

**THE PRIMARY PUBLIC
SCHOOL ARITHMETIC: BASED
ON MCLELLAN AND DEWEY'S
"PSYCHOLOGY OF NUMBER"**

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The Primary Public School Arithmetic: Based on McLellan and Dewey's "Psychology of Number" by J. A. McLellan & A. F. Ames

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BASED ON
MCLELLAN AND DEWEY'S "PSYCHOLOGY OF NUMBER"

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PREFACE

THIS book is strictly introductory to "The Public School Arithmetic," and forms with it a complete course. In both, the method of treatment closely follows "The Psychology of Number." A few special points in the Primary may be noticed.

1. While number work in the first grade may be largely incidental, it ought not to be accidental. The teacher should have a clear conception of the work to be done, and of the order and method by which the child may step by step reach the desired end. When the child enters school the number sense is alert; he is, roughly speaking, in the counting stage of development. Upon the principle "strike while the iron is hot," this counting power should at once be used for further growth by applying it to more definite measurements. Such application arouses fresh interest in number, and is in a high degree educative. On this point Dr. Dewey says, "Unless there is to be arrested development when the child enters school, some function must be found with reference to which he may utilize his ability to count—the number sense becomes vitalized and truly educative at this point by being largely directed towards the definition of values in the form of measurement." This book, therefore, while not

giving first grade work in full, presents in systematic form and in sufficient detail for any primary teacher the amount of work to be done and the method of doing it.

2. Those to whom counting is the whole of number hold that almost the sole object of number-work in primary grades is quickness and accuracy in the figure-work of the fundamental rules. They are inclined to belittle the training of intelligence. Most teachers know, however, that not accurate figure-work and rule-learning is the crux, but rather what figure-work — “what rule” — to apply in given cases. Accordingly, while not unmindful of the use of skill in figure-work, the authors of this book have a wider purpose. Recognizing that number is the “tool of measurement,” they have endeavored by a careful grading and an unusual variety of concrete and constructive exercises to develop true ideas of number and numerical operations, as well as trained intelligence and ability to apply what has been learned to the varying problems of social life.

3. There are two extreme views regarding the nature of number leading to two quite different pedagogical methods: one of these, *No ratio in number*; the other, *No number in ratio*. The one begins with the ratio idea, and ignores or subordinates the “how many” (counting) idea, letting it struggle into being incidentally in the development of ratio. The other begins with the vague “how many,” and subordinates ratio or rather totally ignores it as not involved in the number process. This book, following as it does “The Psychology of Number,” avoids both extremes. It begins with the *how many* (counting) as applied to some total; and keeping together

things which psychologically cannot be separated, viz. number and quantity, proceeds from the vague *how many* and the vague *how much* to the definite *so many* and the definite *so much*. Thus there is gradually yet surely evolved the concept of ratio—a concept which is indispensable in practical life, and without which there can be no Science of Arithmetic. On this important point Dr. Dewey—whose views on the psychical nature of number have never been questioned by a competent critic—says: “When counting is used by the child to value some amount or other the ratio idea is *implied*. It need not, therefore, be consciously or explicitly stated. In fact, I should say that for a considerable period it should not be. It is enough that the child gets a sense for the use and application of number in measurement. When number is so used, the transition to the conscious ratio idea, whether in the form of ratio proper, or fractions, or percentage, is natural and inevitable; this is not a mere doctrinaire statement; it rests upon continuous experimenting and observation in a school where the child’s number sense is developed in connection with constructive operations in manual training, in which number relations are introduced as instruments to practical valuation.”

4. This has been verified during the preparation of this book. Through the kindness of the publishers printed sheets of the exercises and methods have been placed in the hands of teachers in training (and public) schools, and actually tested in the classes. The reports have been unanimously favorable. The children got hold of the idea of number as “*The Tool of measurement*,”