

WARREN COLBURN ON THE TEACHING OF ARITHMETIC TOGETHER WITH AN ANALYSIS OF HIS ARITHMETIC TEXTS¹

I. THE LIFE OF WARREN COLBURN²

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In recent times we have come to recognize Pestalozzi, the humble Swiss philosopher, as the source of certain practices which have been introduced into our elementary schools within the past century. Oral instruction, object-teaching, nature-study, and several minor practices are traceable to Pestalozzi as the first to realize them in practice. The first phase of Pestalozzianism to secure a strong hold on American schools was oral instruction. The introduction of this practice was due primarily to the work of Warren Colburn, although there is reason to believe that Colburn did not owe as much to Pestalozzi as is commonly supposed. But regardless of this question, Colburn must be regarded as a successful exponent of oral instruction and his *First Lessons in Intellectual Arithmetic* achieved almost incredible success as a text.

This alone is sufficient reason to justify a presentation of his life and work. But in addition, a new period in both the organization and the teaching of arithmetic begins with the appearance of his *First Lessons* in 1821. Thus Colburn occupies a place of first importance in the development of American arithmetic and arithmetic teaching.

Finally, his writings and his activities show him to be a man who had an unusual appreciation of the value and importance of education, and to be a man who possessed an insight into the educative process which was far ahead of his time and which we are only now coming to realize.

¹ This is the first of a series of articles on this subject. The next article will consist of Colburn's address on "The Teaching of Arithmetic."

² The source of most of the facts of Warren Colburn's life is an account in Barnard's *Journal of American Education*, II, 294.

Warren Colburn was born March 1, 1793, in the part of Dedham (Mass.) called Pond Plain. In 1794 or 1795 the family moved into Clapboardtrees Parish, later to High Rock, and in 1800 or 1801 to Milford. Richard Colburn, his father, was a farmer and the early life of the boy was spent on the farm. Presumably he participated in the usual activities of farm life. At the age of four, Warren attended a summer district school. At Milford, he began to attend the winter district school. From Milford the family moved, about the year 1806, to Uxbridge, where he continued to attend the winter terms of the common school.

It was at this last place that his aptitude and expertness in arithmetic began to attract attention. His father encouraged this aptitude by taking into the family Mr. Gideon Alby, an old school-master who was good at figures. Mr. Alby instructed the boy in "cyphering" during the long winter evenings.

About this time Colburn seems to have developed either a distaste for the farm, or an aptitude for machinery and certain lines of manufacturing. Apparently on his account, the family left the farm about 1810 and moved to Pawtucket, R.I., so that he might have the opportunity to learn something of machinery. During the next five years he worked in factories, and it was not until the summer of 1815 that he began to prepare himself for college. Just why he developed a desire for a college education is not told us, but clearly he possessed a very keen motive for it. Such was his zeal that he prepared for college within twelve months, although apparently he had not studied languages before. For this reason he was ill prepared in all except mathematics when he entered Harvard College in 1816.

Throughout his college course he was recognized as excelling all his classmates in mathematics. It is said that he applied himself with equal faithfulness to the classics, and in spite of his poor preparation he commanded the respect of his instructors and stood well in these classes. In mathematics he mastered the calculus and read through a considerable portion of the great work of Laplace. He graduated in August, 1820.

During his collegiate course he taught during the winter months in Boston, in Leominster, and in Canton. After leaving college

he began teaching in a select school in Boston. He continued in this school for about two and a half years. He then gave up school teaching and went to Waltham as superintendent of the Boston Manufacturing Company. In August, 1824, he became superintendent of the Lowell Merrimack Manufacturing Company at Lowell. He continued in this position until his death, September 13, 1833.

In the winter of 1826, Lowell was incorporated as a town, and at the first town meeting Mr. Colburn was chosen a member of the Superintending School Committee. It is said that in order to provide time for proper attention to the affairs of the new school system, the committee often held their meeting at six o'clock in the morning. Mr. Colburn served on this committee for two years and was re-elected in 1831 but was excused at his own request.

He was elected a Fellow of the American Academy of Arts and Science in 1827. Also, for a number of years he was a member of the Examining Committee for Mathematics at Harvard College.

While at Lowell he conceived a scheme for the intellectual improvement of the community by popular lectures on scientific subjects. Throughout the autumn and winter of 1825 he gave illustrated lectures upon natural history, light, the seasons, and electricity. He continued giving popular lectures for several years, varying the content somewhat from year to year. On one occasion he received and accepted an invitation to deliver a series of lectures before the Mechanics' Charitable Association in Boston.

It was while teaching in Boston that he wrote his arithmetics. The *First Lessons in Intellectual Arithmetic* came from the press in the autumn of 1821. The *Sequel to the First Lessons* was published about a year later.¹ In 1825 he published *An Introduction to*

¹ The date of publication of the *Sequel* has been erroneously given as 1824, and one writer has given it as 1826. Neither of these dates is correct for I have in my possession a copy bearing the date of 1822, the date of copyright being October 30.

I have in my possession two other copies of the *Sequel*. One bears the date of 1826 and is a third edition, but retains the copyright date of October 30, 1822. The other bears the date of 1828 and there is a slight change in the title of the book. The first copy bears the title, *Arithmetic; Being a Sequel to First Lessons in Arithmetic*. In the edition of 1828 the title is changed to *Arithmetic upon the Inductive Method of Instruction: Being a Sequel to Intellectual Arithmetic*. The copyright date of this edition is May 25, 1826. This does not appear to be a revision of the original text, except that a few minor changes are made.

Algebra upon the Inductive Method of Instruction. Although the algebra was not published until after he had ceased teaching, it was a part of his originally conceived plan which had its incipency in his teaching experience.

