Your Name Here: The Evolution of Bryce's *Commercial Arithmetic*

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After the end of the American Civil War in 1865, the North American economy was recovering fast from a period of wartime stagnation. University faculties of commerce were still in the future (the University of Pennsylvania's Wharton School, the first such institution, was not founded until 1881), but ambitious young men (and, to some extent, women¹) could train at private business schools. These schools taught subjects such as bookkeeping, banking, penmanship, arithmetic, commercial law, "phonography" (a system of shorthand), and telegraphy.

The phenomenon may be traced back to 1848, with the founding of E.G. Folsom's Business College in Cleveland, Ohio. (There had been business schools in the United States since 1824, but they were few and their impact was limited.²) Two of his early students, Henry B. Bryant and Henry D. Stratton, bought him out in 1852, and by 1867 they had extended the business to a chain of around fifty colleges, scattered through the United States and Canada; the history of this chain is given in various sources.³ Each college was run as a business, jointly owned by its principal and by Bryant and Stratton.

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1 The increasing participation of women is documented by Janice Weiss, "Educating for Clerical Work: The Nineteenth-Century Private Commercial School," *Journal of Social History* 14 (1981): 407-24.

2 Paul A. Moreland, *A History of Business Education* (Toronto: Pitman, 1977), 44.

3 "Bryant & Stratton Chain of Business Schools," (Ohio History Central, 13 September 2007). Available at <http://www.ohiohistorycentral.org/entry.php?rec=2481> (accessed 21 April 2009); C. Honick, "The Story Behind Proprietary Schools in the United States" in Darrel A. Clowes and E.M. Hawthorne, eds., *Community Colleges and Private Schools: Conflict or Convergence? New Directions for Community Colleges*, 91 (1995) (San Francisco: Jossey-Bass); "125 Years of Education for Business: The History of Dyke College 1848-1973" (Cleveland, 1973). Available at <http://www.chancelloru.edu/about/history.aspx> (accessed 21 April 2009); Moreland, 44.

Courses of instruction were intense and brief, taking between a few months and a year. Teaching methods were practical; a typical school would have its own “bank” with several hundred thousand dollars in specially printed “banknotes,” to be used in simulated commercial transactions. The school’s telegraph office would be connected into the international network of telegraph wires.⁴ Standards were uniform throughout the chain; and all colleges used the same textbooks, many written internally. For instance, *Bryant and Stratton’s Commercial Arithmetic*⁵ was written by E.E. White and J.B. Meriam, with some sections by Bryant and Stratton themselves; *Bryant and Stratton’s Counting House Book-keeping* was written by Bryant, Stratton, and Silas Packard, the principal of the New York college. This “vertical integration” of course also increased the profits of the business. Bryant’s death in 1867 precipitated the end of the chain in its original form; however, many of the individual colleges continued, and some still exist today.

Other business schools, not connected with the Bryant and Stratton chain, but following the same model, also sprang up around this time. The schools were small, with a handful of instructors.⁶ The principal-proprietors seem often to have been young men, typically around thirty years of age,⁷ and, often, recent graduates of the same

4 The system is described in detail in the anonymous article “Business Colleges” (*Scientific American*, 43, 1880), 388; C.C. Williams, “A Study of Business Education in Halifax Public and Private Schools” (unpublished MA thesis, Saint Mary’s University, Halifax, 1969), especially Appendix L.

5 E.E. White, J.B. Meriam, H.B. Bryant, and H.D. Stratton, *Bryant and Stratton’s Commercial Arithmetic, in Two Parts. Designed for the Counting-Room, Commercial and Agricultural Colleges, Normal and High Schools, Academies, and Universities* (New York: Phinney, Blakeman, and Mason, 1861).

6 A prospectus for the British American Commercial College (undated, though on internal evidence from 1882; see CIHM microfiche 10322) claims seven faculty and 200 students. Williams, 48, lists three instructors at the Halifax Commercial College in 1867, of whom one taught only commercial law and was probably part-time. Moreland, 111, reproduces an advertisement of the London Commercial College, founded in 1862, which claims 100 students.

7 Aside from Bryant and Stratton themselves, both 28 at the time of the takeover, among those involved with this book we find Thomas C. Musgrove (29) and Henry C. Wright (23), proprietors of the British American Commercial College, Toronto in 1866; Abijah H. Eaton (29), proprietor of the Saint John (NB) Commercial College in 1869; John M. Musgrove (25), proprietor of the Ottawa Business College in 1866; Chauncey Perkins Meade (25), proprietor of the Oswego Business College in 1865; Joseph W. Sharp (29), co-proprietor of the Ohio Business College in 1867; and Duncan McLachlan (21), partner in the Canada Business College in 1873. In most cases, dates of birth have been obtained

or other business schools; little background in business or education seems to have been required. In Canada, they had often been born in the United States, or had American family connections.⁸

The first business college in Toronto was the British American Commercial College,⁹ founded by Isaac Bates in 1860.¹⁰ By 1866, it was run by Thomas C. Musgrove and Henry C. Wright: like Bryant and Stratton, they were alumni who had bought out the *alma mater*. It was not part of the Bryant and Stratton chain, which had operated a competing college in Toronto since 1862.¹¹ However, it followed the Bryant and Stratton model, using simulations intensively, and with its own “money” and “bank.” There remained the question (among, of course, others) of what arithmetic textbook to use.

Arithmetic Textbooks in Upper Canada Before Confederation

The Common School Act of 1846 is often seen as a watershed in the history of school textbooks in Upper Canada.¹² Before that time, schools had chosen their own textbooks, which were frequently imported from England or the United States. Some of these, such as the British standard, Francis Walkingame's *Tutor's Assistant*, first published in 1751, and the American *Schoolmaster's Assistant* (1799) by Nathan Daboll, were somewhat out of date by this time. (For the history of Walkingame's much-republished classic, the reader is referred to the articles of Ian Michael¹³ and Peter Wallace.¹⁴ Wallace, in particular, argues that by remaining popular and comparatively

from census records; full names have often been gleaned from advertisements in online archives of ephemera.

- 8 The 1880 US census shows the place of birth of Thomas Musgrove's mother as Pennsylvania, of Henry Wright's mother as Vermont, and of Abijah Eaton's father as Massachusetts.
- 9 Moreland, 109.
- 10 Most sources give this date, although the prospectus mentioned above gives the founding date as 1861.
- 11 Moreland, 110.
- 12 J. Donald Wilson, “Common School Texts in Use in Upper Canada Prior to 1845,” *Papers of the Bibliographical Society of Canada* 9 (1970): 37-53; Bruce Curtis, “Schoolbooks and the Myth of Curricular Republicanism: The State and the Curriculum in Canada West, 1820-1850,” *Histoire Sociale/Social History* XVI (32) (1983): 305-29.
- 13 Ian Michael, “The Textbook as a Commodity: Walkingame's *The Tutor's Assistant*,” *Paradigm* 12 (December 1993).
- 14 P.J. Wallis, “An Early Best Seller: Francis Walkingame's *The Tutor's Assistant*,” *Math Gazette* 47 (1963): 199-208.

unchanged over such a long period, Walkingame's book eventually hindered the teaching of arithmetic.) Others, such as Benjamin Greenleaf's *National Arithmetic* (1835), were more modern.

Prior to the Common School Act, concerns had been voiced by (among others) John Strachan¹⁵ and Egerton Ryerson about the presence of inappropriate republican sentiments in American textbooks used in Ontario schools.¹⁶ Bruce Curtis,¹⁷ however, has argued that the real agenda was the imposition of central governmental control over the curriculum, and that in fact only one textbook in common use (Olney's *Geography*) had significant anti-British sentiments.

In arithmetic texts, of course, currency was a more significant concern. In the 1840s Upper Canada still made exclusive use of the "Halifax pound," a devalued version of sterling worth four-fifths of a London pound. American textbooks of course concentrated on decimal currency; "pounds, shillings, and pence" took second place, and typically sterling and Halifax currency were given no precedence over the various obsolete sterling-like currencies that had been issued by the various states even for some years after the Revolution.¹⁸

The Common Schools Act banned the use of textbooks except for those expressly approved by the General Board of Education;¹⁹ the original recommended list (including the arithmetic text) was built around the series produced by the Irish Commissioners of National Education. This had the double effect of preventing the use of "unsuitable" texts and, by coordinating demand, creating the conditions for a local textbook publishing industry; within a year, the first of many authorized Canadian reprintings of the *Irish National*

15 Strachan himself had written an arithmetic text, *Concise Introduction to Practical Arithmetic* (Montreal: N. Mower, 1809).

16 Fiona A. Black, "'Horrid Republican Notions' and Other Matters: School Book Availability in Georgian Canada," *Paradigm* 2/3 (2001): 1-11; Wilson, 37-53.

17 Curtis, 305-29.

18 Benjamin Greenleaf, *The National Arithmetic, Combining the Analytic and Synthetic Methods in which the Principles of Arithmetic are Explained in a Perspicuous and Familiar Manner; Containing also, Practical Systems of Mensuration, Gauging, Geometry, and Book-Keeping, Forming a Complete Mercantile Arithmetic, Designed for Schools and Academies*, (Boston: Robert S. Davis and Gould, Kendall, and Lincoln, 1836), 134-35. Electronic facsimiles of various issues are available from Google Books.

