

# Reflecting on Current Practice

## *Using 19<sup>th</sup> Century Voices*



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# Motivation

“A constant attendance at school is one main axis whereon the great wheel of education turns” (p. iv).

Dilworth, T. (1816). *The schoolmaster's assistant: Being a compendium of arithmetic, both practical and theoretical*. Edinburgh: J. Ruthven and sons.

# Motivation

“But whatever task he [the teacher] imposes on his pupils, *to be done at home* [italics added], they should be careful to have it performed in the best manner, ...” (p. iv)

Dilworth, T. (1816). *The schoolmaster's assistant: Being a compendium of arithmetic, both practical and theoretical*. Edinburgh: J. Ruthven and sons.



# Motivation

“Algebra has not always proved to be an interesting subject to the younger classes in our secondary or lower schools; indeed, in very many instances it has been greatly disliked by the students in such institutions” (Milne, 1894, p. 3).

Milne, W. J. (1894). *Elements of algebra; A course for grammar schools and beginners in public and private schools*. New York: American Book Company.



# Motivation

“To raise the curiosity, and to awaken the listless and dormant powers of younger minds, we have only to point out to them a valuable acquisition, and the means of obtaining it” (p. iv).

Bonycastle, J. (1825). *An introduction to algebra with notes and observations; designed for the use of schools and places of public education* (J. Ryan Ed). New York: Evert Duyckinck.

# Relevance

“A parent often inquires, ‘Why should my son study mathematics? I do not expect him to be a surveyor, an engineer, or an astronomer.’”  
(p. v)

Ray, J. (1848). *Ray's algebra, part first: on the analytic and inductive methods of instruction: with numerous practical exercises*. Cincinnati: Winthrop B. Smith & Co.



# Relevance

Yet, the parent is very desirous that his son should be able to reason correctly, and to exercise, in all his relations in life, the energies of a cultivated and disciplined mind. That is, indeed, of more value than the mere attainment of any branch of knowledge.” (p. v)

Ray, J. (1848). *Ray's algebra, part first: on the analytic and inductive methods of instruction: with numerous practical exercises*. Cincinnati: Winthrop B. Smith & Co.



# Relevance

By an early attachment to these elegant and sublime studies, we acquire a habit of reasoning, and an elevation of thought, which fixes the mind, and prepares it for every other pursuit.... it is, likewise, equally estimable for its practical utility.  
(pp. iv-v)

Bonycastle, J. (1825). *An introduction to algebra with notes and observations; designed for the use of schools and places of public education* (J. Ryan Ed). New York: Evert Duyckinck.



# Relevance

The main design should be to call into exercise, to discipline, and to invigorate the powers of the mind. ... The time and attention devoted to them, is for the purpose of forming *sound reasoners*, rather than expert mathematicians.  
(pp. iii-iv)

Day, J. (1841). *An introduction to algebra, being the part of a course in mathematics, adapted to the method of instruction in American colleges*. New Haven: Durrie & Peck.





# Depth

“An attempt has been made to render the science [mathematics] as easily attainable as possible, without prejudice to the main result; not to save the learner the trouble of thinking and reasoning, but to teach him to think and reason” (p. vi)

Sherwin, T. (1846). *The common school algebra*. Boston: Phillips and Sampson.



# Depth

“the pupil should not be taught merely to perform a certain routine of exercises mechanically, but to understand the *why* and the *wherefore* of every step” (p. v)

Ray, J. (1848). *Ray's algebra, part first: on the analytic and inductive methods of instruction: with numerous practical exercises*. Cincinnati: Winthrop B. Smith & Co.



# Depth

“he who relies upon thousands of special rules” is nothing compared with those “who can apply a score of general principles to millions of particulars” (p. 4)

Bailey, M. A. (1892). *American mental arithmetic*. New York: American Book Company.

# Pedagogy

“This mode has also the advantage of exercising the learner in reasoning, instead of making him a listener, while the author reasons before him.”

Colburn, W. (1834). *An introduction to algebra upon the inductive method of instruction*. Boston: Hilliard Gray & Co.



# Textbooks

“Two causes, chiefly, have conspired to produce this unfortunate condition of affairs [student dislike of algebra], -- one, the unattractive and uninteresting method of presenting the subject; the other, the difficulty of the examples and the complexity of the problems presented to the pupils for solution.” (p. 3)

Milne, W. J. (1894). *Elements of algebra; A course for grammar schools and beginners in public and private schools*. New York: American Book Company.

# Textbooks

“The learner is expected to derive most of his knowledge by solving examples himself; therefore care has been taken to make the explanations as few and as brief as is consistent with giving an idea of what is required.” (p. 3)

Colburn, W. (1834). *An introduction to algebra upon the inductive method of instruction*. Boston: Hilliard Gray & Co.