Mr. Batchelder, of Cambridge, states: "I remember once, in conversing with him with respect to his arithmetic (the *First Lessons*), he remarked that the pupils who were under his tuition made his arithmetic for him: that he had only to give attention to the questions they asked, and the proper answers and explanations to be given, in order to anticipate the doubts and difficulties that would arise in the minds of other pupils; and, the removal of these doubts and difficulties in the simplest manner was the foundation of that system of instruction which his school-books were the means of introducing."

He published about the same time a series of reading books for young children. Each book of the series contained some appropriate instructions in English grammar. It is said that his method of presenting grammar gave results scarcely less admirable than in arithmetic. Before his death he had planned a revision of his *Sequel* which was intended to meet the criticisms which had been made upon it. Unfortunately he had not committed his ideas for the revision to writing and nothing has come down to us of what probably would have been a work of even more merit.

The *First Lessons* was immediately introduced into the schools. It enjoyed greater popularity than any other arithmetic ever published. In 1856 the statement was made that 50,000 copies were used annually in Great Britain and 100,000 annually in the United States. It was even translated into foreign languages. It is still published by Houghton Mifflin Company.

Says Mr. Thomas Sherwin, principal of the high school, Boston: "I regard Mr. Colburn as the great benefactor of his age, with respect to the proper development of the mathematical powers. Pestalozzi, indeed, first conceived the plan; but Mr. Colburn realized the plan, popularized it, and rendered it capable of being applied by the humblest mediocrity. Indeed, I regard the *First Lessons* as the *ne plus ultra* of primary arithmetics.

The *Sequel* is certainly a work of great ingenuity, which shows a great mastery of the principles of education, and which he himself considered a book of more merit and importance than the *First Lessons*. Of the *Sequel*, indeed, it may be said, not only that its true value has not, in general, been sufficiently estimated, but, that its actual influence on the use, the understanding, and popularity of the *First Lessons* has been appreciated only by particular observers.

Colburn received the genuine respect of all who knew him. At college he was liked and respected by all his classmates, although he was not accustomed to participate in the social activities of college life. He was older and more mature than his fellow-students and seems to have taken his college studies quite seriously. He was not brilliant in conversation nor in public speech. Soon after Colburn's death, Dr. Edward G. Davis, a classmate, wrote of him as follows:

In the constitution of Colburn's mind, many circumstances were peculiar. His mental operations were not rapid, and it was only with great patience and long-continued thought that he achieved his objects. This peculiarity, which was joined with an uncommon power of abstraction, he possessed in common with some of the most gifted minds which the world has produced. Newton, himself, said that it was only by patient reflection that he arrived at his great results, and not by sudden or rapid flights. In Colburn this slowness and patience of investigation were leading traits. It was not his habit, perhaps not within his power, to arrive at rapid conclusions on any subject. . . . His conclusions, reached slowly and painfully, were established on a solid basis, and the silent progress of time, that great test of truth, has served but to verify and confirm them.

The trend of his mind at the time of leaving college is reflected in his thesis, which was *On the Benefit Accruing to an Individual from a Knowledge of the Physical Sciences*. One paragraph is especially significant:

The purpose of education is to render a man happy as an individual, and agreeable, useful, and respectable as a member of society. To do this, he ought to cultivate all the powers of his mind, and endeavor to acquire a general knowledge of every department of literature and science, and a general acquaintance with the world by habits of conversation. And this is not inconsistent with the most intense application to a favorite pursuit.

His life after leaving college is an example of the opinion he expresses here. Although engaged as a superintendent of a manufacturing company, a position of responsibility and one which required constant attention, Colburn found time to continue his educational endeavors. His algebra was completed after leaving the schoolroom. He was one of the founders of the American Institute of Instruction, and delivered a masterly address before that body on "The Teaching of Arithmetic."

Dr. Davis, referred to above, says further:

His great and most interesting project, that of improving the system of elementary instruction in mathematical science, appears to have occurred to him during the latter part of his college life, and was the subject of painful thought many years before his first work made its appearance. It required, indeed, no small energy of mind thus to break through the trammels of early education, and strike out a new path; for, Colburn, like others, had been brought up under a system the reverse of that which he now undertook to mature and introduce. . . . In the course of a few years, the appearance of these little books seemed to have revolutionized the mode of teaching elementary mathematics in the schools of New England. Various modifications have since been introduced into his plan, for which, whether improvements or otherwise, little credit can be claimed on the score of originality; and it may with safety be asserted, that whatever in the present mode of teaching the science of numbers in our schools distinguishes it from that in use twenty years since, is attributed mainly to his publications. . . .

His *First Lessons* was, unquestionably, the result of his own teaching. He made the book because he needed it, and because such a book was needed in the community. He had read Pestalozzi, probably, while in college. That which suited his taste, that which he deemed practicable and important, he imbibed and made his own. He has been sometimes represented as owing his fame to Pestalozzi. That in reading the account and writings of the Swiss philosopher, he derived aid and confidence in his own investigations of the general principles of education is true. But, his indebtedness to Pestalozzi is believed to have been misunderstood and overrated.

As indicated in this last statement, it is usual to speak of Colburn as one who successfully utilized Pestalozzi's ideas, but, even before I came upon this comment by Dr. Davis, my studies of the works of the two men had caused me to feel that the connection between them was much less than I had supposed. Colburn's work shows much originality, and in any case he went much farther than Pestalozzi. His books contain several important features which do not appear in Pestalozzi's writings.

When we come to give proper recognition to the pioneers in American education, much credit will be attached to Colburn's work. His arithmetic texts and his address on "The Teaching of Arithmetic" can profitably be studied by any teacher. Besides the historical interest which is attached to a significant work, his books contains excellent ideas which we are only now coming to realize. It is my purpose to present in a future article some of the most significant features of his texts.