19 Curtis, 316.

*Arithmetic*²⁰ took place in Montreal. In reaction to the introduction of decimal currency (begun in 1854 and theoretically complete in 1857²¹), J.H. Sangster wrote a decimalized (and heavily-revised) version,²² which appeared in 1860 and went through many impressions. Curtis makes the interesting point that whereas earlier arithmetic texts were designed both for schools and private tuition, the new books were intended for a specific curriculum and school system.²³

The Bryant and Stratton school in Toronto would have used the chain's standard arithmetic textbook, dealing with American currency and commercial law, and using American place names in "word problems." But the British American Commercial College would have had few choices. We may understand that the proprietors would have been reluctant to use their competitor's text. Sangster's book was clearly intended as a grade school textbook, aimed at a wider and younger readership; it would have been quite unsuitable for the young gentlemen of the British American Commercial College. Various other American texts were available, but these would have presented several problems, particularly with regard to currency and commercial law. Musgrove and Wright decided to follow the example of Bryant and Stratton and publish their own textbook.

The British American Commercial Arithmetic

In 1866 Musgrove and Wright published *The British American Commercial Arithmetic: For the Use of Schools, Colleges, and Counting-Houses, Embracing an Extensive Course Both in Theory and Practice*.²⁴ It was printed in demy octavo, "stereotyped and printed at the Globe Steam Job Press, Toronto, C[anada] W[est]."²⁵ The authors were given as "T.A. Bryce, MA, Teacher of Mathematics and English, in the Toronto BACC" and also "T.C. Musgrove and H.C. Wright, Principals and Proprietors of the British American Commercial Colleges." Musgrove and Wright appear to have written the preface,

20 Irish Board of National Education, *First Book of Arithmetic for the Use of Schools* (Montreal: Armour and Ramsay, 1847).

21 James Powell, *A History of the Canadian Dollar* (Ottawa: Bank of Canada, 2005), 23-24.

22 J.H. Sangster, *National Arithmetic in Theory and Practice: Designed for the Use of Canadian Schools* (Montreal: J. Lovell, 1860).

23 Sangster, 328.

24 The subtitle reflects the older tradition of multi-purpose textbooks mentioned above.

25 Printer's note on verso of title leaf.

and probably made significant contributions elsewhere on matters of business practice, but state in the preface that they “entrusted a great part of the composition of the work” to their employee Mr. Bryce.²⁶ Like Bryant and Stratton, they found a commercial advantage in placing their own names – and that of their college – prominently on the book. However, there can be little doubt that, as the preface suggests, Bryce was the principal author. The sections on pure and applied arithmetic that comprise the bulk of the book are in a consistent style, with solutions given to all problems. As will be seen below, sections that were rewritten for a later edition, almost certainly in Bryce’s absence, use different spellings and no solutions are given.

The sections of Commercial Law were credited to “J.D. Edgar, Esq., Barrister-at-Law.” James David Edgar (1841-1899), a young and ambitious lawyer,²⁷ was later a member of the Canadian Parliament and author of the once-popular patriotic song “This Canada of Ours.” However, Edgar’s name does not appear on the title page.

The preface underlines the need for a Canadian textbook at this level: “We have for some time looked upon it as a kind of reproach that Canada has never produced a treatise on Arithmetic adequate to the wants of a commercial community such as this country has become ... We have felt this keenly in conducting the BRITISH AMERICAN COMMERCIAL [*sic*] COLLEGES. We have hitherto been obliged to have recourse to United States publications, which, without any disparagement to their intrinsic merit, we are forced to say, are not suited, in many important respects, to the wants of Canada.”²⁸ It is worth looking carefully at this. We do not see here

26 According to the preface, Bryce was educated at the University of Glasgow. An exercise on page 198 uses the name “Thomas A. Bryce,” and the first Canadian Census (available online at Library and Archives Canada) gives one “Bryce, Thomas A.,” teacher, resident in Saint James’ Ward, Toronto East. Assuming this to be our author, he was then 62 years of age and born in Ireland. His religion is given as “Canada Presbyterian,” which would be consistent with a Scottish education. He does not appear in the 1881 census, or the 1882 BACC prospectus (CIHM microfiche 10322).

27 Maud J. McLean and Robert M. Stamp, *My Dearest Wife: The Private and Public Lives of James David Edgar and Matilda Ridout Edgar* (Toronto: Dundurn Press, 1998).

28 T.A. Bryce, T.C. Musgrove, and H.C. Wright, *The British American Commercial Arithmetic: for the Use of Schools, Colleges, and Counting-Houses, Embracing an Extensive Course both in Theory and Practice* (Toronto: Musgrove and Wright, 1866), iii, CIHM microfiche 48329. (See Appendix A for edition details.)

any echo of the Tory objections to “republican” and “anti-British” bias that characterized the discussion leading up to the Common School Act. There is no suggestion that the American textbooks are in any way at fault. Rather, it is Canada that has failed, in providing no homegrown alternative.

Undoubtedly, the venture had other reasons to recommend it to Musgrove and Wright. Not only did it confer upon them the cachet of scholars and publishers, and allow their school to compete on a more equal footing with Bryant and Stratton’s international chain; but they would also have hoped to make a moderate profit from the sale of the books, both to their own students and to others. (While the size of the print run is unknown, the title page at least suggests a hope of sales outside the British American Commercial College.)

Contents of the First Edition

In some ways, the *British American Commercial Arithmetic* had much in common with earlier arithmetic texts. While it was intended for the use of young men who had already completed their ordinary schooling, it took little for granted, beginning with positional notation and addition. To be sure, this was not intended as a first introduction; the first exercise in addition was:

$$\begin{array}{r} 895763 \\ 49176 \\ 283527 \\ 659845 \\ 7984 \\ 31659 \\ +968438 \\ \hline \end{array}$$

and sophisticated suggestions for improving speed and accuracy are given.²⁹ However, a few pages later, when multiplication is reached, the multiplication table is included.

Largely, this was a matter of convention and conservatism, with the author emulating the content of books such as Walkingame’s *Tutor’s Assistant*. It seems certain that most students entering a business

29 The number and length of summands were not unusual for texts of the period. One of the goals of arithmetic training, in an age without widespread calculating technology, was to train the student to do long calculations without hesitation or error.

college would have already been familiar with this material. However, in a largely rural society with a certain amount of social mobility, the level of education that students had upon entering a commercial college would have varied greatly. No doubt many students benefited from their review of basic operations.

Currency in British North America at this time was extremely complicated. Canada West and East had theoretically completed the transition to decimal currency in 1858, but the old Halifax currency was still in use a decade later. In a contemporary American commercial arithmetic text such as that of the Bryant and Stratton chain, the "Pound sterling of British Prov. of Nova Scotia, New Brunswick, Newfoundland and Canada" rated one line in a conversion table.³⁰ The Toronto book, on the other hand, gives many detailed examples and even a little poem:

The Farmers' Rule for Reducing Cents to Pence, and Pence to Cents

QUESTION.

Said farmer A. to grocer B.
There's something here that puzzles me;
I sold some butter here today,
I sold by cents, in pence they pay.
How shall I change the cents to pence,
And know the trick from this day hence?

ANSWER.

Five cents are three pence you must know
As twenty cents to twelve pence go;
Three times the cents, the fifth of that
Is just the thing you would be at.
And if you buy from grocers here
The other case is just as clear.
Five times the pence, the third of it
Will make you safe and always fit.³¹

Exchange between decimal and "Halifax" currency was not a matter of international finance to Canadians, but of everyday life.

³⁰ White et al, 325.

³¹ Bryce et al. (Toronto), 42.

Given the monetary system, and the system of weights and measures, in use at the time, arithmetic texts of all types placed considerable emphasis on operations with “denominate numbers.” These could be as simple as sums of money in pounds, shillings, and pence, or as complicated as adding volumes (of dry materials such as grain) in chaldrons, bushels, pecks, gallons, quarts, and pints. These were all dealt with together, using a superficially uniform notation. The numbers of each type of unit were written, ordered from the largest unit to the smallest, separated by “points” between the numbers. Thus, 5 chaldrons, 35 bushels, 3 pecks, 3 quarts and 1 pint would be written as 5.35.3.0.3.1, the zero representing no gallons. Of course, to add such numbers one would need to know that there were two pints in a quart but 36 bushels in a chaldron; the simplicity and uniformity of the notation hid but did not alleviate the very real complexities of imperial units. As was also common in textbooks of the time, the superiority of the decimal system was underlined, more in hope than in anticipation: “It would be of great benefit to the whole commercial community, and perhaps still greater to the farmer, if the decimal scale were adopted in weights and measures, as well as in money, as it would materially simplify and expedite all calculations ... It would also very much accelerate the learner’s progress, for it would save him the heavy labour of committing to memory the formidable host of tables, through which he has now to cut his way ... [T]he pupil could pass at once from the elementary rules to the higher ones, such as proportion and interest, and could either get into business in a much shorter time than is possible at present, or devote his time to higher and more important studies.”³²

Here (as in many other books) it is not entirely clear whether the writers advocated the adaptation of the metric (“French”) system, or a decimalized system based on selected imperial units. Perhaps they held no strong opinion.

Computational techniques extended to finding square and cube roots, and (unusually) the use of logarithms for multiplication was introduced, with an included logarithm table and instructions for use, including the use of interpolation to obtain additional digits of precision. The computation of higher powers was streamlined by repeated squaring, and a footnote suggests finding (for instance) a fifteenth power by squaring four times and dividing by the original

32 Bryce et al. (Toronto), 34-35.

number. Decimals and fractions were given approximately equal prominence.

