BOOK PRINTING AT THE UNIVERSITY PRESS AT OXFORD BETWEEN 1660 AND 1780

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Abstract

My research has yielded publications that contribute to the field of printing history through the first comprehensive accounts of the operation of two large English printing houses in the seventeenth and eighteenth centuries: the Learned Press at Oxford in the period 1660 to 1780 and the Oxford Bible Press in the period 1769 to 1772.

Those publications contribute to the field in two ways. Firstly, my research into the Oxford Bible Press in the period 1769 to 1772 reveals operational features of a large printing house that could otherwise only be speculated about, in particular the extent and nature of concurrent printing there[1]. Secondly, my research into the Learned Press at Oxford has produced insights into the operation of a large printing house at a level not seen before, surpassing in detail D. F. McKenzie's description of the Cambridge University Press in the period 1696 to 1712. Both areas contribute extensive economic data for the period, including pay rates, the prices of materials and services, productivity figures, and the movement of workers. Moreover, from the basis established by my publications I have been able to widen my contribution by confirming and in some cases challenging McKenzie's assertions about the operation of an eighteenth-century printing house.

[1] 'Concurrent printing' is a term used for the situation where more than one work is in hand in a Press at any one time.

Preliminaries

Publications submitted

The following publications are submitted

1) 'The workplace: places, procedures, and personnel, 1668–1780s' in Ian Gadd (ed.), *The history of Oxford University Press* I (Oxford: Oxford University Press, 2013), 193–240 (23,000 words) (submitted file: publication1.pdf)
2) 'Printing at the Bible Press, Oxford, 1769–72: a quantitative analysis', *Journal of the Printing Historical Society*, new series 30 (2019), 89–110 (10,000 words) (submitted file: publication2.pdf)
3) 'Printing at the Bible Press, Oxford, 1769–72: further analysis', *Journal of the Printing Historical Society*, new series 31 (2019), 33–63 (7500 words) (submitted file: publication3.pdf)
4) 'The "Little Print-house" and "New Print-house" ' (5200 words) (submitted file: publication4.pdf)
5) '1733–1780: Type from Caslon' (7000 words) (submitted file: publication5.pdf)
6) 'The press-man's work' (9000 words) (submitted file: publication6.pdf).

Publications 4, 5, and 6 are representative sections from each of the three volumes of Ould, Martyn, *Printing at the University Press, Oxford, 1660–1780* (Hinton Charterhouse and Seaton: The Old School Press, 2015–2019) (210,000 words), which concerns the Learned Press, and which draws on the same research as publication 1. (The submitted files for publications 5 and 6 are extracted from the files sent to commercial printers for digital printing; that for publication 4 is the text provided to the Monotype typesetter prior to letterpress printing.)

Related published work

The following works do not form part of the materials submitted for this PhD but derive from the research upon which this PhD is based, and indicate a continuing contribution to the field:

- 'Caslon's supplies to the University Press, Oxford', *Matrix 36* (Risbury: Whittington Press, 2020), pp. 114–17
- (co-authored with Jim Nottingham) *Michael Burghers, Oxford engraver* (Seaton: The Old School Press, 2020)
- *Learning about printing* (2019) – an additional volume in the *de luxe* copies of volume III of *Printing at the University Press, Oxford, 1660–1780*, being an essay on business planning at the nascent university Press in 1671–72 based on manuscripts by John Fell and Thomas Yate
- 'A note on inter-linear spacing at the University Press, Oxford, 1670–1780', *Journal of the Printing Historical Society*, new series 25 (2016), 85–88
- 'An eighteenth-century factory for bibles', *Matrix 33* (Risbury: Whittington Press, 2015), pp. 104–11
- *Correspondence on paper* (2015) – an additional volume in the *de luxe* copies of volume I of *Printing at the University Press, Oxford, 1660–1780*, being a set of edited transcriptions of letters from the London paper wholesalers to Thomas Yate in the 1670s
- 'Ephemera and frequently reprinted works' in chapter 9, 'Printing for the University', in Ian Gadd (ed.), *The history of Oxford University Press* I (Oxford: Oxford University Press, 2013), pp. 293–306
- (co-authored with Paul Luna) 'The printed page', in Ian Gadd (ed.), *The history of Oxford University Press* I (Oxford: Oxford University Press, 2013), pp. 511–45
- *Oxford's ornaments* (Hinton Charterhouse: The Old School Press, 2008)

– *Stanley Morison and 'John Fell'* (Hinton Charterhouse: The Old School Press, 2003)
– (co-authored with Martyn Thomas) *The Fell revival* (Hinton Charterhouse: The Old School Press, 2000).

