Numerical Ratings of Pupils' Original Paintings</td>
<td>30</td>
<td>.80</td>
<td>1.10</td>
<td>.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.272</td>
</tr>
<tr>
<td>Goodenough Draw-A-Man Test and Numerical Ratings of Pupils' Original Paintings</td>
<td>30</td>
<td>.59</td>
<td>.68</td>
<td>.20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
reference to their z-score equivalents were found to be as follows: For
the California Test of Mental Maturity and the Original Paintings Tests,
an "r" of .80 had a z-score equivalent of 1.10, as compared to the Cali-
ifornia Test of Mental Maturity and the Goodenough Draw-A-Man Test which
had an "r" of .38 with a z-score equivalent of 0.40. The standard error
of the difference between the "r's" was 0.27, and the difference between
the two z-score equivalents was 0.70, to indicate a "t" of 2.57, which
was significant at the one per cent level of confidence.

The California Test of Mental Maturity and the Original Painting Test
had an "r" of 0.80 with a z-score equivalent of 1.10 as compared to the
Goodenough Draw-A-Man Test and the Original Painting Test which had an "r"
of 0.59 with a z-score equivalent of 0.66. The standard error of the
difference between the two "r's" was 0.27, and the difference between the
z-score equivalents was 0.42, to indicate a "t" of 1.56 which was not signi-
ficant at the one per cent level of confidence.

The California Test of Mental Maturity and the Goodenough Draw-A-Man
Test had an "r" of 0.38 with a z-score equivalent of 0.40 as compared to
the Goodenough Draw-A-Man Test and the Original Painting Test with an "r"
of .59, with a z-score of 0.68. The standard of the difference between
the two "r's" was 0.27, and the difference between the two z-score equiva-
lents was 0.28 to indicate a "t" of 1.37 which was not significant at the
one per cent level of confidence.

**Interpretative Summaries.**— The interpretative summaries of the data
of this research are reported under the following captions.

1. Summary of Chronological Ages.

2. Summary of the Findings of Certain Characteristic Patterns of
Artistic Ability as measured by the Viktor Lowenfeld Scale.
3. Intelligence as measured by the California Test of Mental Maturity and the Goodenough Draw-A-Man Test.

4. Summary of Artistic Ability as measured by the Four Art Specialists.

5. Summary of Differences between Intelligence and Artistic Ability.


Summary of Chronological Ages.— Pertinent to this study and presented first is a description of the chronological ages of the pupils. The ages of the pupils tended to cluster toward the center of the distribution and was considered to be at the normal level of chronological age expectancy as prescribed by age norms for first-grade pupils.

Summary of Significant Age-Levels of Art Ability Through the Application of the Viktor Lowenfeld Scale.— A description of the group on the basis of Lowenfeld's Scale which considers the aspects of (1) Human Figure, (2) Color, (3) Space, and (4) Design, are shown in Tables 2, 3, 4, and 5. The description follows.

1. Human Figure. The group was not very advanced in drawing the Human Figure as is shown by the fact that 66.7 per cent of the pupils ranked within the 4-6 age-level of maturity as compared to the 7-9 age-level norm of expectancy.

2. Color. The group was not highly advanced in the use of Color as is shown by the fact that there was a piling up at the center of the distribution.

3. Space. The group was slightly low in the aspect of Space as is seen by the fact that there was a piling up at the center of the distribution.

4. Design. In the aspect of Design, the pupils fell within the
4-6 age-level of maturity, which was considered only a slight below average, since development in the aspect of Design is usually slight for first-graders.

**Summary of Intelligence as Measured By the California Test of Mental Maturity**— The data revealed that the pupils were slightly inferior in mental development for the grade-placement obtained was 1.3 as compared to the 1.8 expected grade-placement for the pupils.

**Summary of Intelligence as Measured By the Goodenough Draw-A-Man Test**— On the Goodenough Draw-A-Man Test the pupils were inferior in mental development. For the obtained age-placement of 6.3 was low as compared to the 7.0 age-placement of expectancy.

It is significant to note that the indices of intelligence on the California and Goodenough Tests of Mental Ability differed by only 0.2 in relative grade-placements.

**Significant Differences**— On the intelligence test and the Art Test the data obtained revealed no significant differences for the following:

1. On the California Test of Mental Maturity and the Goodenough Draw-A-Man Test the data obtained revealed no significant differences.

2. On the Goodenough Draw-A-Man Test and the Original Painting Test the data revealed no statistical significant difference.

3. On the California Test of Mental Maturity and the Original Painting Test no statistical significant difference was found between the two test results.

**Significant Correlations**— The results obtained from the varied pairings among the intelligence test raw scores and the art test raw scores revealed the following:
1. A statistical significant relationship was found between the California Test of Mental Maturity and the Original Paintings Test.

2. No statistical significant relationship was found between the Goodenough Draw-A-Man Test and the Original Paintings Test even though both of the tests are basically concerned with drawing and/or painting.

3. No statistical significant relationship was found between the California Test of Mental Maturity and the Goodenough Draw-A-Man Test.
CHAPTER IV

SUMMARY AND CONCLUSIONS

Statement of the Problem. — The problem in this study was to determine the relationship, if any, between intelligence and artistic ability of thirty first-grade pupils of the Dolomite Junior High School, Dolomite, Alabama, for the school year of 1954-1955.

Summary of the Limitations of the Study. — This study was concerned primarily with the artistic ability of first-grade pupils of the Dolomite Junior High School, Dolomite, Alabama and was focused primarily on the area of the original paintings of these children and does not include other media of creative expression. The following limitations should be recognized:

1. The art experience was limited to drawing and painting.
2. This study was primarily concerned with the relationship of intelligence to artistic ability.
3. The level of intelligence are traits as measured by the California Test of Mental Maturity.
4. The level of intelligence as measured by the Goodenough Draw-A-Man Test.
5. The level of artistic ability as measured by the Viktor Lowenfeld Scale.

Purpose of the Study. — The major purpose of this study was to determine the relationship, if any, between intelligence and artistic ability.
of the first-grade pupils of the Dolomite Junior High School, Dolomite, Alabama. More specifically, the purposes of this study were as characterized below:

1. To determine the general patterns which characterize the intelligence of first-grade pupils of the Dolomite Junior High School, Dolomite, Alabama.

2. To determine the general patterns which characterize the artistic ability of first-grade pupils at Dolomite Junior High School, Dolomite, Alabama.

3. To determine the difference, if any, between the intelligence and artistic abilities of first-grade pupils at Dolomite Junior High School, Dolomite, Alabama.

4. To determine the relationship, if any, between the intelligence and artistic abilities of first-grade pupils at the Dolomite Junior High School, Dolomite, Alabama.

5. To determine the difference, if any, between the correlations of intelligence and artistic abilities of first-grade pupils at Dolomite Junior High School, Dolomite, Alabama.

6. To formulate whatever implications, if any, for educational theory and practice as was derived from the analysis and the interpretation of the data collected in this study.

**Definition of Terms.**—The significant terms which were used throughout this research are characterized in the following statements:

1. The term, "intelligence", as used in this study refers to mental traits as measured by the California Test of Mental Maturity and the Goodenough Draw-A-Man Test.
The term, "artistic ability", as used in this study refers to the traits as measured by the Goodenough Draw-A-Man Test and the judges appraisal of pupil's drawing based upon the Viktor Lowenfeld Scale.

3. The term, "creative ability", as used in this study refers to individuality and originality used to portray an idea which comes from the self. It is used synonymously with self-expression.

4. The term, "design", as used in this study refers to the sum total use made of color, space, and perspective which were to be characteristic of the paintings.

Locale and Design of Research.—Significant aspects of the design of this research are specified below:

Locale: This study was conducted at the Dolomite Junior High School, Dolomite, Alabama, during the school term of 1954-1955.

Method of Research: The Descriptive-Survey method of research, employing the techniques of testing and original drawings and paintings, was used to gather the necessary data for this research.

Subjects: The subjects involved in this research were the thirty first-grade pupils enrolled at the Dolomite Junior High School, Dolomite, Alabama. There were 14 boys and 16 girls ranging in ages from six years and five months to seven years and four months.

Instruments: The instruments used to collect the necessary data were: (a) California Test of Mental Maturity, (b) Goodenough Draw-A-Man Test of Intelligence, (c) Original Paintings and (d) The Viktor Lowenfeld Scale.

Criterion of Reliability: The criterion of reliability was established as a "t" of 2.58 at the one per cent level of confidence for 29 degrees of freedom. The criterion of reliability for the "r" was established as a "t" of 2.77 at the one per cent level of confidence and 28 degrees of freedom.

The remaining section of this chapter will present the data of this research under the following categories:

2. The Summation of the Basic Findings.

3. The Conclusions.

4. The Implications.

5. The Recommendations.

Summary of the Related Literature.— The summation of the findings of the literature in this area of research has been organized under these captions: (a) The Theories of Intelligence, (b) The Measurement of Intelligence; (c) The Theories of Art, (d) The Measurement of Art Ability, (e) The Relationship Between Intelligence and Artistic Ability, and (f) The Research Studies in the Field.

Theories of Intelligence

The following are statements on theories of intelligence which the writer regards as being significant.

Intelligence consists of a number of relatively independent and largely correlated, specialized abilities of various types such as memory, imagination, honesty, and language ability.

Intelligence is composed of a general factor which is present always and of specific factors which combine with the general factor to determine total activity.

Intelligence is composed of nine primary mental abilities: (a) visual or spatial ability, (b) perceptual ability, (c) numerical ability, (d) logical or verbal relations ability, (e) fluency in dealing with words, (f) memory, (g) inductive ability, (h) deductive ability, (i) ability to restrict the solution of a problem.

Intelligence is the organization of abilities to learn, to grasp facts with alertness and accuracy.
Individuals differ in the ability to learn, to adjust to novel situations and to manage things, people and ideas, may be considered a definition of intelligence.

Intelligence is the ability of the individual to learn to adjust himself to his environment.

Intelligence is the capacity to learn or to profit by experience.

Intelligence is the ability of the individual to adapt himself adequately to relatively new situations.

Intelligence is one's ability to carry on abstract thinking.

Measurement of Intelligence

Binet and Simon developed the first scale of intelligence with the purpose of proving that it is possible to determine in a precise and scientific way the mental level of intelligence.

Stern proposed the use of the intelligence quotient to show the relationship between a child’s mental age and his chronological age.

Jersild states that there is a high consistency in intelligence test ratings from year to year at the school age and beyond.

Fox et al., propose characteristic patterns of intelligence which are identifiable in young children.

Theories of Art

According to the Alabama Course of Study, Art is a series of experiences which may help in solving problems of everyday living.

To Lee and Lee, Art is an interpretation of feeling and experiencing.

According to Winslow, Art is an organized body of educational experiences dealing with the meeting of human needs as efficiently as
possible through the use of materials.

Read states that individuals create in order to communicate and their creations is a pictorial language developed from color and line.

Hopkins asserts that the integrating value of art depends upon a comprehensive idea of unity and the vision of the possibility is a factor which motivates creative art strongly.

Dewey states that an art experience approximates a complete unity, the motivation, the doing, the product and the purpose compliment each other.