Various techniques for solving “word problems” were given, many involving rates of work. (“If A can do $\frac{2}{3}$ of a certain piece of work in 4 hours, and B can do $\frac{3}{4}$ of the remainder in 1 hour, and C can finish it in 20 minutes, in what time will they do it all working together?”) In general, little attempt was made to make numbers come out “cleanly.” Many problems involve places in Upper and Lower Canada: “Suppose that one man starts from Montreal and walks six miles an hour, and another at the same time from Newtonville (5 miles west of Port Hope) at the rate of 5 miles an hour, when will they meet, the whole distance being 285 miles? Ans: $\frac{5}{11}$ of a mile west of Gananoque, which is 155 miles west of Montreal by the Grand Trunk line.”³³

Bryce often tries to make the problems livelier by giving names to the people involved (a practice popular in modern texts as well). Sometimes they are somewhat formulaic (Mr A.B. Smith features often), but we also encounter Dr Gallipot, Thomas Goodpay, Attorney Screw and the Widow Flaunt; and indeed Bryce, Musgrove, and Wright themselves all appear repeatedly as characters in problems.³⁴ Sometimes their surnames are used with other initials – twice, those of John M. Musgrove, principal in 1866 of the Ottawa Business College and presumably younger brother of Thomas. Unlike modern textbooks, however, the book makes little attempt to depict peers of the students, spending a middle-class student’s allowance on sports and entertainment; for the most part, the characters in the text are the prosperous businessmen and merchants that the students would hope to become.

There is one amusing exception, reminiscent of Archimedes’ “Oxen of the Sun” problem in its complexity:

A, in a scuffle, seized on $\frac{2}{3}$ of a parcel of sugar-plums; B caught $\frac{3}{8}$ of it out of his hands, and C laid hold on $\frac{3}{10}$ more; D ran off with all A had except $\frac{1}{7}$ which E afterwards secured slyly for himself; then A and C set jointly upon B, who, in the conflict, let fall $\frac{1}{2}$ he had, which were equally picked up by D and E, who lay perdu. B then kicked down C’s hat and to work they all went anew for what it contained; of which A got $\frac{1}{4}$, B $\frac{1}{3}$, D $\frac{2}{7}$, and C and E equal shares of what was left of that stock. D then struck

33 Bryce et al. (Toronto), 107.

34 Bryce et al. (Toronto), 158, 159, and 198.

$\frac{3}{4}$ of what A and B last acquired out of their hands; they, with some difficulty, recovered $\frac{5}{8}$ of it in equal shares again, but the other three carried off $\frac{1}{8}$ apiece of the same. Upon this, they called a truce, and agreed that the $\frac{1}{3}$ of the whole left by A at first should be equally divided among them; how many plums, after this distribution, had each of the competitors?

Ans. A had 2863; B, 6335; C, 10,294; and E, 4950.³⁵

(This answer, by the way, is not only incomplete but wrong: C got 2438, and D 10,294. The nature of the mistake suggests a copying or typesetting error.)

This problem is not original to Bryce; it had appeared about ninety years before on page 157 of Charles Vyse's *Tutor's Guide*³⁶ and had been copied more or less verbatim in many other textbooks in the intervening years. It should be noted that copying problems from other textbooks, with or without adaptations and generally without credit, was a standard practice during this period, and there is no evidence that Bryce indulged in it more than was usual among his contemporaries.³⁷

It is also noteworthy that few authors who give answers to this problem mention that it has infinitely many other solutions, in which the shares have the same proportions but are 2, 3, 4 ... times larger. Even the British puzzle expert Henry Ernest Dudeney, who gives a version as Problem 109 in his 1917 *Amusements in Mathematics*,³⁸ mentions only that the answer given is the "smallest." This suggests an *ad hoc* approach rather than any attempt to develop even an elementary theory of Diophantine equations. However, the problem was clearly included for entertainment value, not because of its relevance to business or mathematics. The inclusion of recreational problems in texts was not uncommon; Sangster's *National Arithmetic* is a good example.

An odd – to modern eyes – omission is that of negative numbers. However, this was standard for nineteenth-century arithmetic textbooks. In those days negative numbers were considered to come under the heading of algebra, a more abstract subject studied only

³⁵ Bryce et al. (Toronto), 118-119.

³⁶ C. Vyse, *The Tutor's Guide, Being a Complete System of Arithmetic; with Various Branches in the Mathematics* (London: G.G.J. and J. Robinson, 1785).

³⁷ The appearance, in recent years, of a wide selection of early textbooks online and in searchable form has made this practice much easier to demonstrate and study.

³⁸ H.E. Dudeney, *Amusements in Mathematics* (London: Nelson, 1917).

by the mathematically inclined. Problems were posed in such a way as to introduce (say) a loss rather than a negative profit.

A large number of financial matters, mostly of little mathematical sophistication, are dealt with in detail: bills of parcels, partial payments, insurance, commission, brokerage, "Custom House business," bankruptcy, and others. Simple interest is dealt with in detail, solving for any one of interest rate, principal, final values, and time from the other quantities. Compound interest, however, is dealt with much more briefly. Although the formula for the sum of a geometric series is given,³⁹ and used for abstract problems, both annuities and compound interest are only computed by means of tables. (Walkingame, and other textbooks of the period, use the geometric series formula for financial calculations.) The "Rule of 70" for determining how long it takes to double an investment at a given rate of compound interest is never stated. Partially this is due to the wider use of simple interest in the nineteenth century; as the book stated: "It is not against the law in Canada to take compound interest, but it can never be collected unless it has been specially agreed on beforehand, or unless it is the custom of a house, and known to the customer to that effect."⁴⁰

Other textbooks of the period cover the theory more deeply; it seems likely that the main intention here was to ensure that, in a brief intensive course, no more mathematics was used than necessary. Overall, Bryce keeps this resolution, though in the section on arithmetic and geometric series ("Progression by Common Differences" and "by Ratio") he forgets himself somewhat and at one point even introduces the quadratic formula,⁴¹ probably to the puzzlement of many students.

The "Table of Foreign Moneys" on page 250 shows New Brunswick, Nova Scotia, and Newfoundland using the Halifax pound. Although Nova Scotia and New Brunswick had officially decimalized in 1860, in practice the lack of decimal coinage kept the Halifax pound alive until Confederation. A footnote does point out that New Brunswick was issuing decimal stamps.

All in all, the *British American Commercial Arithmetic* was an innovative book, designed specifically to meet the needs of a Canadian business school. It combined readable but scholarly writing, and

39 Bryce et al. (Toronto), 284.

40 Bryce et al. (Toronto), 162.

41 Bryce et al. (Toronto), 278.

copious exercises with a Canadian flavour and meticulously checked answers – these presumably provided by Thomas Bryce – with James Edgar's clear explanations of business law, all guided by Musgrove and Wright's knowledge of what young men studying business needed to know. So why was there never a second edition – at least under that name?

Bibliographic Considerations

As has been seen, the title page of the original edition of this book did not accurately reflect the authorship as described in the preface. The front matter of subsequent issues was also of limited reliability, suppressing various elements of the book's publication history – in particular, the existence of previous issues. Nonetheless, we can learn a great deal from the evidence of the books themselves.

For instance, it is interesting to note that the pagination of the first edition is nonstandard. Page 51 is followed by pages 52a, 53a, 54a, 55a, and 52. The interpolated pages form part of an ordinary octavo signature running from page 49 to page 60. It thus appears that the decision to introduce these pages (containing additional exercises on denominate numbers) was made after the production of at least some of the plates (before which, renumbering would have been almost trivial) but before printing. This suggests a certain hastiness about the enterprise.

A word about the stereotype process may be relevant here. In the “wet-flog” process used in the nineteenth century, the text was first typeset, a page at a time, in movable lead-alloy type. Wet papier-mâché was then pressed onto the surface of the type and allowed to dry, yielding a matrix or “mat” that could be used to cast the “plate,” a replica of the standing type. Shrinkage and even distortion of the matrix during drying was a known problem.⁴² A matrix of this form could be used to produce multiple plates.⁴³ These plates could be preserved, and the type redistributed and used for other pages. This allowed the typesetter's work to be preserved for future print runs, without locking up one of the printer's most valuable assets, his stock

42 Philip Gaskell, *A New Introduction to Bibliography* (New York: Oxford University Press, 1972), 204.

43 Michael Winship (“Printing with Plates in the Nineteenth Century United States,” *Printing History* 5 (2) (1975): 15-26) suggests a maximum of around 12 plates per matrix.

of type. Without such a process, only a few books, such as Bibles, for which a significant ongoing demand could be foreseen, could be reprinted on demand.

By this period, the more modern electrotpe process was largely used for books (at least in the United States), with stereotype used more frequently for newspapers.⁴⁴ In the electrotpe process, a wax impression was taken of the type. This was then coated with graphite and copperplated. The resulting thin copper sheet was then heated to release it from the wax, and then filled from the back with molten typemetal. While it would have been impossible to produce a second plate from the same wax impression, and the cost per plate was higher, the comparative hardness of the copper meant that a single plate might suffice for most purposes.

In the case of the *British American Commercial Arithmetic*, however, the verso of the title leaf stated that it had been stereotyped; this is presumably explained by the fact that it was produced at the print shop of a newspaper, the *Toronto Globe*. There is also, as will be explained below, some evidence that further stereo plates were created later in the publication history.

Stereotype plates even permitted some crude editing. Erasure was comparatively easy, performed with a file, hammer, or a sharp chisel. "Cut-and-paste" operations required a chisel or hacksaw,⁴⁵ and pieces of movable type could be soldered in and cut down to the correct length.⁴⁶ This would be moderately easy for repagination or changing a few important words, prohibitively difficult for detailed editing. Finally, a new matrix could be made from an original or altered plate; as will be seen, there is evidence that this was done here.