Conventions

Bibliographical references use the MHRA author-date system. Quotations have not been modernised although u/v and i/j usage has been regularised. The start of the calendar year has been taken as 1 January throughout.

Glossary

The Critical Commentary uses certain technical terms and terms specific to the Oxford Press; for the ease of the reader these are briefly defined here.

Author's book: a book whose production at the *Oxford Press* was funded by an author or editor, as opposed to a *Delegates' book*.

Cambridge Press: the organisation that was responsible for printing at Cambridge beginning with the Press established by Richard Bentley in 1696.

cut: a wood-cut, typically a diagram or image engraved on wood for printing.

Delegate: the Delegates of the Press at Oxford had authority for the printing, publishing, and selling of books from the University Press. They were appointed by the Proctors with the authority of the University Vice-Chancellor.

Delegates' book: a book whose production was funded by Oxford University, as opposed to an *Author's book*.

em: a unit of measurement of length, normally expressed as a number of points (72nds of an inch).

en: half an *em*.

engraving: an engraving on copper printed using a rolling press.

full press: a press operated by two men.

half press: a press operated by one man.

measure: the length of a set line of text, typically measured in ems of the fount (e.g. in pica units for text set in pica).

Oxford Press: the organisation that was responsible for printing at Oxford beginning with the Press established in 1671–72 by John Fell and his partners. From 1678 the Press divided into two: the Learned Press printing scholarly works, and the Bible Press printing bibles and prayer books for Stationer lessees.

perfected token: a *token* printed on both sides of the sheet.

Press: an organisation that prints books; the term is used here with a capital initial letter to distinguish it from a 'press', the equipment used to print type onto paper.

press-crew: two men working a press together.

sort: an individual piece of type.

token: 250 sheets of paper.

type sizes: the following names of type body sizes were used during my period. I give their approximate sizes in modern points as derived from measurements of ancient moulds at Oxford University Press,[2] followed by their modern point sizes.

- double pica – 20.3 pt (24 pt)
- great primer – 17 pt (18 pt)
- English – 13.5 pt (14 pt)
- pica – 12 pt (12 pt)

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[2] Ould and Thomas 2000: 3.
[3] Carter 1975.

- small pica – 10.4 pt (11 pt)
- long primer – 9.8 pt (10 pt)
- brevier – 7.8 pt (8 pt)
- minion – 7 pt (7 pt)
- nonpareil – 6.4 pt (6 pt)
- pearl – 5 pt (5 pt).

Dramatis personae

A small number of people feature in the Critical Commentary and brief biographical details are given here.

Ackers, Charles: Charles Ackers (1702/3–1759) was a master printer in London.

Bentley, Richard: Richard Bentley (1662–1742) was an English classical scholar, critic, theologian, and Master of Trinity College, Cambridge.

Blackstone, William: William Blackstone (1723–1780) was an English jurist, judge, and Tory politician who was made a Delegate of the Learned Press at Oxford in 1755 and undertook a radical reform of its operation.

Bowyer, William: William Bowyer the elder (1663–1737) and William Bowyer the younger (1699–1777) were master printers in London.

Burghers, Michael: Michael Burghers (1647/8–1727) was a Dutch copper engraver who worked in England, in particular for the Oxford Press.

Crownfield, Cornelius: Cornelius Cronefelt (?–?) was a Dutchman brought to England to manage the Press at Cambridge.

Fell, John: John Fell (1625–1686) was Dean of Christ Church, Oxford, at one time Bishop of Oxford, and Delegate of the Press. With three partners he took over management of the Oxford Press in 1672.