Landis states that emphasis must be placed upon the art process as well as upon the art product and upon the relationship of process and product.

Measurement of Art Ability

Meir and McCloy constructed a novel apparatus for revealing art ability by means of which compositions could be produced at will by manipulating colored light on gray-green colored figures and background.

Kline-Carey developed a drawing scale which consists of series of samples for measuring (1) representation and (2) design and composition. The first series used such subject matter as a house, a tree in silhouette, a running boy, and a rabbit in scales having 14 samples; the second uses the themes of illustrations, posters, structural designs and borders.

Meir developed an Art Judgement Test which may be used as a group or individual test in which the pupils are confronted with 100 pairs of artistic specimens adopted from many sources.

Munro concludes that any formal test of children's creative ability
in art should be of the work-sample type, providing the child a chance to construct a complete, independent form of his own since his power to do this is precisely what we are interested in.

Grimes and Borden proposed a check-list for evaluation in art which includes: (a) initiative, (b) concentration, (c) interest and (d) motivation.

Vaughn believes one of the best methods of evaluating a pupil's work is that of keeping cumulative records from week to week, and year to year.

As a result of tests and research, patterns which characterize general growth in art have been indicated and are presented in the paragraphs to follow.

Korperth-Tippel says the attention of the typical child was up to the eighth year primarily upon the object of the picture.

Anastasi and Foley state that the drawings of children between the ages of 6 and 12 reveal intercultural differences, and there is a factor present when drawing is produced.

McCarthy found that when it comes to drawing, the most popular figure for the first-grade child is the human figure. Next in popularity were houses, trees, and furniture.

Beach and Bressler have noted that the patterns of young children's paintings are indicated by five developmental phases which are as follows: (1) relatively uncoordinated scribbling, sweeping, and spreading color on the page, (2) accidentally attained design, (3) consciously sought design, (4) representation such as a horse or a man and (5) full realization of representation and design, in which there is a more highly developed communication of feeling and idea.
Gesell defines the developmental pattern in crayoning for children from 4-6 years as follows: (1) copies a cross, (2) copies a square, (3) draws a recognizable man and (4) begins to differentiate between square and oblique cross drawn from model.

Lowenfeld states that normal vision is by no means essential for artistic production; that it tends to handicap rather than facilitate expressive work.

Lowenfeld has defined certain characteristic patterns in creative expression as (1) Scribbling, 2 to 4 years, (2) Representational Attempt, 4-6 years, and (3) the Achievement of a Form Concept, 7-9 years.

Gaitskell says that almost every child begins his art career by manipulating his materials.

Relationship Between Intelligence and Artistic Abilities

The statements which follow are pertinent to the relationship which have been observed between intelligence and artistic abilities.

Garrison states that the relationship between intelligence and artistic ability has been revealed in connection with the development, analysis, and interpretation of intelligence tests.

Gaitskell says that art education has considerable significance with regard to the general education of slow learners.

Lowenfeld states that characteristic patterns in creative expressions are indicative of mental or emotional disturbances.

Winslow states that thinking and performing are both aspects of art as experience.

Goodenough reports that "children of inferior mental ability sometimes copy well, but they rarely do good original work in drawing."
Conversely the child who shows real creative ability in art is likely to rank higher in general mental ability."

Christensen and Karwoski emphasize the point that art tests bring out a special phase of mental activity which is not reached by intelligence, energy preservation, creative imagination, perceptual facility, and aesthetic tests.

Research Studies

Lark-Earovitz found that gifted children's reasons for aesthetic perception is influenced more by design and color of the picture and the knowledge, through analysis of which it is gathered from. Their choice demonstrates a more emotional and imaginary character than the children of average intelligence.

Drought proved that children's response to pictures shows that sensitivity to good art increases with education and general training.

Goodenough found that the intellectual level of the child influences drawing. Bright children at every age are superior, in their drawing skills, to children of average or below-average intelligence.

Kier and Tiebout found that measures of artistic composition and verbal tests of intelligence are usually higher in the first grade; that persons who produce artistic works are slightly superior in verbal intelligence, but that artistic ability is not dependent upon such intellectual capacity.

Carroll and Murich concluded that abstract intelligence at the extreme seems to affect art judgement ability.

Mier on the basis of a ten-year study found that artistic ability
depends upon six factors: (1) mechanical ability, (2) energy preservation, (3) intelligence, (4) creative imagination, (5) perceptual facility, and (6) aesthetic judgement.

Stephen and Miller concluded that there is a close relationship between intelligence and artistic ability and that the child whose intelligence level is above normal has a 50-50 chance of being rated "good" or "superior" on the basis of these same criteria.

Basic Findings Summation

Introductory Statement.-- The data on the basic findings of this research are summarized under two major captions, to wit: (a) a general overall statement of the crucial findings, and (b) a detailed summary of the data as treated from area to area in the analysis. These summations will be presented in this order in the immediate paragraphs to follow. Summary Table 1, page 83, illustrates major aspects of the Findings to follow.

General Findings.-- Statements of the general and crucial findings are enumerated below:

A. The chronological ages ranged from a low of six years and five months to a high of seven and four months, with a mean age of 7.0 and a median age of 6.73.

B. Performance of the group according to the Viktor Lowenfeld Age-Level Scale as applied to the Art Test yielded the following indications:

1. The group was not highly advanced in drawing the human figure. Twenty per cent of the pupils ranked within the 2-4 age-level; 66.70 per cent ranked within the 4-6 age-level, a normal age-
<table>
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<th>Mean</th>
<th>Median</th>
<th>S. E.</th>
<th>Mean</th>
<th>Median</th>
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<td>7.06</td>
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<td>8.34</td>
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<td>.33</td>
<td>.20</td>
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<td>.59</td>
<td>.20</td>
<td>1.4</td>
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**SIGNIFICANT CORRELATION**

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level for the first-grade pupils; and 13.3 per cent ranked within the 7-9 age-level of maturity.

2. In the aspect of Color, 20 per cent of the pupils ranked in the lowest age-level of maturity, within the 2-4 year range; 70 per cent of the pupils ranked within the 4-6 age-level of maturity; and 10 per cent of them ranked within the highest age-level of maturity, the 7-9 age range.

3. With reference to the use of Space, 26.66 per cent of the pupils ranked within the 2-4 age-level of maturity; the largest number of the pupils or 66.67 per cent ranked within the 4-6 age-level of maturity; and 6.67 per cent of the pupils ranked within the highest age-level of maturity, the 7-9 year range.

4. In the aspect of Design, 30.0 per cent of the pupils ranked in the lowest age-level of maturity, within the 2-4 year range; the largest number of pupils in the group, which was 56.7 per cent, ranked within the 4-6 age-level of maturity; and 13.3 per cent of the pupils ranked within the highest age-level of maturity, the 7-9 year range.

5. The performance of the pupils on the California Test of Mental Maturity indicated a mean of 62.09, which was equivalent to a grade-placement of 1.3. The T-score equivalent obtained by the pupils indicated a mean score of 49.34, which was equivalent to a grade-placement of 1.3.

6. The performance of the pupils on the Goodenough Draw-A-Man Test of Intelligence indicated a mean of 13.1, which was equivalent to an age-level of 6.3.
7. The performance of pupils on the Art Test (Numerical Ratings of Pupils Paintings) indicated a mean of 11.37, which was equivalent to the age-placement of the 4-6 year range according to the Viktor Lowenfeld Scale. The T-score equivalent indicated a mean score of 46.28, which was equivalent to an age-level of 4-6.

8. T-score equivalents on the Goodenough Draw-A-Man Test as obtained by the pupils indicated a mean score of 49.77, which was equivalent to an age-level placement of 4-6.

9. A comparison of the performance of the pupils on the California Test of Mental Maturity and the Goodenough Draw-A-Man Test of Intelligence reveals no significant difference between the two test scores. The mean T-score equivalent for the California Test was 49.34 and the mean T-score equivalent for the Goodenough Test was 49.66. The difference between the means was 0.32 in favor of the Goodenough Test.

10. A comparison of the performance of the pupils on the California Test of Mental Maturity and the Art Test (Numerical Ratings of Pupils Paintings) reveals no significant difference between the two test scores. The mean T-score equivalent for the California Test was 49.34 and the mean T-score equivalent for the Art Test was 46.28. The difference between the means was 3.06 in favor of the California Test of Mental Maturity.

11. A comparison of the performance of the pupils on the Goodenough Draw-A-Man Test and the Art Test (Numerical Ratings of Original Painting Test) reveals no significant difference between the two
test scores. The mean T-score equivalent for the Goodenough Test was 50.27 and the mean T-score equivalent was 46.28 for the Art Test. The difference between the means was 3.99 in favor of the Goodenough Test.

12. For the paired variables of the California Test of Mental Maturity and the Goodenough Draw-A-Man Test, the data reveal an "r" of 0.38, a z-score equivalent of 0.40, a standard error of "r" of 0.20 with a "t" of 2.57 which was significant at the one per cent level of confidence.

13. For the paired variables of the California Test of Mental Maturity and the Original Painting Test the data reveal an "r" of 0.80, a z-score equivalent of 1.10, a standard error of "r" of 0.20 with a "t" of 3.5 which was significant at the one per cent level of confidence.

14. For the paired variables of the Goodenough Draw-A-Man Test and the Original Painting Test, the data reveal an "t" of 0.59, a z-score equivalent of 0.68, a standard error of "r" of 0.20, with a "t" of 1.4, which was not significant at the one per cent level of confidence.

Detailed Summaries of the Data.— Under the appropriate Table Captions the basic findings for each distribution of the data will be presented in the paragraphs to follow.

Chronological Ages

(Table 1)

With reference to the Chronological Ages the following statistical measures were obtained: a mean age of 7.0 and a median age of 6.73;
53.33 per cent of the pupils' ages were above the mean; 40.00 per cent of them were below the mean; and 6.66 per cent of the pupils' ages were within the mean class-interval.

Performance of the pupils according to the Viktor Lowenfeld Age-Level Scale with reference to the Original Painting Test are specified below under the following headings: (a) Human Figure, (b) Color, (c) Space and (d) Design.

Human Figure
(Table 2)

In the aspect of the Human Figure, 13.3 per cent of the pupils ranked in the highest age-level of maturity, within the 7-9 year range; the largest number of pupils in the group, which was 66.7 per cent ranked within the 4-6 age-level of maturity; and 20.0 per cent ranked within the 2-4 age-level of maturity.

Color
(Table 3)

In the aspect of Color, 10 per cent of the pupils ranked in the highest age-level of maturity, within the 7-9 year range; the largest number of pupils in the group, which was 70.0 per cent ranked within the 4-6 age-level of maturity; and 20.0 per cent ranked within the lowest age-level of maturity, the 2-4 year range.

Space
(Table 4)

In the aspect of Space, 6.67 per cent of the pupils ranked in the highest age-level of maturity, within the 7-9 year range; the largest number of pupils in the group, which was 66.67 per cent ranked within the
4-6 age-level of maturity; and 26.66 per cent ranked within the lowest age-level of maturity, the 2-4 year range.