When printing with movable type, a letter damaged during the print run could (if detected) be replaced quickly. With a stereotype plate, however, this was not practical, and damage – typically scratches and dents in the middle of the page and broken letters at the edge of the block of type – would accumulate. These could occur during printing, or (more likely) during setup, and storage of

44 Winship, 20; see also Gaskell, 206.

45 "An editor who uses much of this [stereotype plate service] material is said to 'edit his paper with a saw.' [...] His telegraph equipment then consists of a hacksaw and a boy to meet the afternoon passenger train and receive the daily package of plates." G.M. Hyde, *Newspaper Editing: A Manual for Editors, Copyreaders, and Students of Newspaper Desk Work* (New York: D. Appleton and Co., 1931).

46 Winship, 17-18.

the plates.⁴⁷ If a plate was copied, damage would be copied into the new matrix and any plates made from it. Comparing such damage between various issues allows us to make various deductions about the printing history.

In particular, incomparable damage (in which each of two issues shows plate damage or repair not seen in the other one) allows us to deduce the parallel existence of multiple sets of plates. Anachronistic damage (in which the change seen in an earlier issue is greater than that in a later issue) suggests that the two issues were printed in an order other than that in which they appeared. In such a case, we can assume that printed sheets were stockpiled and published, in a later year, with a new title page.

There are two ways in which this might be done. In some cases (including at least one issue of this book) the title page is a “cancel leaf” (that is, the original title leaf was cut off and a new one tipped in). In such a case the process is fairly obvious. However, there is also an issue that is out of chronological order, and which has a title page that is an integral part of its signature. In such a case, the most plausible explanation is that the title page was left blank on first printing, with a second press run to add the title page once a “publisher” was found. In the first case, various explanations are possible; in the second case, we can only infer that the sheet was intended from the beginning to be sold to an as-yet-undetermined “publisher.”

The American Commercial Arithmetic

Also in 1866, a textbook entitled *The American Commercial Arithmetic* was published in Oswego, New York. A Toronto business student scanning a copy might have been forgiven a sensation of *déjà vu*; the majority of the text was identical to that of the *British American Commercial Arithmetic*. But there were many changes.

The preface was extensively rewritten, with no reference to the specific needs of Canadian business colleges. Musgrove and Wright had disappeared from the title page; and their editorial “We” in the preface was replaced by references to “The Author” – who had also acquired an LLD and was described as “Author of Treatises of Algebra and Geometry.” This degree (Doctor of Laws) is normally granted in North America as an honorary degree, and may not imply specific legal expertise on the part of the recipient; but there is no

⁴⁷ Winship, 22.

indication of what university might have awarded it to him. (It was not, in particular, the University of Toronto.⁴⁸) It must be said that Bryce, an arithmetic teacher at a minor commercial college, seems like an improbable honorand. Similarly, his other mathematical writings appear, at best, to have been of an ephemeral nature.

Neither did Musgrove and Wright appear as publishers; this issue was published by “C.P. Meads & Co., Business College – Grant Block.” (In this edition, the printer was not identified.) A few lines above, the title page states “Adopted and used in the Oswego Business College.” Also, there was, at least originally, a full-page advertisement for the college at the end of the book. This does not appear in the Library of Congress’s exemplar; the advertisement is detectable only by a faint offsetting of ink onto the otherwise blank verso of the last page. As will be explained below, this face was actually the 352nd of the book, and thus the end of a signature; the missing advertisement was thus on the inside of the back cover, and would have been discarded when the book was rebound into the library binding it now bears.

With digital enhancement, the offset image may be made clear enough that one can make out much of a text that appears identical to that of an advertisement that appeared on the front leaf of the 1866-7 Oswego City Directory.⁴⁹ This advertisement makes it clear that this school, too, used Bryant and Stratton’s pedagogical methods, including a college bank with its own scrip.

“C.P. Meads” was probably Chauncey Perkins Meads, born in 1840.⁵⁰ If so, like Musgrove and Wright, he was a comparatively young man in 1866, at most a decade older than his students; and as in their case, being the “publisher” of the textbook used in his school would have built up his reputation and made his college seem more like those of Bryant and Stratton. The absent Bryce could safely be lionized as a scholar; Musgrove and Wright, on the other hand, had to retreat from the limelight so that Meads could have the full measure of it.

James Edgar’s contributions had been largely removed; instead, a dense section on “Laws of the United States relating to Interest, Damages on Bills, and the Collection of Debts” by the American financial writer J. Smith Homans appeared at the end, and various

48 Harold Averill (Assistant University Archivist, University of Toronto), personal communication, 2007.

49 *Oswego City Directory* (Webb & Fitzgerald, Rochester, NY at the Advertiser Steam Press, Oswego, 1867).

50 LDS Pedigree Resource File, CD #126 PIN #3244466.

other sections on commercial law and practice were added or rewritten. Homans (1807-1874) was the author of such books as the *Cyclopedia of Commerce and Commercial Navigation* and editor of the *Banker's Magazine and Statistical Register*. (He had also been a Treasury clerk in Washington until 1864, but had been dismissed over irregularities in the hiring of an assistant.⁵¹) The commercial law section was organized state by state, with "Upper and Lower Canada" appearing at the end.

The section on "Banking" had gained a page-long rant worthy of "Mr. Potter," the cold-hearted banker in Capra's film *It's a Wonderful Life*:

The objects of banking. – Correct sentiments beget correct conduct. A banker ought, therefore, to apprehend correctly, the objects of banking. They consist in making pecuniary gains for the stockholders by legal operations.

... [S]ome bankers have deemed the good of society so much more worthy of regard than the private good of stockholders, that they have supposed all loans should be dispensed with direct reference to the beneficial effect of the loans on society, irrespective, in some degree, of the pecuniary interests of the dispensing bank. ... The late Bank of the United States is a remarkable illustration of these errors. Its manager seemed to believe that his duties [*sic*] comprehended the equalization of foreign and domestic exchanges, the regulation of the price of cotton, the upholding of State credit, and the control, in some particulars, of Congress and the President – all vicious perversions of banking to an imagined paramount end.

... [T]he stupendous temporary injuries which its mismanagement inflicted on society, are a smaller evil than the permanent barrier its mismanagement has probably produced against the creation of any similar institution.⁵²

51 "Too Speculative By Half," *New York Times*, 26 January, 1864, 1. Letters published in response on 27 January and 8 February suggest that Homans' dismissal may have been for poor judgment rather than for criminal behaviour.

52 T.A. Bryce, *The American Commercial Arithmetic for the Use of Commercial Colleges, Private Students, Schools, and Counting-Houses, Embracing an Extensive Course Both in Theory and Practice, Together with the Laws of the United States Relating to Interest, Damages to Bills, and the Collecting of Debt* (Oswego: C.P. Meads and Co., 1866), 167-68. This issue is for most purposes identical with the Ann Arbor issue, available online through the Making Of America project, <http://quod.lib.umich.edu/cgi/t/text/text-idx?c=moa;idno=ABU7334.0001.001> (accessed 21 April 2009).

The land speculation fed by the policies of the Second Bank of the United States, and the resulting Panic of 1819, had taken place almost half a century before. The level of indignation evident in the preceding paragraphs suggests that it might have caused personal hardship to the writer, or at least hardship personally observed. We may suspect the hand of Homans (who would have been twelve years old at the time), rather than of the much younger Musgrove or Wright, in this passage.

Most problems involving “Halifax” or sterling currency had been removed and replaced by a shorter section on “Decimal and Duodecimal Currencies,” justified by reference to trade with the “Lower British American Colonies” (the Maritime Provinces). In fact, Nova Scotia, New Brunswick, and Prince Edward Island were, like Canada East and West, officially decimalized by then; but there too the transition was slow. The “Farmer’s Rule” poem had vanished; conversion of small change from sterling to decimal was not important to the American businessman.

Throughout the book, many (but not all) Canadian place names had been replaced by American names. For instance, on page 158, Belleville, Dundas, Oshawa and “the Bank of Montreal, Brockville” become Cincinnati, Indianapolis, Mobile, and “the First National Bank here” in sample promissory notes. The number of Canadian place names that remain is still unusual for an American textbook. Oddly, in the same set of examples, “H.C. Wright” becomes “J.H. Wilson” and “T.C. Musgrove” becomes “A.R. Tension.” It is not clear what the point of this change is, as both names remain in several other places.

The section on “American Exchange”⁵³ might have been thought to be an obvious candidate for rewriting. However, at this time, during the Reconstruction period that followed the Civil War, the US “greenback” was so devalued due to wartime overprinting that one silver dollar (trading at par with its Canadian counterpart) had recently been valued at up to \$2.78 in the greenbacks in which trade was normally carried out. Thus the problem was an internal American one as well. The section was not even retitled; but several problems were rewritten to reverse the viewpoint. Thus a problem in the Toronto edition: “Purchased a draft on New York for \$1500, at a discount of 31½%; what did it cost me? Ans. \$1027.50,”⁵⁴

53 Bryce (Oswego), 242-246.

54 Bryce (Oswego), 245.

becomes “Purchased a draft on Montreal, Canada East, for \$1500 at a premium of $64\frac{7}{8}\%$; what did it cost me?”⁵⁵ Here and in almost all other new problems, no answer was given – a major break from the invariable practice of the first edition, and evidence for a change in authorship.

In the section on “Simple Interest,” already divided up into cases such as “Case V: To find the interest on any sum of money, for any number of days, at a given rate per cent,” a new, oddly specific case was added: “Case XI: To find the interest on bonds, notes, or other documents drawing $7\frac{3}{10}$ per cent interest.”⁵⁶ Why single out this subcase of Case V? The answer was that the interest rate in question was that paid by various issues of Treasury notes (“seven-thirties”) issued by the Union to fund the costs of the Civil War; the interest per day was exactly two-tenths of a mill on the dollar, making calculation for short periods easy.