Laud, William: William Laud (1573–1645) was a Church of England clergyman, appointed Chancellor of Oxford University in 1630 and Archbishop of

Canterbury in 1633.

Prince, Daniel: Daniel Prince (1711/12–1796) was an Oxford bookseller, appointed Warehouse-keeper at the Learned Press by *William Blackstone* in 1758.

Richardson, Samuel: Samuel Richardson (?1680–1761) was a master printer in London.

Richardson, Stephen: Stephen Richardson (?–1755) was the Learned Press Warehouse-keeper from 1715 to 1755.

Richardson, William: William Richardson (1698–1775) became Vice-Chancellor of Cambridge University in 1737 and called for a review of the operation of the Press there.

Yate, Thomas: Thomas Yate (1603–1681) was Principal of Brasenose College, Oxford, and was one of *John Fell*'s three partners.

Acknowledgements

I am most grateful to Professor Ian Gadd and Professor Astrid Swenson for guiding me through the process that has led to this Critical Commentary.

I am very grateful to Dr Martin Maw, OUP Archivist, and his staff, and to Simon Bailey, Keeper of the Archives, University of Oxford, for access to the archives on which my work on the Learned Press largely rests. A number of other people provided help, information, and criticism and I acknowledge them in the Preface to Ould 2015a. My publications identify all the sources that I have consulted.

My analysis of the operation of the Oxford Bible Press was made possible by the transcription of three years of accounts into the relational database Microsoft Access by Dr Jo Howe, as part of the preparation for Gadd 2013a.

I thank Dr Jim Pimpernell for bringing the NodeXL tool to my attention.

Contents

1 The aims, results, and contribution of my published research

My research has yielded publications that contribute to the field of printing history. They provide print historians with the first comprehensive accounts of the operation of two major English printing houses in the seventeenth and eighteenth centuries: the Learned Press at Oxford in the period 1660 to 1780 and the Oxford Bible Press in the period 1769 to 1772. They extend our understanding of how books were printed in the period and in particular make possible comparison with descriptions of other printing houses in England and the Continent. They also contribute economic data for the period, including pay rates, productivity figures, the prices of materials and services, and the employment profiles of workers. (1660 was chosen as the start date for my period being the start of the decade in which the Oxford Press emerged, and 1780 was chosen as the end date being the point at which there is a break in the extant Learned Press accounts and at which the University took back ownership of the Bible Press.)

My research into the Oxford Bible Press in the period 1769 to 1772 reveals the day-to-day inner workings of a large English printing house that could otherwise only be speculated about and provides printing historians with concrete evidence about the dynamics of such an establishment. My research into the Learned Press at Oxford has produced a panoramic view of the operation of a large printing house at a level of detail not presented before, surpassing D. F. McKenzie's description of the Cambridge University Press in the period 1696 to 1712. Building on the basis established by my publications I have been able to widen my contribution by confirming and in some cases challenging McKenzie's assertions about the operation of an eighteenth-century printing house.

Two authors dominate past writing on printing at Oxford: Harry Carter and Falconer Madan. Neither addresses the operation of the Oxford Press to the level

of detail that I have in my publications. Carter began a history of the Press but only volume 1, covering the period to 1780, was completed and published;[3] it is a broad-brush history of the institution which only in passing notes aspects of the operation of the Press. Madan's extensive and forensic three-volume *Oxford books* provides bibliographic detail of the Learned Press's output up to the year 1680;[4] detail of the actual operation of the Learned Press is again noted only in passing. I can therefore summarise my initial aim in carrying out the research that led to my publications as 'to fill two major gaps in the literature'.

Firstly, although there exists a rich seam of material for the period in the archives of OUP and the University, there had been no thorough analysis of the archives or comprehensive narrative concerning the operation of the Learned Press, even though it is one of only a handful of archives of major (or indeed any) English printing houses of the time. My aim was to develop from those sources chronological narratives on the themes of three assets of the Learned Press – its premises, paper, and type – and a further narrative tracing the process from author's copy to printed sheets as enacted at the Press. During my research, I based my writing wherever possible on contemporary records, making my own readings and transcriptions of them by examining the original documents where available or photographic records where necessary, and quoting or citing subsequent writers only where access to the original material has not proved possible.