Design
(Table 5)

With reference to Design, 13.5 per cent of the pupils ranked in the highest age-level of maturity within the 7-9 year range; the largest number of pupils in the group, which was 56.7 per cent ranked within the 4-6 age-level of maturity; and 30 per cent ranked within the lowest age-level of maturity, the 2-4 year range.

California Test of Mental Maturity

On the California Test of Mental Maturity for the component Total Mental Factors the following statistical measures were obtained: a mean score of 62.09, a median score of 65.00, with a standard deviation of 12.24. The mean score of 62.09 was equivalent to a grade-placement of 1.3.

T-Score Equivalents on the California Test of Mental Maturity---The data on the T-score equivalents of the raw scores on the California Test were found to be as follows: a mean score of 49.34, a median score of 49.66, a standard error of the mean of 1.30, and a standard deviation of 7.06. The mean score of 49.34 was equivalent to a grade-placement of 1.3.

Goodenough Draw-A-Man Test

On the Goodenough Draw-A-Man Test for the component Total Mental Factors the following statistical measures were obtained: a mean score
of 13.1, a median score of 13.33, a standard error of the mean of .573 and a standard deviation of 3.09. The mean score of 13.1 was equivalent to an age-placement of 6.3.

**T-Score Equivalents on the Goodenough Draw-A-Man Test (Total Score).**

The data on the T-score equivalents of the raw scores on the Goodenough Draw-A-Man Test were found to be as follows: a mean score of 50.27, a standard error of the mean of 1.16, and a standard deviation of 6.26. The mean score of 50.27 was equivalent to an age-placement of 6.3.

**Original Painting Test**

<table>
<thead>
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<td>(Tables 10 and 11)</td>
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On the Original Painting Test for the component Total Artistic Factors the following statistical measures were obtained: a mean score of 11.37, a median score of 6.71, a standard error of the mean of .7235 and a standard deviation of 3.90. The mean score of 11.37 was equivalent to an age-level placement of the 4-6 year range, with reference to the Viktor Lowenfeld Age-Level Scale.

**T-Score Equivalents on the Original Painting Test (Total Score).**

The data on the T-score equivalents of the raw scores on the Original Painting Test were found to be as follows: a mean score of 46.28, a median score of 35.71, a standard error of the mean of 2.06, and a standard deviation of 11.12. The mean score of 46.28 was equivalent to an age-level placement of 4-6.

**California Test of Mental Maturity and Goodenough Draw-A-Man Test**

**Comparative Data and "T" Ratio**

(Table 12)

As indicated in Tables 6, 7, 8, and 9, the T-score data for the
thirty first-graders were as follows: the mean T-score on the California Test of Mental Maturity was 49.34 and on the Goodenough Draw-A-Man Test the T-score was 50.27, with a difference of 0.93 in favor of the Goodenough Draw-A-Man Test. The median T-score on the California Test of Mental Maturity was 49.66 and on the Goodenough Draw-A-Man Test the median T-score was 49.67, with a difference of 0.01 in favor of the Goodenough Draw-A-Man Test. The standard deviation for the T-scores on the California Test of Mental Maturity was 7.06 and on the Goodenough Draw-A-Man Test the standard deviation of the T-scores was 6.26, with a difference of 0.80 in favor of the California Test. The standard error of the mean T-scores was 1.30 and 1.16 for the California and Goodenough Tests, respectively, with a standard error of the difference between the two mean T-scores of 1.74, and a "t" of 0.54.

California Test of Mental Maturity and Original Painting Test Comparative Data and "t" Ratio (Table 13)

As indicated in Tables 6, 7, 10 and 11, the T-score data were as follows: the mean T-score was 49.34 on the California Test of Mental Maturity and the mean T-score was 46.28 on the Original Painting Test, with a difference of 3.06 in favor of the California Test. The median T-score on the California Test was 49.66 and on the Original Painting Test was 35.71, with a difference of 13.95 in favor of the California Test. The standard deviation for the T-scores on the California Test was 7.06 and on the Original Painting Test the standard deviation was 11.12, with a difference of 4.06 in favor of the Original Painting Test. The standard error of the mean T-scores was 1.30 and 2.06 for the
California Test and the Original Painting Test, respectively, with a standard error of the difference between the two mean T-scores of 2.44 and a "t" of 1.21.

**Goodenough Draw-A-Man Test**

and

**Original Painting Test**

(Table 14)

As indicated in Tables 8, 9, 10, and 11 the T-score data were as follows: the mean T-score on the Goodenough Draw-A-Man Test was 50.27 and on the Original Painting Test the mean T-score was 46.28, with a difference of 3.99 in favor of the Goodenough Test. The median T-score on the Goodenough Test was 49.66 and on the Original Painting Test the median T-score was 55.71, with a difference of 13.95 in favor of the Goodenough Test. The standard deviation for the T-scores on the Goodenough Test was 6.26 and on the Original Painting Test the standard deviation for the T-scores was 11.12, with a difference of 4.86 in favor of the Original Painting Test. The standard error of the mean T-scores was 1.16 and 2.06 for the Goodenough Test and the Original Painting Test, respectively, with a standard error of the difference between the two mean T-scores of 2.36, with a "t" of 1.69.

**The "r" Between Total Factors of California Test of Mental Maturity and Goodenough Draw-A-Man Test**

(Table 15)

The "r" was found to be as follows: For the paired variables of the California Test of Mental Maturity and the Goodenough Draw-A-Man Test the "r" of 0.38, with a z-score equivalent of 0.40, a standard error of "r" of 0.20, with a "t" of 2.3, which was not significant at the one per
For the paired variables of the California Test of Mental Maturity and the Original Painting Test the \( r \) was found to be 0.80, with a z-score equivalent of 1.10, a standard error of the \( r \) of 0.20, with a \( t \) of 3.5, which was significant at the one per cent level of confidence.

For the paired variables of the Goodenough Draw-A-Man Test and the Original Painting Test the \( r \) was found to be 0.59, with a z-score equivalent of 0.68, a standard error of \( r \) of 0.20, with a \( t \) of 1.4, which was not significant at the one per cent level of confidence.

The difference between the \( r \)'s with reference to their z-score equivalents were found to be as follows.

For the California Test of Mental Maturity and the Original Painting Test an \( r \) of 0.80 had a z-score equivalent of 1.10 as compared to the California Test of Mental Maturity and the Goodenough Draw-A-Man Test a \( r \) of 0.38 with a z-score equivalent of 0.40. The standard error of the difference between the two \( r \)'s was 0.27, and the difference between the two z-scores was 0.70, to indicate a \( t \) of 2.57 which was
significant at the one per cent level of confidence.

The California Test of Mental Maturity and the Original Painting Test had an "r" of 0.80 with a z-score equivalent of 1.10 as compared to the Goodenough Draw-A-Man Test and the Original Painting Test an "r" of 0.59 with a z-score equivalent of 0.68. The standard error of the difference between the two "r's" was 0.27, and the difference between the two z-score equivalents was 0.42, to indicate a "t" of 1.56 which was not significant at the one per cent level of confidence.

The California Test of Mental Maturity and the Goodenough Draw-A-Man Test had an "r" of 0.38 with a z-score equivalent of 0.40 as compared to the Goodenough Draw-A-Man Test and the Original Painting Test with an "r" of 0.59, with a z-score equivalent of 0.68. The standard error of the difference between the two "r's" was 0.27, and the difference between the two z-score equivalents was 0.28, to indicate a "t" of 1.57 which was not significant at the one per cent level of confidence.

**Conclusions.** The findings of this research appear to warrant the following conclusions:

1. The data indicated that the thirty pupils enrolled in the Dolomite Junior High School, Dolomite, Alabama were at the normal level of age expectancy for first-grade pupils.

2. The data indicated that the thirty first-grade pupils enrolled in the Dolomite Junior High School, Dolomite, Alabama were slightly inferior in their mental development as compared to the usual norms of expectancy.

3. The data indicated that the thirty first-grade pupils enrolled in the Dolomite Junior High School, Dolomite, Alabama were
slightly below average of the optimum degree of artistic ability as objectively measured by the Viktor Lowenfeld Scale.

4. The data revealed that there was no significant difference between intelligence and artistic ability of the thirty first-grade pupils enrolled in the Dolomite Junior High School, Dolomite, Alabama. However, there was a tendency of a slight number of the pupils to be superior in the endowment of artistic ability.

5. The data revealed that there was a marked degree of relationship between intelligence and artistic ability as measured by the California Test of Mental Maturity and the Original Painting Test of the thirty first-grade pupils enrolled in the Dolomite Junior High School, Dolomite, Alabama.

6. The data revealed there was no significant relationship between intelligence and artistic ability as revealed by the Goodenough Draw-A-Man Test and the Original Painting Test. More specifically, a conclusion applicable to the findings is that the high degree of correlation for the California Test of Mental Maturity and the Original Painting Test would appear to indicate that the two tests to a marked degree measure the same thing or possess a common variable or variables.

Implications. -- The interpretation of the data collected in this study appears to point to the following implications:

1. There is a statistically significant relationship between intelligence and artistic ability among the first-graders. Hence, the low level of artistic ability of the pupils was apparently due to the low level of their intelligence.
2. Since maturation in artistic ability can be determined by the use of an objective scale of age-levels on art ability, it is highly probable that the teachers of early grade children will receive valuable insight into artistic potentialities.

3. Since the children fell somewhat below the usual norm of expectancy in intelligence and artistic ability; it is to be expected that growth in these areas may not be as rapid as suggestions in books and manuals might indicate.

Recommendations.-- The findings stemming from the data of this research suggest the recommendations to follow.

1. Teachers should acquaint themselves with the recent viewpoints of art authorities, thereby getting a better understanding of what the child should be able to do in creative expression at a given age-level.

2. Further research should be made to ascertain the relationship between intelligence and artistic ability over a more prolonged period of time.

3. It is recommended that the primary teachers of Dolomite Junior High School should seriously consider an art program which includes the use of a standardized age-level scale for measuring artistic ability in the primary grades.
BIBLIOGRAPHY

Books


**Articles**


Theses

Banks, Mary Ernestine, "A Comparative Study of Two Approaches to the Teaching of Art to Two Selected Groups of Sixth Grade Pupils." Unpublished M. A. Thesis, Atlanta University, Atlanta, Georgia, 1954.