The section on use of logarithms, and the table accompanying it, had vanished completely (although a footnote on page 257 still referred to the section). This is probably because the use of a standard five-place table of logarithms in financial calculations would lead to rounding errors of at least a few cents in a thousand dollars. While this might seem unimportant, it would be completely contrary to good bookkeeping practice. The one place in which logarithms would be almost indispensable is the computation of compound interest; but as observed above, this was not a very important problem in the business culture of nineteenth-century North America, and specialized tables were available.

Who did these revisions? The new title page and preface might make it appear that Bryce was asserting his identity as the author, and created the new edition alone, except for a little help on legal matters from Homans. However, there are several reasons to doubt this. Firstly, there are stylistic differences; in the new material, “merchandise” is consistently spelled as “merchandize.”⁵⁷ Bryce, the mathematics teacher, gives meticulous and accurate answers in the first edition; almost none of the dozens of questions appearing for the first time in the American edition has an answer. And, finally, as mentioned before, census records suggest that Musgrove and Wright

⁵⁵ Bryce (Oswego), 245.

⁵⁶ Bryce (Oswego), 148.

⁵⁷ See, for example, question 8 on page 171 of the Oswego, Erie or Ann Arbor issues.

moved to the United States,⁵⁸ while Bryce remained in Toronto. It seems likely that Bryce had no involvement with the American edition; but his educational accomplishments, perhaps even somewhat inflated by his erstwhile employers, were seen as a useful marketing feature. It is quite possible that Musgrove or Wright did the revision personally.

Some sections were typeset anew to effect these changes. In other places, close inspection shows that the plates from which the first edition was printed were sawn up and reset with small amounts of new type inserted. For instance, question 53 on page 109 of the Oswego issue has the name “Oswego” replacing “Oshawa.” The letters “swego” are raised a couple of points, apparently to accommodate the tail of the “g” on the baseline of the comma after “Oshawa”.

Figure 1: “Editing with a saw”: corresponding passages in Toronto edition (left) and later issues. Horizontal rulings added digitally to indicate baselines.

As another sign that the editing was somewhat hasty, two more sections with nonstandard pagination (152a-157a, 171a-172a) were added; and there are various smaller changes made to preserve pagination while adding other material. The last numbered page is now page 341; with the twelve interpolated pages and the blank verso of the last leaf, this brings the page count up to 352, or 22 full octavo signatures.

In 1867, no fewer than four issues were published. Two of these, nominally published in Ann Arbor, Michigan, and Erie, Pennsylvania, were basically identical to the Oswego issue. Not only were contents and pagination identical, but even the upper portion of the three title pages appear to have been printed from the same plates. In

⁵⁸ Under American law of the time, Musgrove and Wright (who were not American citizens) could not have held copyright except by becoming residents (Gaskell, 313). Of course, other factors may have been involved.

particular, the word “Private” on the fifth line is warped identically in all three issues. Note that this damage probably occurred during the creation of the plate; leading would normally prevent individual pieces of type from moving vertically. As mentioned above, warping was typical of the wet-flong stereotype process, suggesting that this was again being used.

Private Students, Schools

Figure 2: Warped plate as seen in title page of Oswego, Ann Arbor, and Erie issues. Horizontal ruling added digitally to indicate baseline.

Only the names of the publishers and the institutions adopting them have changed: in Ann Arbor, the book was published by A.C. Parson, “President of the Ann Arbor Business College,” and in Erie, by “T. Cook & Co, Business College,” to be used at the Erie Business College. None of these issues identifies the printer.

The Oswego, Erie, and Ann Arbor issues show similar damage to the plates – for instance, the word “pages” is damaged near the bottom right corner of page 99, and the margin of page 53a is damaged. Most revealingly, there are common blemishes – such as the scratch through the words “is payable” on page 157a – in text that did not exist in the Toronto edition. This damage – extending across multiple letters – thus occurred on a plate that was used to print all three issues.

Oddly, the Library of Congress exemplars of the Oswego and Erie issues show one blemish to the plates (a wide scratch through the words “necessity for a constant calculation” at the bottom of page 242) that does not appear in the “Making of America” digital library’s facsimile of the Ann Arbor issue, despite its later publication date. From this, we may suppose that the bodies of all three issues were from a common impression, during the printing of which the damage to page 242 occurred. The title pages and the Ann Arbor advertising matter were, of course, printed separately. There is no reason for pages to have been bound in the same chronological order that they were printed; indeed, if each of the twenty-two 16” × 20” unfolded sheets that made up the book was stored in a single stack, the first sheets printed might have been the last bound (though as we will see below that did not happen).

The Library of Congress exemplar of the Erie issue even shows an offset of the *same* advertisement, for the Oswego Business College,

that is visible in the Oswego issue. The Ann Arbor issue, in contrast, carries an advertisement for the Ann Arbor business college on page 255. This advertisement, incidentally, lists Ann Arbor's affiliated business schools (at Adrian, Grand Rapids, Jackson, and Sturgis, Michigan), making it clear that it was not affiliated with the Oswego or Erie schools.

Breaking chronological order, we mention the fourth and final "issue" in this family. This was nominally published in 1869, in Hamilton, Ontario, under the title of *The American Commercial Arithmetic, for the Use of the Royal Dominion Commercial College (T.N. Harris, principal and proprietor) and for schools, colleges, and counting houses, embracing an extensive course, both in theory and practice, together with the laws of Canada and the United States, relating to interest, damages on bills of exchange, and the collection of debts*. Harris is named as the publisher; no printer is mentioned. The title page mentions explicitly the inclusion of a section on Canadian commercial law, though on closer inspection this turns out to be no more than the summary by Homans that all the American issues contain. However, the American copyright deposit notice was omitted.

The exemplar reproduced in the CIHM microfiche collection shows damage more or less identical to the known exemplars of the Erie and Oswego issues. In particular, it shows the scratch on page 242 that does not appear in the Ann Arbor issue. It follows that, if these issues were printed in one run, they were not bound either in direct or inverse order of printing.

Why should Harris have chosen to republish the American edition and not the Canadian edition, only three years old? There had been no great decline in Canadian nationalism in the years immediately following Confederation; and the Fenian raids, widely believed to have at least the tacit support of the American government, were still occurring sporadically, causing a certain amount of anti-American sentiment. One might have expected there to be more demand for a reissue of the original book, perhaps under the title of "The Canadian Commercial Arithmetic." But this did not happen.

It is possible that Harris got a good deal on remaindered copies of what would by then have been, as we will see below, an out-of-date impression. Certainly, he seems to have been more a salesman than an academic.⁵⁹ However, it seems likely that reprinting the Canadian

59 A handbill over his name (CIHM microfiche 39726) advertises: "...last great offer, great and special inducements are offered at this institution from the

edition was not an option. While the stereotype process permitted multiple plates to be made, this was not always done; and it is probable that the only plates of Canada's first business mathematics textbook had already been sacrificed, to produce the American version.

How do we classify these four versions of the book? They might constitute a *subedition*: an impression or set of impressions made by a publisher who has taken over plates, rather than unbound stock, from another publisher.⁶⁰ However, I would argue that the *American Commercial Arithmetic* would be better classified as a separate book. While the changes made are moderate as a proportion of the text, they affect the very essence of the publication. The *British American Commercial Arithmetic* was written explicitly for use in Canada; Canadian currency, law, and place names permeated it; and this was a large part of its *raison d'être*. These distinguishing features were systematically, if not completely, removed or changed in the creation of its American counterpart. The resulting book was no longer the *British American Commercial Arithmetic*, and could not have been sold as such.

As the title pages of the four versions differ, and were intended to do so, we can certainly consider them as distinct issues under Bowers' definition of "consciously planned printed unit."⁶¹ We will see below that they are from a single impression, but the evidence for this comes from a later issue.

Later Issues of the *American Commercial Arithmetic*

Meanwhile, still in 1867, another more carefully revised version of the book had appeared.

The new version was published in Cleveland, Ohio, and apparently also in Memphis, Tennessee. While the Cleveland issue was designated on the title page as being "for the use of the Ohio Business College, Delaware, O., J.W. Sharp & R.R. Hinds, founders and proprietors," Musgrove and Wright were (for the second and last

15th of January 1869 until May 1st 1869, to the young men of Ontario who are desirous of pursuing a course of business training for the least possible amount ... business prospects are great, ... positively the last offer of a like nature."

60 See, for example, 32-33, 57 of G. Thomas Tanselle, "The Bibliographical Concepts of *Issue* and *State*," *Papers of the Bibliographical Society of America* 69 (1975): 17-66.

61 Fredson Bowers, *Principles of Bibliographical Description* (Princeton: Princeton University Press, 1949), 40.

time) given as the publishers; it would seem that at least at this time, they were both still directly involved. The copyright deposit notice in the new version is identical to that in the old except for a different line break. While it is conceivable that the new plates were used as early as 1866, it is more likely that the expense of a new deposit was thought unnecessary.

The pagination was rationalized; the section on "Properties of Numbers" (basically prime factorization) was sensibly moved forward from pages 297-298 to pages 56-57, before the section on "Greatest Common Measure"; the section on "Brokerage" was expanded, to include a discussion of the simple futures being traded in those days, and various additional examples were added (this time, with answers). This brought the length up to 368 pages, an increase of one octavo signature; in fact, the increase would have been greater had some exercises not been deleted. Again, where possible, existing plates were reused, perpetuating damage seen in the earlier impressions; and there are signs of efforts to preserve page boundaries, to maximize the number of plates that could be used without modification beyond renumbering. As mentioned above, there is evidence that the four "Oswego family" issues came from one set of plates. If this was then the only set, and was altered in 1867, this would confirm that the 1869 Hamilton issue was bound from sheets printed at least two years earlier, probably forming part of the same impression as the other "Oswego family" issues.