# Textbooks

“In fact, explanations rather embarrass than aid the learner, because he is apt to trust too much to them, and neglect to employ his own powers.”  
(p.3)

Colburn, W. (1834). *An introduction to algebra upon the inductive method of instruction*. Boston: Hilliard Gray & Co.

# Textbooks

In the colleges in this country, there is generally put into the hands of a class, a book from which they are expected *of themselves* to acquire the principles of the science to which they are attending: receiving, however, from their instructor, any additional assistance which may be found necessary. (p. iii)

Day, J. (1841). *An introduction to algebra, being the part of a course in mathematics, adapted to the method of instruction in American colleges*. New Haven: Durrie & Peck.

# Textbooks

“One of the designs of this book is to create in the minds of the pupils a love for the study, which in some way must be secured before success can be attained” (p. iv).

Robinson, H. N. (1856). *A theoretical and practical treatise on algebra: In which the excellences of the demonstrative methods of the French are combined with the more practical operations of the English; and concise solutions pointed out and particularly inculcated* (24<sup>th</sup> ed., university Ed.). Cincinnati: Jacob Ernst.

# Textbooks

“The happy medium between the theoretical and practical mathematics, or, rather the happy blending of the two, which all seem to desire, is most difficult to attain; hence many have failed in their efforts to meet the wants of the public.” (Robinson, 1856, p. iv)

Robinson, H. N. (1856). *A theoretical and practical treatise on algebra: In which the excellences of the demonstrative methods of the French are combined with the more practical operations of the English; and concise solutions pointed out and particularly inculcated* (24<sup>th</sup> ed., university Ed.). Cincinnati: Jacob Ernst.

Adams, D. (1830). *Adams's New Arithmetic*. Keene, NH: J. and J. W. Prentiss.

#1. An army of 1500 men, having plundered a city, took 2625000 dollars; what was each man's share? (p. 50)



Adams, D. (1830). *Adams's New Arithmetic*. Keene, NH: J. and J. W. Prentiss.

#1. Bought 23 firkins of butter, each containing 42 pounds, for  $16\frac{1}{2}$  cents a pound; what would that be a firkin, and how much for the whole?

(p. 67)

Ans. \$159.39



Colburn, W. (1834). *An introduction to algebra upon the inductive method of instruction*. Boston: Hilliard Gray & Co.

#15. From two towns, which are 187 miles apart, two travelers set out at the same time with an intention of meeting; one of them travels at the rate of 8, the other of 9 miles each day. In how many days will they meet? (p. 14)



Wentworth, G. A. (1895). *A school algebra*. Boston: Ginn & Company.

#37. A man swimming in a river which runs 1 mile an hour finds that it takes him three times as long to swim a mile up the river as it does to swim the same distance down. Find his rate of swimming in still water. (p. 72)



Colburn, W. (1834). *An introduction to algebra upon the inductive method of instruction*. Boston: Hilliard Gray & Co.

#9. A man when he was married was three times as old as his wife; after they had lived together 15 years, he was but twice as old. How was each when they married? (p. 27)



Day, J. (1841). *An introduction to algebra*. New Haven: Durrie & Peck.

#4. A privateer in chase of a ship 20 miles distant, sails 8 miles, while the ship sails 7. How far must the privateer sail before she overtakes the ship? (p. 156)

*Ans. 160 miles*



Ray, J. (1848). *Ray's algebra, part first: on the analytic and inductive methods of instruction: with numerous practical exercises*. Cincinnati: Winthrop B. Smith & Co.

**It is intended that the pupil shall recite the Intellectual Exercises with the book open before him.**

#5. A farmer bought 2 hogs and 7 sheep; a hog cost 5 dollars more than a sheep, while the hogs and sheep both cost the same sum; what was the cost of each?  
(p. 23)



Olney E. (1873). *A University Algebra*. New York: Sheldon & Company.

Find the time between 3 and 4 when the hands of a watch are opposite each other. When they are at right angles to each other. When they are together.  
(p. 112)

*Ans.* 3 h. 49  $\frac{1}{11}$  m.,  
3 hr. 32  $\frac{8}{11}$  m.,  
3 hr. 16  $\frac{4}{11}$  m.



Davies, C. (1854). *Elements of algebra: On the basis of M. Bourdon: Embracing Sturm's and Horner's theorems, and practical examples*. New York: A.S. Barnes & Co.

#19. A man and his wife usually drank out a cask of beer in 12 days; but when the man was from home, it lasted the woman 30 days; how many days would the man be in drinking it alone? (p. 100)





# Classroom Use

Good for small group work

A connection with history

Historical perspective on what is  
an educated person

A little variety to help maintain  
interest

Questions?

Comments?

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