Berry, Mildred, "The Relationship Among Tested Mental Ability, Tested Mechanical Aptitude, and Tested Art Ability of Fifth, Tenth, Eleventh, and Twelfth Grade Girls of the Pike County Training School, Brundidge, Alabama, for the year, 1953-1954." Unpublished M. A. Thesis, Atlanta University, Atlanta, Georgia, 1954.
### Characteristic Patterns Found in Pupils' Paintings Indicative of Age Levels According to Viktor Lowenfeld

<table>
<thead>
<tr>
<th>Age Level</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Human Figure</strong></td>
<td></td>
</tr>
<tr>
<td>2-4</td>
<td>1. None</td>
</tr>
<tr>
<td>4-6</td>
<td>2. Circular and longitudinal lines</td>
</tr>
<tr>
<td>7-9</td>
<td>3. Definite concepts of figure:</td>
</tr>
<tr>
<td></td>
<td>a. Exaggeration of important parts</td>
</tr>
<tr>
<td></td>
<td>b. Omission of important parts</td>
</tr>
<tr>
<td><strong>Color</strong></td>
<td></td>
</tr>
<tr>
<td>2-4</td>
<td>1. No conscious approach (scribbles)</td>
</tr>
<tr>
<td>4-6</td>
<td>2. Controlled but not related to reality</td>
</tr>
<tr>
<td>7-9</td>
<td>3. Realistic relationship between color and object</td>
</tr>
<tr>
<td><strong>Space</strong></td>
<td></td>
</tr>
<tr>
<td>2-4</td>
<td>1. None</td>
</tr>
<tr>
<td>4-6</td>
<td>2. No orderly space relationship</td>
</tr>
<tr>
<td>7-9</td>
<td>3. Base-line, sky line</td>
</tr>
<tr>
<td>7-9</td>
<td>4. Mixed forms of plane-elevation</td>
</tr>
<tr>
<td>7-9</td>
<td>5. Folding Over</td>
</tr>
<tr>
<td>7-9</td>
<td>6. X-ray</td>
</tr>
<tr>
<td><strong>Design</strong></td>
<td></td>
</tr>
<tr>
<td>2-4</td>
<td>1. None</td>
</tr>
<tr>
<td>4-6</td>
<td>2. No conscious approach</td>
</tr>
<tr>
<td>7-9</td>
<td>3. No conscious approach</td>
</tr>
</tbody>
</table>
RATING SCALE FOR CHILDREN'S PAINTINGS

<table>
<thead>
<tr>
<th>Highest Possible Score</th>
<th>Poor</th>
<th>Fair</th>
<th>Very Good</th>
<th>Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Representational Aspects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Degree to which items in picture are recognizable as to shape, color, spacing, arrangement.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Degree to which picture gives an evidence of control of medium (waxed crayons) used.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II. Creative Aspects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Degree to which picture exhibits a portrayal of inner feeling for form, color, design, and individuality of expression.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TOTAL TEST SCORE

Rating Values:

<table>
<thead>
<tr>
<th>Rating</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>Very Good</td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td></td>
</tr>
<tr>
<td>Highest Possible Score</td>
<td>15</td>
</tr>
</tbody>
</table>

NAME ____________________________

*I Was Playing On The Playground At Recess Time.*
GOODENOUGH INTELLIGENCE TEST

For Kindergartens and Primary Grades

By Florence L. Goodenough, Ph.D.
Research Assistant Professor, Institute of Child Welfare
University of Minnesota

CHILDREN'S DRAWING SHEET

Name ................................................................. Sex ......
Age .................. years, ........... months. Grade ............ Date ..........................
School .......................................................... City ...................

<table>
<thead>
<tr>
<th>SCORE</th>
<th>M.A.</th>
<th>IQ</th>
</tr>
</thead>
</table>

SUPPLEMENTARY DATA

Date of child's birth ........................................ Birthplace ........................................
Nationality of father ....................................... Nationality of mother ........................................
Language spoken at home ................................. Social status ........................................
Teacher's estimate of intelligence: very superior, superior, average, inferior, very inferior. (Underline.)
Quality of school work: very superior, superior, average, inferior, very inferior. (Underline.)
Health: excellent, good, fair, poor. (Underline.)
Attendance: very regular, fairly regular, somewhat irregular, very irregular. (Underline.)
Additional notes: .............................................

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PRINTED IN U.S.A.
Class A
Total score

Class B
Total score

1. 11 a.
2. 11 b.
3. 
4 a. 12 a.
4 b. 12 b.
4 c. 12 c.
4 d. 12 d.
5 a. 12 e.
5 b. 
6 a. 13 
6 b. 14 a.
7 a. 14 b.
7 b. 14 c.
7 c. 14 d.
7 d. 14 e.
7 e. 14 f.
8 a. 15 a.
8 b. 15 b.
9 a. 16 a.
9 b. 16 b.
9 c. 16 c.
9 d. 16 d.
9 e. 
10 a. 17 a.
10 b. 17 b.
10 c. 
10 d. 18 a.
10 e. 18 b.
GOODENOUGH INTELLIGENCE TEST

KEY

1. Head present.
2. Legs present.
3. Arms present.
4 a. Trunk present.
4 b. Trunk proportion.
4 c. Shoulders present.
5 a. Attachment of limbs. (A)
5 b. Attachment of limbs. (B)
6 a. Neck present.
6 b. Neck outline.
7 a. Eyes present.
7 b. Nose present.
7 c. Mouth present.
7 d. Features in two dimensions.
7 e. Nostrils shown.
8 a. Hair present.
8 b. Hair detail.
9 a. Clothing present.
9 b. Two articles non-transparent.
9 c. Entirely non-transparent.
9 d. Four articles shown.
9 e. Complete costume.
10 a. Fingers present.
10 b. Number correct.
10 c. Detail correct.
10 d. Thumb shown.
10 e. Hand shown.

11 a. Arm joints.
11 b. Leg joints.
12 a. Proportion. Head.
12 b. Proportion. Arms.
12 c. Proportion. Legs.
12 d. Proportion. Feet.
12 e. Two dimensions.
13. Heel.
14 a. Coördination. Lines A.
14 b. Coördination. Lines B.
14 c. Coördination. Head.
14 d. Coördination. Trunk.
14 e. Coördination. Arms and Legs.
15 a. Ear present.
15 b. Ear detail.
16 c. Eye detail. Shape.
17 a. Chin and forehead shown.
17 b. Chin and forehead; detail.
18 a. Profile A.
18 b. Profile B.

1 See over for Table of Mental Age Equivalents of Scores. This Key is, of course, merely an outline and can be used only by a scorer who is thoroughly familiar with the methods of scoring each item as described in the author's book, Measurement of Intelligence by Drawings, pages 112–153 (published by World Book Company).
# TABLE OF MENTAL AGE EQUIVALENTS OF SCORES

<table>
<thead>
<tr>
<th>Score</th>
<th>M. A.</th>
<th>Score</th>
<th>M. A.</th>
<th>Score</th>
<th>M. A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3-3</td>
<td>18</td>
<td>7-6</td>
<td>35</td>
<td>11-9</td>
</tr>
<tr>
<td>2</td>
<td>3-6</td>
<td>19</td>
<td>7-9</td>
<td>36</td>
<td>12-0</td>
</tr>
<tr>
<td>3</td>
<td>3-9</td>
<td>20</td>
<td>8-0</td>
<td>37</td>
<td>12-3</td>
</tr>
<tr>
<td>4</td>
<td>4-0</td>
<td>21</td>
<td>8-3</td>
<td>38</td>
<td>12-6</td>
</tr>
<tr>
<td>5</td>
<td>4-3</td>
<td>22</td>
<td>8-6</td>
<td>39</td>
<td>12-9</td>
</tr>
<tr>
<td>6</td>
<td>4-6</td>
<td>23</td>
<td>8-9</td>
<td>40</td>
<td>13-0</td>
</tr>
<tr>
<td>7</td>
<td>4-9</td>
<td>24</td>
<td>9-0</td>
<td>41</td>
<td>Above 13</td>
</tr>
<tr>
<td>8</td>
<td>5-0</td>
<td>25</td>
<td>9-3</td>
<td>42</td>
<td>Above 13</td>
</tr>
<tr>
<td>9</td>
<td>5-3</td>
<td>26</td>
<td>9-6</td>
<td>43</td>
<td>Above 13</td>
</tr>
<tr>
<td>10</td>
<td>5-6</td>
<td>27</td>
<td>9-9</td>
<td>44</td>
<td>Above 13</td>
</tr>
<tr>
<td>11</td>
<td>5-9</td>
<td>28</td>
<td>10-0</td>
<td>45</td>
<td>Above 13</td>
</tr>
<tr>
<td>12</td>
<td>6-0</td>
<td>29</td>
<td>10-3</td>
<td>46</td>
<td>Above 13</td>
</tr>
<tr>
<td>13</td>
<td>6-3</td>
<td>30</td>
<td>10-6</td>
<td>47</td>
<td>Above 13</td>
</tr>
<tr>
<td>14</td>
<td>6-6</td>
<td>31</td>
<td>10-9</td>
<td>48</td>
<td>Above 13</td>
</tr>
<tr>
<td>15</td>
<td>6-9</td>
<td>32</td>
<td>11-0</td>
<td>49</td>
<td>Above 13</td>
</tr>
<tr>
<td>16</td>
<td>7-0</td>
<td>33</td>
<td>11-3</td>
<td>50</td>
<td>Above 13</td>
</tr>
<tr>
<td>17</td>
<td>7-3</td>
<td>34</td>
<td>11-6</td>
<td>51</td>
<td>Above 13</td>
</tr>
</tbody>
</table>

1 It has not seemed wise to attempt to derive mental age equivalents above age 13. In finding the IQ's of retarded children who are more than thirteen years old, the chronological age should be treated as thirteen only, and the IQ recorded as "or below." In the case of children who earn scores above 40, the mental age should be recorded as "13 or above" and the IQ as "or above."
PART 1 Description of the Test
Reliability and Validity

PART 2 Uses of Test Results
Diagnostic Profile

PART 3 Directions for
Administration

PART 4 Directions for Scoring
Norms
California Test of Mental Maturity

The Authors

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Editor-in-Chief, California Test Bureau. Formerly Dean of University College and Professor of Education at the University of Southern California. Dr. Tiegs served for fifteen years as principal and superintendent in the public schools of Wisconsin, Michigan, and Minnesota, before going to the University of Southern California where he offered courses and wrote textbooks in the fields of tests, measurements, and statistics. He is a member of Phi Beta Kappa, Phi Delta Kappa, and Phi Kappa Phi. He is co-author of the California Reading Test, the California Arithmetic Test, the California Language Test, the California Test of Personality, and the Mental Health Analysis.

The Test

The California Test of Mental Maturity is available on five levels: Pre-Primary, Primary, Elementary, Intermediate, and Advanced.

It is a diagnostic test of mental maturity. Its primary purpose is to make for each pupil a diagnostic evaluation of those mental abilities which are related to, or determine, his success in various types of school activity, in order that the teacher may utilize this information directly in aiding him when he is experiencing learning difficulties.

A separate four-page booklet is provided on each of the five levels for testing visual acuity, auditory acuity, and motor coordination. The purpose of these three tests is to identify pupils with defects sufficiently serious to prevent obtaining a valid diagnosis or measurement when they take any type of paper-and-pencil test.

Because of the wide range of abilities found in most age or grade groups this test provides for measurements several years of mental age above and below the particular group being tested.

Although this test is primarily diagnostic and analytical, attention is called to the fact that it yields not one mental age and I.Q. characteristic of the familiar intelligence test, but three mental ages (language, non-language, and total) and three I.Q.'s (language, non-language, and total).

The Diagnostic Profile has been devised in order to show graphically the status of each pupil in language, non-language, and total mental ages and intelligence quotients. It also provides spaces for recording the chronological age and the actual grade placement status of each pupil in relation to mental age.