It may be noted that 1867 was the year in which the death of H.B. Bryant triggered the dissolution of the Bryant & Stratton chain of business schools. Most of the schools remained in business (indeed, Bryant and Stratton College still exists today) but they were no longer constrained to use the Bryant & Stratton textbooks. This must have seemed like a great opportunity for the publishers of competing texts, although the revisions may already have been under way.

The title pages of both issues contain the line "Used in the Erie business college." It is not entirely clear why the Erie college was singled out here. There is no evidence that the Erie college published anything from this impression; and the Erie issue of 1866 carried another school's advertisement in its inside back cover, which does not suggest that it was a dominant institution among local business schools.

I have been able to locate no copy of the Memphis issue. There are, however, references in library catalogues to now-missing copies; it is supposed, according to the catalogue of the Memphis Public

Library, to have been published by one "T.A. Leddin, proprietor of the Business Academy." The *Southern Business Guide* for 1879-80 cites "Leddin, T.A." as the proprietor of the Business College, 238 Main Street, Memphis, Tenn.⁶² The number of pages given and the similar wording of the title suggest that it is consistent with the Cleveland issue.

In 1868, the new version appeared in Canada. Although the title page refers to the Ottawa Business College and its proprietor, J.M. Musgrove, little else has changed from the Cleveland issue. The level of damage to the plates is apparently the same as that in the Cleveland issue; it is plausible that (except for the title pages) the Cleveland, Ottawa, and Memphis issues were printed at the same time. In particular, the American copyright notice appears on the back of the title page, suggesting that even this was printed in the United States. Moreland⁶³ gives Musgrove's full name as John M. Musgrove; the 1881 census⁶⁴ gives his date of birth as 1841. It seems fairly certain that he was Thomas Musgrove's younger brother.

Also in 1868, one of the more extraordinary issues appeared. It was published by E.W. Miller of Philadelphia, an actual publishing house. Miller specialized in Bibles and "Sacred Harp" shape note music. But Bryce's name was not to be seen; the sole author given was "T.C. Musgrove, Teacher Of Actual Business, Peirce's Union Business College, Philadelphia." It would appear that Musgrove, though reduced in circumstances from principal to teacher, still had the plates, and decided to use them in a manner that would further his new position. Perhaps he considered that as his own contributions comprised a significant proportion of the *American Commercial Arithmetic*, and had so far gone unacknowledged, it was his turn to take credit. Legally, at least if he had done the revisions for the American book himself, he was safe; until the 1890s the United States recognized no foreign copyrights.

Though no new material appears, this issue shows some new typesetting. Page 241 was reset in its entirety, and a few other corrections were made – for instance the page numbers of pages 38 (damaged in the Oswego plates) and 232 (set as "232" in the Cleveland plates) are replaced with new type. However, there are also many

62 *Southern Business Guide*, 1879-80 (New York: United States Central Publishing Co., 1879).

63 Moreland, *History*.

64 1881 Canadian Census, available online at http://www.familysearch.org/Eng/Search/frameset_search.asp (accessed 21 April 2009).

new broken letters, and the overall quality of printing in this issue is notably poorer. For instance, one of the dots is missing from the page number on page viii; the word "these" appears damaged on page x; the word "cannot" in the footnote on page 14 is damaged; the word "country" is badly damaged on page 38; the tail of a "y" is broken off on page 106; an "S" on page 152 is chipped; a "k" on the first line of page 232 is broken; the word "legal" is severely damaged on page 264; a capital "P" is broken on page 303; and a period is missing from the footnote on page 334. Most of this damage appears near the margins.

Miller also published an undated issue, nominally as a joint venture with the Canada Business College in Hamilton, Ontario. The title page gives the proprietors as D.A. McLachlan and James Tennant. Tennant had founded the college in 1862; McLachlan, a graduate of the British American Commercial College, did not become a partner until 1873.⁶⁵ The college operated for over a century, closing in 1968.

This issue appears to have been published from the same plates as Miller's 1868 issue, and the plate condition is similar. However, Bryce's authorship has been reinstated on the title page. The title leaf of the exemplar in the collection of Library and Archives Canada is a cancel leaf. The verso bears the usual American copyright deposit notice, so we may infer that the change was made in Philadelphia, not Hamilton. While the title leaf must have been printed in 1873 or later, the other sheets may well have been printed in the 1868 press run; the cancel leaf argues for this.

In 1869, an issue was published in Saint John, New Brunswick, under the name of "*Eaton's Commercial Arithmetic...compiled by T.A. Bryce*." Abijah H. Eaton, at that time the proprietor of commercial colleges in Saint John and Halifax, Nova Scotia, was responsible for adding one more page of tables at the end and of course a new title page.⁶⁶ Apart from that, its text and pagination is identical with that of the Cleveland, Ottawa, and Philadelphia issues. The publisher was

65 *Commemorative Biographical Record of the County of Kent, Ontario, Containing Biographical Sketches of Prominent and Representative Citizens and of Many of the Early Settled Families* (Toronto: J.H. Beers & Co., 1904), CIHM microfiche 77197. This chronology incidentally shows the Canada Business College to have been a completely distinct institution from the Royal Dominion Commercial College, operating in the same city in 1869.

66 A fairly complete history of Eaton's colleges is given in Williams, "Business Education."

J. & A. McMillan, a local Saint John printing company, who published various other textbooks. While Eaton's name appears prominently on cover, spine, and title page, he did not actually claim to be either author or publisher.

The level of type damage is intermediate between the early impression and the Philadelphia issues. Of the blemishes noted above, those on pages viii, x, 232, 303 and 334 do not appear in this issue. Moreover, page 24I, reset in the Philadelphia issues, appears here in its original form but with a damaged letter "S" not seen elsewhere. The additional table at the end – a "Rule to Find the Interest for Days" – was set in slightly different fonts from those used elsewhere in the book, with a sanserif heading and a distinctive dollar sign. Its page number, 369, indicates that it is tipped in, not part of the last full signature.⁶⁷

This venture must have been a success; Eaton's name appears again on an issue published the next year, also by McMillan. The condition of the plates is better than in the first Saint John issue; the 1870 issue differs very little from the Cleveland and Ottawa issues. The title page resembles that of the 1869 issue, but states that the book was "printed and published by J. & A. McMillan," whereas the wording in the previous issue was "J. & A. McMillan, Printers." As we will see, this may be significant.

It is almost impossible to reconcile the conditions of the plates when these two issues were printed, unless we assume that the plates used by Miller were not those used to publish the 1870 Saint John issue. It should be remembered that 1867, the year of Bryant's death, was probably the time at which the prospects of Bryce's book seemed highest; this may have suggested the creation of a second set of plates in anticipation of higher sales. It is also possible that Musgrove and Wright were ending their partnership and wished to have a set each.

With one exception (Memphis), the pre-1868 issues were adopted at colleges around Lake Ontario and Lake Erie, suggesting that marketing efforts, and possibly also production, were at that time still centered in that region – perhaps in Cleveland or Oswego. The beginning of production in Philadelphia would have required a complete set of plates to be transported to Miller's printshop. Any

67 As in all known impressions, there are twelve pages of front matter partially indexed with roman lowercase, followed by an unnumbered first body page with its verso numbered 14. Thus page 368 is the last page of the 23rd signature.

carelessness in packing or handling could explain the significant increase in damage that appears at this time. Also, if Miller only had one set of plates, this would explain why from 1868 to 1870 the worse set of plates was used while the better set apparently sat idle. (Of course, we cannot rule out the possibility of one or more lost impressions printed from the other plates.)

The Philadelphia issues used some plates (such as the completely reset page 241) that were not used for the Saint John 1869 issue. Thus, the Saint John 1869 issue must have been printed from largely the same plates as the Philadelphia 1868 issue – and printed first. Its title leaf, however, is an integral part of the signature, not a cancel leaf. It would thus appear that it was printed with a blank title page, expressly for resale to a then-undetermined “publisher,” and sold a year later. If indeed McMillan only printed the title page and the interest table in the back, this would explain the ambiguous wording of the title page.

This leaves the interesting question of who did print it. While it is conceivable that Miller did so, it cannot have been part of the same impression. As Michael Winship points out,⁶⁸ damage to plates normally occurred during imposition and moving plates in and out of storage, not in mid-run; and this issue is significantly less damaged, with differences within several signatures. There is also a page entirely reset in the other three issues. Thus, if Miller did print this issue, they kept the sheets in storage, unpublished, while creating a second impression; this seems unlikely. Theoretically, also, McMillan might have obtained the plates from the printer of the Cleveland subedition, printed a (rather small) run, and then disposed of the plates to Miller. However, Miller had the plates by 1868, and there is no plausible reason why, if printed and published by McMillan with distribution through Eaton’s college already arranged, the 1869 issue should carry any date other than its date of printing.

The most plausible explanation is that McMillan obtained the printed stock, and Miller the plates, from a third printer. “Occam’s razor” suggests that this would most probably have been the publisher of the Cleveland, Memphis, and Ottawa issues. McMillan may not have been the only purchaser of that impression; it is not improbable that there are other issues to which I have found no reference. While reprints and microfiches are fairly widespread, originals of about half of these issues appear only in a single library within the Worldcat

68 Winship, 22.

and AMICUS union catalogues, and one (Saint John, 1870) does not appear in those catalogues at all. Under these circumstances, the existence of further issues cannot be ruled out, and it is possible that this reconstruction of the printing history will have to be amended in future if these emerge.

