THE USE OF CONCRETE, SEMI-CONCRETE AND PICTORIAL

MATERIALS IN A FIRST GRADE

ARITHMETIC PROGRAM

AN ABSTRACT OF A THESIS

PRESENTED TO THE GRADUATE FACULTY

OF DANBURY STATE COLLEGE

IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE DEGREE

MASTER OF SCIENCE

by

Josephine J. Penn

June 1963

ABSTRACT

The materials discussed in this thesis have been chosen to show what is going on in the field of arithmetic and mathematics in some of today's first grade classrooms. The thesis endeavors to show: first, how concrete, semi-concrete and pictorial materials produce learning of the first order; second, how the uses of these materials have grown in importance until today they have become widely accepted as necessary equipment for the modern classroom; and finally, how these materials can be used in actual classroom situations to build understanding not only of the traditional arithmetic concepts, but also of those basic mathematical concepts that today are considered by many educators as belonging in a first grade arithmetic curriculum.

In the Introduction to the thesis, the reader will find the answer to his question, "What are concrete, semi-concrete and pictorial materials?"

The importance of the senses in the learning process of a child, and how sensory experiences and learning are linked together, are topics that are discussed in Chapter I.

In Chapter II the writer discusses the use of concrete, semi-concrete and pictorial materials beginning with Rousseau in the 18th century; through their use by Dr. Stern and M. Cuisenaire in the 1930's and 1940's; through the wider acceptance of their value as teaching aids in the 1950's; to the new uses of these traditional materials in the 1960's.

Chapters III, IV, V and VI, explore certain basic mathematical principles that today many educators believe first grade children can understand. Meaning of these concepts is developed through the use of concrete, semi-concrete and pictorial materials. The selection of materials and the experiences to help build understanding of each concept are included in these chapters.

Beginning experiences in counting are described in Chapter III. These experiences are divided into four groups: rote counting; counting to find "which one" (the ordinal meaning of number); learning to read and write number names and symbols; and experiences with the idea of one-to-one and many-to-one mapping, and counting to find "how many" (the cardinal meaning of number).

In the second section of Chapter III, meaning is developed for place value. Materials are introduced in this section to help young children gain an understanding of this important number concept.

In Chapter IV, experiences to build addition, subtraction and beginning algebraic concepts are described. Materials and procedures are introduced to give meaning to the idea of equality. The postulates that apply to addition--the commutative and associative laws of addition-- are developed with concrete, semi-concrete and pictorial materials. Under subtraction, attention is given to building an understanding of the concept that subtraction is the inverse of addition; and to teaching children through experiences the three ways subtraction is used in social situations. At the end of this chapter, procedures in working with the unknown are introduced to help children gain an understanding of the idea that a numeral is not the only way to represent a number.

The use of concrete, semi-concrete and pictorial materials to help children gain a meaningful introduction to fractions is the topic of the first section of Chapter V. This is followed in the second section by experiences to build an understanding of the direct social applications of fractions in the use of familiar measures--length and distance, time, liquid, weight, temperature and money.

Chapter VI includes those new ideas which a number of educators now believe young children are capable of understanding. These topics include: problem solving; permutation and combination; simple shapes and spatial relationships along with a beginning geometric vocabulary; the idea of negative numbers; and, finally, plotting coordinate points--a beginning notion of function.

The Appendix to this thesis consists of a list of films and film-strips on the primary and first grade levels which can be used as pictorial materials to enrich the teaching of arithmetic and mathematics in the first grade.