The Diagnostic Profile provides the teacher not only with information relative to norms, but with clues for guiding the activities of pupils who are experiencing learning difficulties. Thus the major purpose of this test is not to obtain mental ages or I.Q.'s but to provide information on the nature and organization of the abilities of a given pupil in order that that information may be used to guide his learning activities.

All levels of the California Test of Mental Maturity measure Memory (immediate and delayed), Spatial Relationships, Logical Reasoning, Numerical Reasoning, and Verbal Concepts. The sub-tests are grouped to provide a score for language and non-language factors. Thus, the examiner has five more or less specific factors, two more general factors, and the total test results, to use as clues in guiding educational activities.

NOTE: This is the complete Manual for administering the California Test of Mental Maturity, Pre-Primary (1951 Edition) and the separate Non-Language and Language Sections.
California Test of Mental Maturity

DESCRIPTION OF THE TEST

The California Test of Mental Maturity, Pre-Primary, (1951 Edition) consists of 11 mental maturity tests which are described below. The format of this edition has been completely redesigned; norms have been adjusted on the basis of over 100,000 recent cases; tables for adjusting expected achievement to I.Q. medians have been included; and the maze test has been omitted because its net contribution was relatively small.

Pre-Tests of Vision, Hearing, and Motor Coordination for use with this and other types of paper-and-pencil tests are available separately in a four-page edition.

MEMORY

Memory ability is basic to all learning. The following two tests are designed to measure immediate and delayed recall.

IMMEDIATE RECALL — Test 1
This test consists of series of two to eight tasks, read in groups, which the pupil must perform immediately after they are read.

DELAYED RECALL — Test 2
A story is read to pupils about 15 minutes before they are given the opportunity to respond to a series of multiple choice test items in picture form.

SPATIAL RELATIONSHIPS

The following two tests are designed to measure the status of certain aspects of thinking which involve orientation in space and the use of spatial relations.

SENSING RIGHT AND LEFT — Test 3
Test 3 consists of 7 pictures of boys, girls, hands, and feet. These 7 items are designed to reveal the individual's ability to discriminate between right and left.

MANIPULATION OF AREAS — Test 4
This test consists of 7 picture items which measure the pupil's ability to use spatial imagery in manipulating spatial patterns of different forms and in different positions.

LOGICAL REASONING

In general, no matter how simple the situation, wherever a problem requiring a decision or a choice of responses presents itself, the simpler aspects of logical reasoning are present.

OPPOSITES — Test 5
This test contains 7 items each of which consists of 4 pictures. The first picture has an opposite among the other three which the pupil must identify.

SIMILARITIES — Test 6
This test consists of a total of 7 picture situations. The first two pictures are alike in some way. The pupil determines the nature of this likeness and then finds another picture among the other three which is similar to the first two.

ANALOGIES — Test 7
This test contains 7 items each of which consists of 6 pictures. The pupil must find among the last three pictures an item which bears the same relationship to the third as the first picture does to the second.

INFERENCE — Test 8
This test consists of 7 picture items in which the pupil is confronted with increasingly complex statements of fact which require the making of inferences in order to complete each task correctly.

NUMERICAL REASONING

This ability involves the recognition and use of likenesses and differences, and the making of inferences with special respect to quantitative or number situations and problems.

NUMBER CONCEPTS — Test 9
This test consists of 7 picture situations which require the pupil to understand such number concepts as tallest, most, middle, etc., and simple number series.

NUMERICAL QUANTITY — Test 10
This test consists of 7 picture problems in quantitative reasoning. The pupil is given a numerical situation in each case together with a task, or a question to which he must find the answer.

VERBAL CONCEPTS — Test 11
This test consists of 14 key words and 42 pictures. Each of these 14 key words must be properly identified in picture form in order to obtain the correct response. Three possible answers (in picture form) are presented for each key word.
RELIABILITY AND VALIDITY

RELIABILITY

The coefficients of reliability of the California Test of Mental Maturity, Pre-Primary, reported below, are based on 573 first grade pupils in representative school districts. These reliability coefficients have been computed by the split-halves method and corrected by the Spearman-Brown formula. These coefficients and the standard errors of measurement expressed in months of mental age are as follows:

Tests Reliability S.E. Meas.
Total Mental Factors .93 2.6
Language Factors .90 3.2
Non-Language Factors .92 2.9
Memory .90 3.1
Spatial Relationships .82 4.2
Logical Reasoning .82 4.2
Numerical Reasoning .80 4.5
Verbal Concepts .80 4.5

No. of cases 573
S.D. (M.A. in Mo.) 10

The standard errors of measurement of the I.Q.'s, determined from the same data, are as follows:

Tests S.E. Meas. of I.Q.'s
Total Mental Factors 4.1
Language Factors 5.2
Non-Language Factors 4.6

No. of Cases 573
S.D. of I.Q.'s 16.0

For those who are interested, additional reliability data may be obtained by writing the California Test Bureau.

VALIDITY

Since there are no purely objective criteria for establishing the validity of intelligence or mental maturity tests, the validity of such tests must be estimated in other ways. The California Test of Mental Maturity was designed to measure, by group methods, most of the types of mental processes which are sampled by the individual Binet. It consists of five series of tests of increasing difficulty. A comprehensive analysis of the Stanford-Binet was made by Dr. Elizabeth T. Sullivan and her results were embodied in a record form entitled, A Psychographic Record Blank.¹

From this conceptual framework, individual test items were prepared and subjected to statistical analysis to determine difficulty and correlation with criteria such as the Binet mental ages and the California Test of Mental Maturity total scores. Intercorrelations among the separate tests were computed and the test data were also factor-analyzed by the Thurstone Centroid Method. The total mental factors score has been found by the authors and other investigators to correlate as high or higher with the individual Stanford-Binet than any other mental ability test.

The eleven tests constituting the California Test of Mental Maturity are described on the preceding page. The intercorrelations among the main test sections, based on 573 cases in grade 1, are as follows:

INTERCORRELATIONS OF TEST SECTIONS
California Test of Mental Maturity—Pre-Primary (573 Pupils—Entering Grade 1)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>20.9</td>
<td>18.7</td>
<td>18.9</td>
<td>19.0</td>
<td>19.8</td>
</tr>
<tr>
<td>Spatial Relationships</td>
<td>19.5</td>
<td>20.6</td>
<td>16.8</td>
<td>14.5</td>
<td>17.0</td>
</tr>
<tr>
<td>Logical Reasoning</td>
<td>33.7</td>
<td>36.2</td>
<td>30.2</td>
<td>27.5</td>
<td>25.7</td>
</tr>
<tr>
<td>Numerical Reasoning</td>
<td>15.7</td>
<td>15.9</td>
<td>24.3</td>
<td>28.9</td>
<td>27.4</td>
</tr>
<tr>
<td>Verbal Concepts</td>
<td>10.2</td>
<td>9.6</td>
<td>9.8</td>
<td>10.1</td>
<td>10.1</td>
</tr>
<tr>
<td>Language Factors</td>
<td>32.6</td>
<td>31.6</td>
<td>36.7</td>
<td>36.6</td>
<td>37.7</td>
</tr>
<tr>
<td>Non-Language Factors</td>
<td>67.4</td>
<td>68.4</td>
<td>63.3</td>
<td>63.4</td>
<td>62.3</td>
</tr>
<tr>
<td>Total Mental Factors</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

¹ Since some sub-test scores are also included in certain other summary scores against which they are correlated, these coefficients are spuriously high.

Traxler², Strang³, Nolan⁴, and many others have testified to the value of the separate language and non-language sections of the California Test of Mental Maturity, both long and short forms, for the purpose of educational diagnosis and for obtaining clues for educational guidance on various levels.

"Apparently," says Dr. Strang, "the language part of the test measures one kind of mental ability, and the non-language another type. . . A verbal test of intelligence may give a misleading estimate of the mental ability of an individual who is seriously retarded in reading and language ability."

Dr. Nolan demonstrated that the language and non-language features made it possible to determine whether lack of reading ability or lack of mental maturity was responsible for low I.Q.'s and whether remedial reading or a simplified curriculum was indicated.

The relative contribution of the sub-sections of all levels of the California Test of Mental Maturity to the Total Mental Factors as determined from factor analysis data, using the Thurstone Centroid Method, are presented below. These are the combined net common and specific factor loadings expressed as per cents.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>20.9</td>
<td>18.7</td>
<td>18.9</td>
<td>19.0</td>
<td>19.8</td>
</tr>
<tr>
<td>Spatial Relationships</td>
<td>19.5</td>
<td>20.6</td>
<td>16.8</td>
<td>14.5</td>
<td>17.0</td>
</tr>
<tr>
<td>Logical Reasoning</td>
<td>33.7</td>
<td>36.2</td>
<td>30.2</td>
<td>27.5</td>
<td>25.7</td>
</tr>
<tr>
<td>Numerical Reasoning</td>
<td>15.7</td>
<td>15.9</td>
<td>24.3</td>
<td>28.9</td>
<td>27.4</td>
</tr>
<tr>
<td>Verbal Concepts</td>
<td>10.2</td>
<td>9.6</td>
<td>9.8</td>
<td>10.1</td>
<td>10.1</td>
</tr>
<tr>
<td>Language Factors</td>
<td>32.6</td>
<td>31.6</td>
<td>36.7</td>
<td>36.6</td>
<td>37.7</td>
</tr>
<tr>
<td>Non-Language Factors</td>
<td>67.4</td>
<td>68.4</td>
<td>63.3</td>
<td>63.4</td>
<td>62.3</td>
</tr>
<tr>
<td>Total Mental Factors</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>


USES OF TEST RESULTS

Some of the ways in which intelligence or mental maturity may be defined are: brightness, mental power, ability to understand relationships, ability to profit from experience. Early students thought that it could be measured on a vertical scale like pupil height.

However, it was soon discovered that pupils with identical mental ages or intelligence quotients did not have the same abilities and did not succeed equally well.

Thorndike and others pointed out that this concept was too simple, and among the new dimensions or aspects of intelligence which they suggested were the speed with which an individual works and the difficulty of the tasks which he can perform. These and other contributions led to extensive factor analysis studies which seem to indicate that intelligence consists of a number of relatively independent factors.

In measuring evidences of intelligence a score is first obtained either from a whole test or from some major part of a test. This score is then expressed in terms of a mental age. Mental age means mental ability equal to that possessed by the average or typical pupil of a given age group. Thus if a large representative number of pupils who were 12 years, 6 months old chronologically made an average score of 130 on a particular intelligence test, any other pupil who subsequently made a score of 130 on this intelligence test would be said to have a mental age of 12 years, 6 months.

Another measure is also used in designating intelligence; namely, the Intelligence Quotient (I.Q.). The Intelligence Quotient is obtained by dividing the Mental Age by the Actual or Chronological Age. It is therefore a ratio and shows the rate at which a particular pupil is developing mental ability. Thus the pupil who is 8 years old chronologically but has a mental age of 10 years has an I.Q. of 125 and is developing at a rate 25% faster than the average child.

Intelligence tests are standardized so that the average I.Q. of an unselected population at the pre-primary level is 100. This means that we merely assign this I.Q. to the average of this age group. The Intelligence Quotient may also be used to find the probable mental age of a person, when no new test data are available, by multiplying it by the chronological or actual age at any given time.