The 1870 issue again has an integral title page and a tipped-in interest table at the end. There is also as a small (3" high, full width) errata sheet bound in, facing the title page, that did not appear in the 1869 issue. As mentioned above, the two issues were printed from different plates; and the title page of the later issue states explicitly "Printed and published by J. and A. McMillan." My copy has the stamp of an Amherst, NS, stationer and the name and address of a purchaser in Mount Whatley, NB – a village just across the border from Amherst, but over two hundred kilometres from Saint John. In this case, at least, the intent – often referred to on the title pages – of selling the book in a market beyond the business school appears to have had some success.

The next issue, published in Grand Rapids in 1873, is easily available online or in a University of Michigan reprint. It shows all damage seen in the Philadelphia issues. There is little new damage, if any (the large faint spot on page ix of the facsimile is probably due to underinking). It may well have been printed by Miller, plausibly as part of the same impression. The publisher of record was C.G. Swensberg, the principal of the Grand Rapids Commercial College and Telegraphic Institute.

Again, we consider the classification of these versions. Clearly, all are separate issues: only two have a common publisher and those differ in impression and publication year. While, especially in the absence of any exemplar of the Memphis issue, this is somewhat conjectural, it seems likely that the Cleveland, Memphis, and Ottawa issues were part of a common impression. Was this by the same printer who printed the first American impression? It could well have been; the significant 1867 revisions would have justified an immediate reprinting even before the last stock from the 1866 impression was sold. In the absence of evidence for a change, we will assume tentatively that the Oswego, Erie, Ann Arbor, Hamilton 1869, Cleveland, Memphis, Ottawa, and Saint John 1869 issues were all the product of one printer.

As, at some stages in the history of this book, plates (rather than printed stock) were transferred, the question of subeditions arises. Subeditions are defined in terms of printing history; thus it would

seem illogical to claim the existence of different subeditions based upon purely nominal publishers, whose involvement with the book began after the end of the press run. Under the circumstances, it makes more sense to classify these three impressions (at least tentatively) as one subedition.⁶⁹ We may also group the Philadelphia, Philadelphia-Hamilton, and Grand Rapids issues as a single-impression subedition; and the Saint John 1870 issue, printed and published by McMillan, was certainly a separate subedition.

Eaton and Frazee's Arithmetic

Finally, in 1874, a significantly revised impression, *Eaton and Frazee's Commercial Arithmetic*, was published in Saint John, New Brunswick, and Halifax, Nova Scotia. Eaton was described as the principal of the commercial college in Saint John, and J.C.P. Frazee of that in Halifax. (An advertisement on the back cover suggests that these colleges, and a third in Charlottetown, PEI, formed a chain, run by Eaton. They, too, according to the advertisement, used simulated currency in their instruction.) This impression was not published by McMillan, but by Barnes and Co., another Saint John company.⁷⁰

The main revision was a complete rewriting of the first hundred pages of the book, dealing with basic arithmetic. Slightly more knowledge was assumed on the part of the beginning student. This undoubtedly reflects improvements in universal education in the period since the first edition appeared, but probably also a delayed recognition of earlier changes, as the influence of Walkingame's book gradually lessened.

Much revision, also, was in response to legal changes: the Weights and Measures Act of 1873 had modernized units to some extent, and the old "Halifax currency" was by now a thing of the past. (It was allowed to remain in the foreign exchange table on page 266, though a footnote expressing a hope that the "upcoming" confederation of Canada might lead to a decimal currency was finally removed.) However, with the increasing importance of railway travel, a section on time zone and longitude calculations was included. (Calculations

69 Following Bowers (388), we might consider the Ottawa, Hamilton 1869, and Saint John 1869 issues as a separate subedition based on their publication in a different country; but (especially given the Americanized nature of the Canadian business colleges of the period) I am inclined to agree with Tanselle, who downplays (58-60) the importance of nationality *per se*.

70 Barnes had also published *Eaton and Frazee's Bookkeeping* in 1871.

were for exact local times; Sir Sandford Fleming was not to propose standard time zones in Canada for two more years.) The section at the end on commercial law was removed, its American parts being irrelevant and its "Upper and Lower Canadian" section obsolete.

Place names were not changed to appeal to local audiences, but the many new problems that were added did tend to refer to local towns and businesses. These were mostly in Nova Scotia rather than New Brunswick; it is perhaps not speculating too much to infer from this that the Haligonian Frazee, who was junior to Eaton in the Maritime chain, may have done the greatest share of the work.

While a significant proportion of the text was new, the majority of it was still identical to earlier versions. The state of the plates in those parts of the book is consistent with the second Saint John issue, suggesting strongly that those plates had remained in Saint John. In some cases the plates had been cut apart and new material added, showing that they were not merely on loan. Whether they were the property of Eaton, or whether Barnes purchased them from McMillan, we do not know.

The proportion of the book that differs from the American version is about a hundred and ten pages out of three hundred and forty-three. This is significantly more than was changed in the production of the original *American Commercial Arithmetic*; nonetheless, it should probably not be considered as a distinct book. Apart from the removal of the section on commercial laws of the various states, no attempt was made to Canadianize (or to de-Americanize) the text; the object was to write a better version of the *American Commercial Arithmetic*, not to create a radically different work. As less than half of the type was reset, it should thus probably be considered as a heavily revised subedition of the *American Commercial Arithmetic*.

Not long after this book appeared, Eaton returned to the United States, settling in Baltimore by 1880.⁷¹ He became one of the operators of Eaton and Burnett's Business College, authored texts on bookkeeping and commercial law, and died in 1917. Frazee (in partnership with Samuel A. Whiston) opened another business college in 1878, and authored *Frazee & Whiston's Commercial Arithmetic*⁷²

71 1880 US Census, available at http://www.familysearch.org/Eng/Search/frameset_search.asp (accessed 21 April 2009).

72 J.C.P. Frazee, *Frazee and Whiston's Commercial Arithmetic* (Halifax: Frazee and Whiston, 1884), CIHM microfiche 64757.

(1884) and *Frazee's Commercial Arithmetic*⁷³ (1893). He states in the preface to this last work that "some of the material of Eaton and Frazee's Arithmetic, now out of print, has been appropriated."

Frazee's Commercial Arithmetic is in many ways a much more modern text. More background is assumed – apart from a little introductory material, the book starts off with fractions, not addition. It is also a very local book, referring to many Nova Scotia locations and companies – in some cases, changing the names in exercises borrowed from the earlier book. But among the exercises, we still find the names of T.C. Musgrove, H.C. Wright and Thos. A. Bryce⁷⁴ – the last words of an unusual and sometimes disreputable chapter in the history of textbook publishing.

Conclusion

We have seen that a significant amount about the revision and publication of a book like this may be learned from a study of incremental changes, both deliberate and accidental, to the plates. Such changes reveal, for instance, that several of the "publishers" had even less connection with the book than might be assumed, with plates being circulated between printers, and nominal publishers putting their own title pages at the front of already-printed books. In at least one case, it appears that a printer left the title page blank in the original print run to accommodate this practice. As David Vander Meulen⁷⁵ points out, in such a situation one has little to go on but the physical evidence of the book itself; and analytical bibliography may uncover what the publisher chose not to reveal.

Vander Meulen stresses the importance of actual books in these studies,⁷⁶ and certainly to answer some questions (*e.g.*, those involving signatures, binding, paper, imposition, and cancels) the book must itself be studied. However, microfiche and electronic facsimiles can be of considerable service where originals are not readily available. In particular, the almost universal availability of electronic reproductions, and the increasingly common (though still unreliable) use of optical

73 J.C.P. Frazee, *Frazee's Commercial Arithmetic* (Halifax: Nova Scotia Printing Co., 1893).

74 Bryce appears on page 179, Musgrove and Wright on page 205.

75 David L. Vander Meulen, "Thoughts on the Future of Bibliographical Analysis," *Papers of the Bibliographical Society of Canada* 46 (1) (2008): 17-34.

76 See, for instance, Vander Meulen, 22.

character recognition to make them searchable, allows conjectures to be followed up that might be daunting otherwise.

During this period, other textbooks were also published repeatedly by a number of different companies. A particularly well-known example is Walkingame's *Tutor's Assistant*, which was still in print in the 1860's. Ian Michael⁷⁷ suggests that in such a situation the textbook, separated both from its author and from any particular publisher, takes on the nature of a "commodity." The [*British*] *American Commercial Arithmetic* exemplifies this.

In his conclusion, Michael suggests the need for a methodology for studying such books. Perhaps analytical bibliography, with a particular focus on the condition of plates, may prove of some service here. The later issues of Walkingame's book (along with its various "keys") yield an obvious (if daunting) subject. Among Canadian textbooks, Sangster's *National Arithmetic*, published ten times by two different publishers in Saint John and another ten times in Upper Canada, might also repay study.

The [*British*] *American Commercial Arithmetic* was a commercial success at first, perhaps due to recognition of a specialized market, with older, more mobile students, often able to choose between competing business schools, and owning their own textbooks. These students were in search of a fast and comprehensive business training, and would want a book designed with this in mind.

Its acceptance was initially accelerated by an unusual business model, a sort of "vanity press in reverse," in which the principal/proprietor of a local business school, in return for acting as distributor, was permitted to style himself as "publisher." These men were generally young and probably considered the cachet of publishing a textbook to reflect well both upon themselves and upon their schools. The success of the Bryant and Stratton chain, with its in-house publications, must have made such an enterprise seem particularly appropriate for the proprietor of a business school. To make the title of publisher as desirable as possible, Bryce's profile as a scholar was enhanced in the *American Commercial Arithmetic* – although his actual contribution seems to have been reduced – and in most cases Musgrove and Wright became discreetly invisible. Here we see the textbook not just as commodity (as Michael suggests) but also as status symbol.