I.Q.'s are ordinarily interpreted as follows:

<table>
<thead>
<tr>
<th>I. Q.</th>
<th>Descriptive Classification</th>
<th>Per Cent of Typical Population Included</th>
</tr>
</thead>
<tbody>
<tr>
<td>130 &amp; above</td>
<td>Very superior</td>
<td>3%</td>
</tr>
<tr>
<td>115-129</td>
<td>Superior</td>
<td>12%</td>
</tr>
<tr>
<td>100-114</td>
<td>High average</td>
<td>35%</td>
</tr>
<tr>
<td>85- 99</td>
<td>Low average</td>
<td>35%</td>
</tr>
<tr>
<td>70- 84</td>
<td>Inferior</td>
<td>12%</td>
</tr>
<tr>
<td>Below 70</td>
<td>Very inferior</td>
<td>3%</td>
</tr>
</tbody>
</table>

In general, the higher the score, mental age, or intelligence quotient, the more complex, abstract, and difficult the task or problem which an individual can handle. Mental ability is one of the most significant factors in educational and in occupational adjustment. Frequently, the level of intelligence is the controlling factor in success.

Care must be observed in using the I.Q. before age 16. Mental ages indicate the level of intelligence or ability at a given time. In business, industry, and in school tasks, the mental age requirements are often known. It is thus possible to assign tasks to individuals which are appropriate to their mental ability.

However, two individuals having approximately the same I.Q. may have very different mental ages. A pupil in the second grade with an I.Q. of 125 cannot do as difficult tasks as a pupil in the sixth grade with an I.Q. of 125. The pupil in the 2nd grade may have a mental age of 10 years, whereas the pupil in the 6th grade would probably have a mental age of 15 years. Comparisons between individuals who are both more than 16 years of age chronologically can usually be made with I.Q.'s as well as M.A.'s.

Up until the age of 16 it is advisable to use M.A. in predicting achievement. In other words, what a given pupil up to this age ought to do can be told more accurately from his mental age than his intelligence quotient.

However, measures of capacity or intelligence should never be used alone, but should be considered in relation to other factors. (Continued on page 8.)

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3 The above distributions and percentages apply only to those tests such as the California Test of Mental Maturity and California Capacity Questionnaire which have provided for a normal, rather than skewed, distribution of mental ages and I.Q.'s. They would not apply in the cases of several intelligence tests which have arbitrarily allotted certain scores to higher mental ages without consideration of the normal probability curve, or which do not have a standard deviation of 16 points for a normal distribution of I.Q.'s.
See MANUAL for instructions.

### DIAGNOSTIC PROFILE

<table>
<thead>
<tr>
<th>Mental Age</th>
<th>36</th>
<th>48</th>
<th>60</th>
<th>72</th>
<th>84</th>
<th>96</th>
<th>108</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yr.</td>
<td>3.0</td>
<td>4.0</td>
<td>5.0</td>
<td>6.0</td>
<td>7.0</td>
<td>8.0</td>
<td>9.0</td>
</tr>
</tbody>
</table>

#### Factor Tests

<table>
<thead>
<tr>
<th>Factor</th>
<th>Possible Score</th>
<th>Pupil's Score</th>
<th>Yr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Immediate Recall</td>
<td>22</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>2. Delayed Recall</td>
<td>8</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

#### Total (1-2)

<table>
<thead>
<tr>
<th>Score</th>
<th>Yr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Total (3-4)

<table>
<thead>
<tr>
<th>Score</th>
<th>Yr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>5</td>
</tr>
</tbody>
</table>

#### Total (5-6)+8

<table>
<thead>
<tr>
<th>Score</th>
<th>Yr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>7</td>
</tr>
</tbody>
</table>

#### Total (9-10)

<table>
<thead>
<tr>
<th>Score</th>
<th>Yr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Total Mental Factors

<table>
<thead>
<tr>
<th>Score</th>
<th>Yr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>12</td>
</tr>
</tbody>
</table>

#### Language Factors

<table>
<thead>
<tr>
<th>Score</th>
<th>Yr.</th>
<th>Intell. Grade Place.</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
<td>12</td>
<td>0.2</td>
</tr>
</tbody>
</table>

#### Non-Language Factors

<table>
<thead>
<tr>
<th>Score</th>
<th>Yr.</th>
<th>Intell. Grade Place.</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>12</td>
<td>0.2</td>
</tr>
</tbody>
</table>

#### Chronological Age

- Average Girl, P.E. Equiv.
- NURSERY SCH. — KGN.
- 0.0

#### Summary of Data

<table>
<thead>
<tr>
<th>Scores</th>
<th>M A ÷ C A = I.Q.</th>
<th>Intell. Grade Place.</th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td>64</td>
<td>75</td>
</tr>
<tr>
<td>20</td>
<td>74</td>
<td>75</td>
</tr>
<tr>
<td>28</td>
<td>57</td>
<td>75</td>
</tr>
</tbody>
</table>

THE DIAGNOSTIC PROFILE

The Diagnostic Profile presents, graphically, significant elements of pupil ability. It summarizes the major factors which are measured by the test. It reduces the mystery which has been associated with the use of mental ages and intelligence quotients. The identification of pupil strengths and weaknesses is greatly facilitated so that they are available to use as the basis for guiding educational activities.

PREPARATION OF THE PROFILE

1. Record the Pupil's Score for each of tests 1 to 11 in the light-colored boxes immediately to the right of the Possible Score in each case.

2. Add the pupil's scores on tests 1 and 2, and write this sum in the box below them.

3. Add the pupil's scores on tests 3 and 4, and write this sum in the box below them.

4. Add the scores on tests 5, 6, 7, and 8, and write this sum in the box below them.

5. Add the scores on tests 9 and 10, and write this score in the box below them.

6. To obtain the Total Mental Factors score, add the totals for Memory, Spatial Relationships, Logical Reasoning, Numerical Reasoning, and the Verbal Concepts score. Record this sum in the box to the right of Possible Score 100.

7. To obtain the Language Factors score, add the scores on tests 2, 8, 10, and 11, and write this sum in the box to the right of Possible Score 36.

8. To obtain the Non-Language Factors score, add the scores on tests 1, 3, 4, 5, 6, 7, and 9, and write this sum in the box to the right of Possible Score 64. (Or subtract the Language Factors score from the Total Mental Factors score.)

9. Chronological Age (C.A.) is the actual or life age of the pupil in months. It is essential that this age be correct for the purpose of calculating the I.Q.'s. Each pupil's correct age is recorded in the box to the right of Chronological Age. The age should be determined from the pupil's birth certificate, school records, or some other source, if these are doubtful.

10. Average Grade Placement Equivalent which appears in small type immediately below Chronological Age is indicated by the numbers on the lower side of the Chronological Age scale. For example, if the pupil's chronological age is 75 months as indicated above the heavy line, a reference to the numbers below the line indicates that those who are 75 months old chronologically have an Average Grade Placement of about 1.2.

If it is desired to mark actual grade placements on the profile it can be done on this average Grade Placement Equivalent line, as illustrated on the sample profile to the left, since otherwise it is used only for inspection.

For more accurate information on chronological age-grade placement relationships, see the Grade Placement and Age Norms which appear in all manuals of the California Achievement Tests. First locate chronological age in one of the columns headed Av. C.A. or Age in Months) and then find the corresponding grade placement in the first column.

Note. When the Non-Language and Language Sections are administered by using separate test booklets, the results may be combined by placing them on the complete profile on the inside back cover of the Non-Language Section booklet.

Actual grade placement is determined by adding to the pupil's grade, the following fractions of a year:

<table>
<thead>
<tr>
<th>Months</th>
<th>Low Section</th>
<th>High Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>September</td>
<td>.0</td>
<td>.5</td>
</tr>
<tr>
<td>October</td>
<td>.1</td>
<td>.6</td>
</tr>
<tr>
<td>November</td>
<td>.2</td>
<td>.7</td>
</tr>
<tr>
<td>December</td>
<td>.3</td>
<td>.8</td>
</tr>
<tr>
<td>January</td>
<td>.4</td>
<td>.9</td>
</tr>
</tbody>
</table>

Where schools have annual promotions only, ignore the Low Section and High Section captions.

11. Mental Ages (M.A.'s) are found by using the norms on page 20 of this manual in the following manner: To find Mental Age for Total Mental Factors, locate the pupil's score for Total Mental Factors in one of the columns headed Total Mental Factors; the corresponding Mental Age in months is found directly to the left in the first column or to the right in the last column. Mental Ages for Language Factors and Non-Language Factors are found similarly by locating the pupil's scores in the 4th and 5th columns from the left and reading the corresponding Mental Ages in months in the first or last column.

12. Intelligence Quotients (I.Q.'s) are found by dividing each of the three Mental Ages (M.A. in months) by the pupil's Chronological Age (C.A. in months).1

13. The Diagnostic Profile presents, graphically, evidences of the maturity or development of each pupil in five factors. It is easily completed by locating pupil M.A.'s and other data on the light and heavy-rule scales to the right of the Scores, as illustrated on the sample profile. For example, the pupil in this case obtained a score of 5 in Spatial Relationships. This score is next located on the heavy rule to the right. The Mental Age (in months, or years and months) to which this score corresponds may then be read directly above or below on the heavy rules. In the illustration this Mental Age is about 56 months. The Mental Age equivalents of each major division and each sub-test may be obtained in the same manner.

Care must be observed in interpreting mental age equivalents of factors and sub-tests. Provision is made for obtaining them merely to reveal the

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1 The work of calculating I.Q.'s has been done for the convenience of test users in the Age and I.Q. Calculator, Los Angeles: California Test Bureau. Price, $1.50.
results of administering this test to thousands of pupils. Mental ages and I.Q.'s of pupils should be computed only on the Total Mental Factors, the Language Factors, and the Non-Language Factors scores.

14. The Percentile Ranks just to the right of the profile are obtained by using the tables for each age group appearing on pages 18 and 19 of this manual. Care must be observed in selecting the correct age table.

USES OF TEST RESULTS (Continued from page 5)

One should not attempt to predict individual achievement from mental test data alone any more than one would attempt to judge an automobile on the basis of a single measure, such as height, weight, length, or horse-power.

LANGUAGE AND NON-LANGUAGE DATA

Tests 1, 3, 4, 5, 6, 7, and 9 are presented with a minimum use of language. Tests 2, 8, 10, and 11 are presented in language form.

The language test data are particularly useful in indicating how well the individual understands relationships expressed in words, such as instructions, discussions, statements of logical principles or courses of action, and the like.

The non-language test data indicate how well the individual understands relationships among things or objects when no language or a minimum amount of language is involved, such as physical or mechanical relationships.

Individuals may possess these two kinds of mental ability in very different degrees. It is not unusual for a person to have a language I.Q. of 70 or 80 and to have a non-language I.Q. above 100. Similarly, the reverse is frequently the case.

In general, score differences between the Language and Non-Language sections may be used as follows:

1. To determine if learners need simplified programs (because of lack of ability) or remedial work (because of failure to realize their potentialities)
2. To predict success in certain construction activities
3. To provide longitudinal (historical) data which may be of clinical significance in cases of mental deterioration
4. Together with factor scores, to determine the types of educational activities which will be most effective in aiding those who are experiencing learning difficulties

MENTAL FACTORS DATA

The mental factor scores provide many clues for helping the pupil who is experiencing learning difficulties. Although factor scores of 14 points cannot be as reliable as the Total Mental Factors score of 100 items, these factor scores are often more useful in guidance than the total score, mental age, or I.Q. obtained from the much larger number of items. For example, two pupils may obtain the same mental age and even the same I.Q. and yet one of them may be very successful in a given kind of work which requires high numerical reasoning ability, whereas the other one fails because he lacks this ability.

MEMORY

Those who make low scores on Test 2, whether or not they score high on Test 1, frequently have a reading disability; they may prove to be poor spellers; they may find music difficult; and they may do poor work in the social studies.

Individuals with good memory ability usually do well in the traditional subject-matter centered school; but they usually have difficulty in such schools if they score low on Tests 1 and 2. In general, those who score low on memory tests must be assisted in various ways to recall the facts and information which they need in the pursuit of other types of educational activities.

SPATIAL RELATIONSHIPS

Handling scissors and paste, removing and replacing supplies on shelves, arranging books or blocks, and making sand table exhibits all involve spatial orientation. A high score indicates ability to do these things.

A low in these tests may be due to poor perception or memory or both. However, if the unsatisfactory status is due to lack of opportunity rather than ability, it may be improved through providing adequate opportunities.

LOGICAL REASONING

Those who obtain high scores on Test 6 and low scores on Test 8 may lack reading or memory ability. Test 11 should be checked in this connection. Where the environment has been favorable, a low score usually indicates an actual lack of capacity.

Individuals with superior logical reasoning ability should be expected to recognize the nature and implications of simple problems; to distinguish between evidence and mere opinion or belief; to suggest and test simple possible solutions; and to reach conclusions appropriate to their level of development.

NUMERICAL REASONING

Individuals who score high on these tests should be able to find their proper places in a line or circle, help arrange chairs for a small group, and get the right number of books or pairs of scissors for a small group.

If individuals who make low scores have not been denied the usual opportunities available to most children, such low scores suggest a deficiency in this factor of intelligence. They need special help in understanding number concepts
and in solving simple numerical problems.

On the other hand, they may do well in reading, music, and art, and in creative work which requires little or no numerical reasoning.

**VERBAL CONCEPTS**

Individuals who score high in this test possess the capacity to understand and profit from their experiences. They possess the beginnings of some of the basic abilities involved in understanding others and making others understand them. A low or average score on this test is not proof of lack of ability in the verbal factor; such a score may be due to lack of a favorable environment or training in the skills associated with this ability.
California Test of Mental Maturity

GENERAL INSTRUCTIONS TO THE EXAMINER

This test is primarily analytical and diagnostic but it also yields standardized test data including the customary M.A.'s and I.Q.'s.

TIME LIMITS

This is a power rather than a speed test.1 However, the time limits should be observed. They are ample for pupils to reach the practical limits of their abilities, and the test should be completed in the time specified.

Because of the wide differences of ability represented in any one kindergarten or first grade class, the time limits for this test are somewhat more flexible than those for middle and upper grades; only upper time limits are given. For this reason the examiner should watch the group being examined and start the next item or sub-test if advanced or bright pupils complete the work before the specified time elapses.

DIRECTIONS FOR ADMINISTRATION

Note to Examiner: If the complete California Test of Mental Maturity is to be administered, or if the separate Non-Language and Language Sections are to be administered in the order just indicated, use Parts A, B, & C of the Directions for Administration in their natural order. However, if only the Non-Language Section is to be given, use Parts A and B. If only the Language Section is to be given, begin with Part A, omit Part B, and finish with Part C of the Directions for Administration.

PART A

Suggested time allotment:
California Test of Mental Maturity (1951 Edition)
Non-Language Section 30 minutes
Language Section 20 minutes
Total 50 minutes (testing time only)

Materials Required:
For each pupil —
1 test booklet — California Test of Mental Maturity (or separate Non-Language or Language Section)
1 ordinary lead pencil with eraser attached or a crayola
1 eraser (if not attached to pencil or if crayolas are used)
1 sheet of paper to be used as a marker

In addition, for the examiner —
extra pencils or crayolas
extra erasers
extra copy of test booklet — for demonstration purposes, if necessary
Stop watch, or watch or wall clock with second hand

After checking to see that all pupils have pencils or crayolas, erasers, and markers, distribute the test booklets, face-up. Be sure that each pupil receives the booklet which has his name on it.

From this point on, certain parts of these directions are printed in this different type face. These parts are to be read to pupils.

SAY: Do not turn the first page of the book I have just given you until I tell you to do so. There are some test games in it which I wish you to try.

No one is expected to do all of them correctly but you should do as many as you can. Work as fast as you can without making mistakes.

PART B
Non-Language Section

SAY: Now open your game book to Test 1 and fold it back so that only the test shows. Demonstrate and be sure that all pupils understand.

TEST 1
Time required, about 4 minutes

SAY: Place your marker so that you can see only the first row with a ball in it. When you mark your answers, put an X on whatever you are told. The examiner will draw a circle on the blackboard and

SAY: If I should tell you to mark a circle, you would do it this way:

The examiner will then put an X on (in) the circle.

SAY: I shall read the names of some things in this row. Listen carefully and remember the things that I name. You are to mark them.

2. Pencils down. Move your marker down so you can see row 2. Now listen to the things I name: Table (Pause.) Chair. (Pause.) Key. Put a mark on each thing I named. (Allow 8 seconds.)
3. Pencils down. Move your marker down to row 3. Listen to the things you are to mark: The tail of the dog; the handle of the basket; the ears of the rabbit; the nest in the tree. Now mark the things I named. (Allow 10 seconds.)
4. Pencils down. Move your marker down so you can see the next row. Listen to the things you are to mark: One foot of the boy; the tail of the pig; the cover of the box; the handle of the broom; one wing of the airplane. Now mark the things I named. (Allow 12 seconds.)
5. Pencils down. Move your marker down so you can see the last row. Listen to the things you are to mark: an eye of the owl; the trunk of the elephant; the head of the giraffe; the tail of the squirrel; a wing of the swan; the tail of the monkey; the basket in the dog's mouth; the pocket on the coat. Now mark the things I named. (Allow 15 seconds.)

When pupils have completed the exercise,

SAY: Now turn the page and fold it back to Test 3.

TEST 3
Time required, about 2 minutes

SAY: Place your marker so you can see only the baby and the girl at the top of the page.

1. Put a mark on the baby's head. (Allow 5 seconds.)

Take time to be sure that pupils are making marks even if they are wrong.

SAY: 2. Now put a mark on the girl's foot. (Allow 5 seconds.) Check to see that pupils understand. Now move your marker down so you can see the boy, the girl, and the man.
3. Put a mark on the boy's right hand. (Allow 5 seconds.)
4. Put a mark on the girl's left eye. (Allow 5 seconds.)
5. Put a mark on the man's left foot. (Allow 5 seconds.) Move your marker down so you can see three hands.
6. Put a mark on each right hand. (Allow 5 seconds.) Move your marker aside so you can see three feet.
7. Put a mark on each left foot. (Allow 5 seconds.)

When the group have completed the seventh item,

SAY: Stop. Turn your game booklet over so that only Test 4 shows.

The examiner should see that all pupils have the right test.

TEST 4
Suggested time limit, 4 minutes

SAY: Place your marker so you can see only the first row of drawings. Look at the first drawing and then look at the other drawings in the same row.

The examiner should point to the drawings in Row 1.

SAY: The first drawing is among the other drawings, but it is turned around or turned over. Find this drawing and put a mark on it. (Allow sufficient time for marking and help individual pupils if necessary.)

The examiner should be sure that pupils have marked the oval. (The norms take account of the fact when pupils are aided with an item.)

SAY: Move your marker down so you can see the boxes. Do this row in the same way. Put a mark on the drawing that is like the first drawing in each row. (Allow 4 seconds.)

Now do all the others on this page in the same way. Find one which is the same as the first and put a mark on it. You may use your marker if you wish to. Ready, begin.

After 4 minutes,

SAY: Stop. Now turn the page and fold it back so that only Test 5 shows.

TEST 5
Suggested time, 4 minutes

SAY: Place your marker so you can see only the first row of pictures.

1. There are four boys. Look at the first picture — a boy standing up straight. Now look at the other pictures in the row and find one that is different — the opposite of the
first picture. Which one is it? Yes, the boy standing on his head. Put a mark on this picture because it is the opposite of the first picture. (Allow 5 seconds.)

2. Move your marker down to row 2. Look at the first picture and then find another one that is different—just the opposite—and put a mark on it. (Allow 5 seconds.)

After pupils have had time to mark the second item,

SAY: Now do all the others on this page in the same way. Find one which is the opposite of the first one in each row and put a mark on it. You may use your marker if you wish to.

Ready, begin.

After 4 minutes,

SAY: Stop. Now turn your test booklet over to Test 6.

TEST 6
Suggested time limit, 4 minutes

SAY: Place your marker so you can see only the first row of pictures. You are to find something in each row that is like the first two pictures and put a mark on it. Put a mark on the cap in the first row. The cap, sweater, and shoes are alike because they are all something to wear. That is why you mark the cap.

Now move your marker down so you can see the sun, moon, and other drawings. Put a mark on the picture that goes with the sun and moon. (Pause.)

Do the others on this page in the same way. Put a mark on the picture that is like the first two pictures in each row. Ready, begin.

Circulate among pupils to see that they are making marks even if they are wrong.

After 4 minutes,

SAY: Stop. Now turn the page and fold it back so that only Test 7 shows.

TEST 7
Suggested time limit, 4 minutes

SAY: Place your marker so you can see only the first row of pictures. In this row you see a girl, a boy, a woman, a coat, some gloves, and a man.

1. In this game you are to find something that goes with a woman in the same way that the girl goes with the boy. What is it? Yes, the man. Put a mark on the man. (Allow 5 seconds.) The girl goes with the boy just like the woman goes with the man.

2. Now move your marker down to the second row. In each row you are to find something that goes with the third picture like the first one goes with the second. Then put a mark on it. Use your marker if you wish to. Ready, begin.

After 4 minutes,

SAY: Now turn the test booklet over to Test 9.

TEST 9
Time required, about 5 minutes

SAY: 1. Place your marker so you can see only the three trees. Put a mark on the tallest tree. (Allow 10 seconds.)

2. Move your marker down so you can see the little chickens. Put a mark on the most chickens. (Allow 10 seconds.)

3. Move your marker down so you can see the kittens. Put a mark on the middle kitten. (Allow 10 seconds.)

4. Move your marker down so you can see the acorns. Put a mark on the most acorns. (Allow 15 seconds.)

5. Move your marker down so you can see the first string of beads. In one place the beads are strung wrong. Put a mark on the place that is wrong. (Allow 15 seconds.)

6. Move your marker down so you can see another string of beads. These beads are also strung wrong in one place. Put a mark on the place that is wrong. (Allow 20 seconds.)