77 Michael, "The Textbook as a Commodity."

While the original textbook was supposedly created for nationalistic reasons, these were quickly set aside. In contrast with the situation that has been described among Canadian schoolbooks of the era, the need for a Canadian text appears to have been more about practical details of currency and commercial law than about either pro-Canadian or anti-American sentiment. It seems most likely that the very plates from which the original book was printed were sacrificed to produce the American version. Some Canadian issues were essentially identical to American issues, though all had considerably more Canadian content than other American texts, due to their hasty and incomplete conversion.

All of these factors help explain why, after going through at least thirteen issues in eight years, the book disappeared. To start with, its initial success was perhaps financial rather than academic, depending as it did on appeals to the personal and professional vanity of the men who chose the textbooks, rather than the quality of the content. It is possible that its many remaining Canadian references seemed somewhat eccentric in the American market; however, it had lost too much of its Canadian content to be a truly appropriate text for the Canadian business colleges either.

On either side of the border, this was an era of rapid change, and the *British American Commercial Arithmetic* in particular was out of date soon after it appeared. Nonetheless, the book contained much good material, and under other circumstances somebody might have revised it successfully in Ontario, as Eaton and Frazee did in the Maritime provinces. However, it would seem that neither the original author nor most of those whose names appeared on the title page as “publishers” had enough of a stake in the book to carry out the needed revision. Even Frazee, after Eaton’s departure, redirected his efforts towards textbooks bearing his own name. By downplaying the professional role of both author and publisher, those marketing the *Commercial Arithmetic* ultimately left it without a champion.

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university. I am also grateful to the Making of America project, which has made the Ann Arbor and Grand Rapids issues available online, and to the Canadian Institute for Historical Microreproductions, which has made five of the six known Canadian issues available on microfiche. The decision to include multiple, very similar versions in these collections has been of inestimable help. I would also like to thank the editors, the anonymous referees, and Dr Fiona Black for helpful suggestions. And, finally, I would like to thank my father, Robert MacGregor Dawson, for teaching me the craft of hand typesetting and printing many years ago.

APPENDIX A:
LIST OF KNOWN ISSUES, INCLUDING SOURCE
INFORMATION FOR WIDELY ACCESSIBLE FACSIMILES

Issues may be divided into five broad groups, differing within each group only in very minor details. Modern facsimile issues are not listed separately.

I. British American Commercial Arithmetic

(1) T.A. Bryce, T.C. Musgrove, and H.C Wright, *The British American Commercial Arithmetic, for the Use of Schools, Colleges, and Counting-houses, Embracing an Extensive Course Both in Theory and Practice*; (Toronto: Musgrove and Wright, 1866); printed at the Globe Steam Job Press, Toronto, CIHM microfiche 48329.

II. American Commercial Arithmetic, "Oswego" plates

(2) T.A. Bryce, *The American Commercial Arithmetic for the Use of Commercial Colleges, Private Students, Schools, and Counting-Houses, Embracing an Extensive Course Both in Theory and Practice, Together with the Laws of the United States Relating to Interest, Damages to Bills, and the Collecting of Debt* (Oswego: C.P. Meads and Co., 1866), printer unknown.

(3) T.A. Bryce. *The American Commercial Arithmetic for the Use of Commercial Colleges, Private Students, Schools, and Counting-Houses, Embracing an Extensive Course Both in Theory and Practice, Together with the Laws of the United States Relating to Interest, Damages to Bills, and the Collecting of Debt* (Ann Arbor: A.C. Parson, 1867), printer unknown, Making of America, <http://quod.lib.umich.edu/cgi/t/text/text-idx?c=moa; idno=ABU7334.0001.001>. A printed facsimile (University of Michigan, 2006) also exists.

(4) T.A. Bryce, *The American Commercial Arithmetic for the Use of Commercial Colleges, Private Students, Schools, and Counting-Houses, Embracing an Extensive Course Both in Theory and Practice, Together with the Laws of the United States Relating to Interest, Damages to Bills, and the Collecting of Debt* (Erie: T. Cook and Co., 1867), printer unknown.

(5) T.A. Bryce, *American Commercial Arithmetic, for the Use of the Royal Dominion Commercial College* (T.N. Harris, principal and

proprietor) and for Schools, Colleges, and Counting Houses, Embracing an Extensive Course, Both in Theory and Practice, Together with the Laws of Canada and the United States, Relating to Interest, Damages on Bills of Exchange, and the Collection of Debts (Hamilton: T.N. Harris, 1869), printer unknown, CIHM microfiche 33372.

IIIa. American Commercial Arithmetic, “Cleveland” plates

(6) T.A. Bryce, *The American Commercial Arithmetic, for the Use of the Ohio Business College, Delaware, O., J.W. Sharp & R.R. Hinds, Founders and Proprietors, and also for the Use of Universities, Private Students, Schools, and Counting-Houses, Embracing an Extensive Course Both in Theory and Practice, Together with the Laws of the United States Relating to Interest, Damages on Bills, and the Collection of Debts* (Cleveland: Musgrove and Wright, 1867), printer unknown.

(7) T.A. Bryce, *The American Commercial Arithmetic, for the Use of Commercial Colleges, Private Students, Schools, Academies, and Counting-Houses ... Together with the Laws of the United States Relating to Interest, Damages on Bills, and the Collecting of Debts*; (Memphis: T.A. Leddin, 1867), printer unknown. (No exemplar of this issue was located; the catalogue of the Memphis Public Library contained a record for it as of August 2007.)

(8) T.A. Bryce, *The American Commercial Arithmetic, for the Use of the Ottawa Business College of Ottawa, Ont., J.M. Musgrove, Principal, and for Private Students, Business Men, Schools, Academies, and Counting Houses, Embracing an Extensive Course Both in Theory and Practice, Together with the Laws of the United States Relating to Interest, Damages on Bills, and the Collection of Debts* (Ottawa: Ottawa Business College, 1868), printer unknown, CIHM microfiche 11995.

(9) T.A. Bryce, *Eaton's Commercial Arithmetic for Schools, Academies, Colleges, Bankers, Merchants, and Mechanics, Embracing an Extensive Course both in Practice and Theory* (Saint John: J & A McMillan [printer and publisher], 1870).

IIIb. American Commercial Arithmetic, “Philadelphia” plates

(10) T.C. Musgrove, *The American Commercial Arithmetic, for the Use of Commercial Colleges, Private Students, Schools, Academies, and Counting Houses, Embracing an Extensive Course both in Theory and Practice: Together with the Laws of the United States Relating to*

Interest, Damages on Bills, and the Collection of Debts (Philadelphia: E.W. Miller [printer and publisher], 1868).

(11) T.A. Bryce, *Eaton's Commercial Arithmetic for Schools, Academies, Colleges, Bankers, Merchants, and Mechanics, Embracing an Extensive Course both in Practice and Theory*, (Saint John: J & A McMillan, 1869). (Probably published from purchased preprinted stock, perhaps the same printer as the Cleveland issue), CIHM microfiche 05856.

(12) T.A. Bryce, *The American Commercial Arithmetic, for the Use of the Grand Rapids Business College, Grand Rapids, Michigan, and also for the Use of Universities, Private Students, Schools and Counting-Houses, Embracing an Extensive Course both in Theory and Practice. Together with the Laws of the United States Relating to Interest, Damages on Bills, and the Collection of Debts* (Grand Rapids: C.G. Swensberg, 1873), [perhaps printed by E.W. Miller, Philadelphia, 1868?], Making of America, <http://quod.lib.umich.edu/cgi/t/text/text-idx?c=moa;idno=ABU7343.0001.001>. Last two pages are missing. A printed facsimile (University of Michigan, 2006) also exists.

(13) T.A. Bryce, *The American Commercial Arithmetic, for the Use of Commercial Colleges, Private Students, Schools, Academies, and Counting Houses : Embracing an Extensive Course both in Theory and Practice: Together with the Laws of the United States Relating to Interest, Damages on Bills, and the Collection of Debts* (Philadelphia: Miller's Bible and Publishing House; Hamilton, Canada Business College, no date [>1873]), printed by E.W. Miller, Philadelphia [1868 ?].

IV. American Commercial Arithmetic, "Eaton and Frazee" subedition

(14) T.A. Bryce, *Eaton and Frazee's Commercial Arithmetic for Schools, Academies, Colleges, Bankers, Merchants, and Mechanics: Embracing an Extensive Course of Theory and Practice*, revised and corrected by A.H. Eaton and J.C.P. Frazee (Saint John and Halifax: Eaton & Frazee, 1874), printed by Barnes and Company, Saint John, CIHM microfiche 26097.

APPENDIX B:
CONJECTURAL "FAMILY TREE"

Dashed arrows represent resetting of type in the main body of the book (not title page changes or tipped-in tables).

SOMMAIRE

Le Bryce's *Commercial Arithmetic*, publié en 1866, fut le premier manuel d'arithmétique commerciale. Les renseignements bibliographiques figurant sur les pages de titre de la plupart des éditions sont incomplets, voire inexacts comme le démontre du reste cet article. Dans de nombreuses éditions, l'information relative aux auteurs, éditeurs ou imprimeurs était par surcroît plus ou moins fausse. En procédant à l'examen des diverses modifications apportées aux clichés, cette étude rétablit une bonne partie de la vérité concernant l'histoire de cette publication.