When the group have completed the seventh item,

SAY: Stop. Put your pencils down.

The examiner will declare at least a five-minute recess if the California Test of Mental Maturity (both Non-Language and Language Test in the same booklet) is being administered, and the Language Section is to be given at this time. If it is not, or if the Non-Language Section in a separate booklet has just been administered, collect the scratch paper, test booklets, and any pencils that have been distributed.

PART C
Language Section

If only the Language Section is to be administered, or if the Language Section (either the separate booklet, or the Language Section of the California Test of Mental Maturity) is to be administered before the Non-Language Section, begin with Part A of the Directions for Administration, omit Part B, and finish with Part C which begins with TEST 2 — STORY, which follows.

TEST 2 — STORY
Reading time for the story, about 3 minutes

SAY: Sit back in your seats and be comfortable. I am going to read you a short story. Listen carefully so you will remember what I read because you will be expected to answer some questions about it later. The name of the
The story I am about to read is, "A Mother Cat and Her Kittens."

The examiner will read the following story in a clear, steady tone of voice usual for story telling or reading. Read the title again before beginning the story.

A MOTHER CAT AND HER KITTENS

I am going to tell you a story about a mother cat and her five kittens.

They belonged to the two children, Jane and Bill.

They lived in a basket on the back porch of the children's house.

The mother cat always seemed worried when the children played with her kittens.

One day Bill and Jane went to play with the kittens.

The basket was empty. The mother cat and her five little kittens were gone.

Bill said, "Let us watch for the mother cat. She will come back for something to eat."

They watched and waited so long that they were hungry.

When they started to go into the house for something to eat they saw the mother cat coming around the corner of the house.

The mother cat saw the children, too. She turned and ran away.

Jane and Bill hid behind a rosebush and watched for her. They saw her go into a barrel near the house.

Jane said, "The poor mother cat must be hungry. She is afraid of us. She will not come and drink her milk."

Bill put her bowl of milk near the barrel for her.

After the children had lunch, Jane said, "Let us see if the mother cat came for her milk." Sure enough, the mother cat was drinking her milk.

The mother cat soon saw that Bill and Jane were her friends.

She wanted to bring her kittens back to the basket where it was brighter and warmer. She took one of her kittens in her mouth and climbed out of the barrel and carried it back to the basket. Then she went back to her hiding place in the barrel. One by one she carried the other kittens out of the barrel. Soon all five kittens were back in the basket.

The mother cat was tired so she lay down near the kittens beside the basket.

Bill and Jane were watching from the kitchen window. They clapped their hands for joy.

Jane put a bowl of fresh milk beside the basket.

The mother cat stood up and rubbed against Jane. She saw that the children were her friends and would be good to her kittens.

After finishing the story, SAY: Now find Test 10 on page 11.

The examiner will assist pupils to find the test if necessary.

TEST 10

Time required, about 5 minutes

SAY: Place your marker so you can see only the first row. This row has nests with eggs in them.

1. Put a mark on the nest with five eggs in it. (Allow 10 seconds.)
2. Move your marker down so you can see the pennies. If you had one penny and you earned two more pennies, put a mark on the box that shows how many pennies you would then have. (Allow 10 seconds.)
3. Move your marker down so you can see the crayolas. If you had two crayolas and the teacher gave you three more, put a mark on the box which shows how many crayolas you would then have. (Allow 15 seconds.)
4. Move your marker down so you can see the flowers. Put a mark on the box of flowers that has one less flower than the box with the most flowers. (Allow 20 seconds.)
5. Move your marker down so you can see the ducks following their leader. Put a mark on the fourth duck from the leader. (Allow 10 seconds.)
6. Move your marker down so you can see the clothespins. Make marks on half of the clothespins. (Allow 15 seconds.)
7. Now put your marker aside so you can see the pies. Make a mark on the pie that has enough pieces for 4 children and would still have 2 more pieces left on the plate. (Allow 20 seconds.)

After the group have completed the seventh item,

SAY: Stop. Now turn the page and fold it back so that only Test 11 shows.

TEST 11

Time required, about 4 minutes

SAY: 1. Place your marker so you can see only the pictures in row 1. You are to mark the picture that I name. Dog. Put a mark on the dog.


Check to see that pupils are making marks even if they are wrong.

The instructions to be given each time are;
Move your marker down. Pronounce the word and say, "Put a mark on the . . . . ." thus pronouncing the test word twice. Pause 5 seconds after each word.

TEST VOCABULARY

3. Flag 6. Locket
4. Package 7. Target
5. Giraffe

SAY: Now move your marker up to the top of the page again.

8. Wheel 12. Measure
10. Statue 14. Arms extended
11. Almost reaching
When the group have completed the fourteenth item,
SAY: Stop. Now turn your booklet over to Test 8.

TEST 8
Time required, about 4 minutes
SAY: Place your marker so you can see only the two boys. This is a game to see how well you can think. Listen to what I say and then put a mark on the picture that is the correct answer.

The examiner will read each statement within double quotation marks twice before telling pupils to mark it, giving them time, and proceeding with the next sentence.

SAY: I will read each thing you should know twice. Do not mark until I tell you to.
1. "Ben is taller than Ned." Put a mark on Ned. (Allow 5 seconds.) Move your marker down so you can see the two girls.
2. "Mary can reach higher than Jane." Put a mark on Mary. (Allow 5 seconds.) Move your marker down so you can see the shoe.
3. "Jack's shoe is smaller than Jim's." Put a mark on Jim's shoe. (Allow 5 seconds.) Move your marker down so you can see three girls.
4. "The teacher said, 'I'll give a lantern to the girl who learns the most words today.' Betty learned the most words." Put a mark on Betty. (Allow 5 seconds.) Move your marker down so you can see the three girls.
5. Look at these flowers. "Ann's flower is bigger than Betty's but not as big as Jane's." Put a mark on Ann's flower (Allow 8 seconds.) Move your marker down so you can see three flowers.
6. Look at the three dogs. "Fido can jump higher than Rover. Gyp can jump higher than Fido." Put a mark on Fido. (Allow 8 seconds.) Move your marker aside so you can see the three dogs.
7. Look at the three boys sitting on a bench. "Ben is nearer to the gate than Sam. Jim is nearer to the gate than Ben." Put a mark on Ben. (Allow 8 seconds.)

After the group have completed the seventh item,
SAY: Stop. Now turn the page and fold it back so that only Test 2 shows.

TEST 2
Time required, about 4 minutes
SAY: Place your marker so you can see only the first box. On this page there is one picture in each box that goes with the story read to you a short time ago.
1. In box 1 there is a chicken, a dog, and a cat with kittens. Put a mark on the picture that shows what the story is about. (Allow 5 seconds.)
2. Move your marker down so that you can see box 2. Put a mark on the picture that shows to whom the cat and kittens belonged. (Allow 5 seconds.)
3. Move your marker down so you can see the third box. Put a mark on the picture that shows where the cat and her kittens liked best to live. (Allow 5 seconds.)
4. Move your marker aside so you can see box 4. Put a mark on the picture that shows where the mother cat hid her kittens. (Allow 5 seconds.)
5. Move your marker up under box 5. Put a mark on the picture that shows where the children hid to watch for the mother cat. (Allow 5 seconds.)
6. Move your marker down below box 6. Put a mark on the picture that shows where Bill put the bowl of milk for the mother cat. (Allow 5 seconds.)
7. Move your marker down below Box 7. Put a mark on the picture that shows how the mother cat carried her kittens. (Allow 5 seconds.)
8. Put your marker aside so you can see the last box. Put a mark on the picture that shows what the mother cat did when Jane brought her milk. (Allow 5 seconds.)

After pupils have attempted to mark the last item,
SAY: Stop. Put your pencils down.
Collect the scratch paper, test booklets, and any pencils that have been distributed.
California Test of Mental Maturity

DIRECTIONS FOR SCORING

HAND SCORING THE TEST BOOKLETS

The examiner may use the key or mark an unused test booklet with the correct answers as an aid in scoring. It is advisable for the examiner to take the test without reference to the key since this procedure will acquaint him with the diagnostic values of the test. Instructions for scoring are:

1. Each item is considered right or wrong. No partial credits are given for partial answers.
2. Mark each correct item with a C.

3. The score for each section is the number right.
4. Credit any clear method of indicating the correct answer. Consider the intention of the pupil, if it can be determined. If in doubt, consider the answer wrong.
5. If two or more answers are given, count the item wrong, unless the pupil has attempted to erase or cross out the incorrect answer.

NORMS

The original standardization of each level of the California Test of Mental Maturity was based on 25,000 cases for which control data from other standardized tests were available. Since that time these norms have been checked against over 100,000 additional cases for many of which control data were available. Only a few minor adjustments had to be made as a result of these checks.

In their final form the norms for the California Test of Mental Maturity, Pre-Primary, have been based on a controlled (stratified) sampling of over 125,000 cases which constituted a normal distribution of mental ability, typical age-grade relationships, and other characteristics as follows:

1. The median I.Q. for Kindergarten and Grade 1 was 100. The standard deviation of I.Q.'s was 16 points.
2. Seventy per cent of the pupils were making normal progress through the grades; about 20 per cent were retarded one-half year or more; and 10 per cent were accelerated one-half year or more.
3. About 85 per cent of the population was Caucasian and the remainder was Mexican, Negro, and other minority groups.

MENTAL AGE AND INTELLIGENCE GRADE PLACEMENT NORMS

These norms represent the average (median) test scores of the standardization population described above. In using the mental age norms, the examiner simply locates the particular score which the pupil obtained in Total Mental Factors, Language Factors, or Non-Language Factors in the columns on page 20 of this manual and then notes the corresponding numbers in the Mental Age columns. Age and/or grade norms make possible the interpretation of the pupil's score by relating it to the average (median) mental ability of a large group.

PERCENTILE NORMS

Percentile norms provide a means for making comparisons between pupils in the same age groups. If a pupil obtains a percentile rank of 25 it indicates that he surpasses 25% and is surpassed by 75% of the pupils of that group.

In using the tables of percentile norms on pages 18 and 19 for scores of various mental factors, the examiner first locates the table for the pupil's correct chronological age. Thus a pupil with a chronological age between 66 and 71 months who obtained a score of 8 on Spatial Relationships has obtained a percentile rank of 70; a pupil of the same age who has made a score of between 72 and 77 on Total Mental Factors has a percentile rank of 90.

For convenience in interpretation, all scores are assigned the percentile ranks of the mid-point of the range of percentile ranks in which they are located. For example, a percentile rank of 70 is assigned to all scores which are located between percentile points 65.0 to 74.9.
### PERCENTILE NORMS — CALIFORNIA TEST OF MENTAL MATURITY — PRE-PRIMARY — 1951 EDITION

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CTMM-PP MANUAL

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* Intelligence Grade Placements established from median mental ages of respective actual grade placements.
Non-Language Section

(Language Section starts with Test 10 on page 11.)
TEST 3

1

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Page 4
CTMM-PP

Test 3 Score
(number right)
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Language Section
Pages 11 through 14
TEST 8

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Test 8 Score
(number right)