Secondly, there had been nothing at all written about the day-to-day operation of the Bible Press: the surviving records had not previously been explored. My aim was to start to fill that gap and to extract quantitative and qualitative information about the operation of the Press from its extant accounts in the OUP archives. My work therefore complements Scott Mandelbrote's account of its activities.[5]

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[3] Carter 1975.
[4] Madan 1895–1931.
[5] Mandelbrote 2013.

My research into the Learned Press resulted in the three volumes of *Printing at the University Press, Oxford, 1660–1780*, published under my own imprint, which are referred to below where appropriate; I drew on the same research for my contribution to volume 1 of Oxford University Press's own history, *The history of Oxford University Press*. My research into the Bible Press led to the two papers 'Printing at the Bible Press, Oxford, 1769–72: a quantitative analysis', and 'Printing at the Bible Press, Oxford, 1769–72: further analysis' in the *Journal of the Printing Historical Society*.

My published work is generally not comparative in its approach. It is in this Critical Commentary that I contextualise my publications within the field of printing history, connecting the findings within them to those of other writers on similar printing establishments of the period. In particular, I compare my research with that of two writers on Cambridge University Press, a Press that was sufficiently similar in nature – they were at least, in principle, both academic Presses – to make comparison rewarding. McKenzie wrote a key work on the Cambridge Press at the turn of the eighteenth century comprising one volume of analysis and a bibliography for the period and a second of transcripts of the 'vouchers' recording payments, a work that has hitherto stood alone on the topic;[6] he later wrote an essay addressing the bibliographical implications of his findings.[7] The part of David McKitterick's history of Cambridge University Press relating to my period has been relevant here for its discussion of the management of the Press.[8] I also highlight points of similarity and difference between my findings about the Oxford Press and three other authors who have described major London printing houses of the time: Keith Maslen and John Lancaster prepared a checklist of the output of the Bowyers printing house from 1710 to 1777 supported by microfiches of their

[6] McKenzie 1966a, McKenzie 1966b.
[7] McKenzie 2002.
[8] McKitterick 1992, McKitterick 1998.

accounts, and Maslen wrote a number of essays based on that evidence;[9] D. F. McKenzie and J. C. Ross prepared a transcription of the ledgers of Charles Ackers's printing house from 1732 to 1748;[10] and William Sale catalogued the output of Samuel Richardson's Press with a commentary.[11] Through this contextualisation, I demonstrate the value of my research to printing historians, as well as to book historians, bibliographers, and those with interests beyond Oxford. Finally, arising from my research, I offer some methods for the analysis of unstructured historical evidence and of structured financial data, and suggest how they could be used in similar situations in this and other fields.

My published work also provides me with the basis for my continuing research on an appraisal of McKenzie's work on the Cambridge Press. It will be based on my findings regarding concurrent printing at the Bible Press and informed by my own practice as a letterpress printer: since 1990 I have operated a studio Press, publishing under the imprint The Old School Press, using traditional printing techniques and equipment, all of which would have been familiar to the printers of the period 1660–1780. I anticipate two papers which I shall offer for publication (see chapter 6), one challenging McKenzie's interpretation of the evidence he invokes from the printed books themselves and the vouchers recording individual payments to the workers, and a second on his discussion of the 'balancing' of composition and press-work at the Cambridge Press.[12]

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[9] Maslen and Lancaster 1991, Maslen 1993.
[10] McKenzie and Ross 1968.
[11] Sale 1950. See also Maslen 2001.
[12] McKenzie 2002, in particular pp. 26–31.

Structure of this Critical Commentary

Chapter 2 describes the sources on which I based my research, and the methods I used that allowed me to extract themed and structured narratives about the workings of the Learned Press from the mass of unstructured detail in those sources, to expose the operation of the Bible Press from its accounts both quantitatively and qualitatively, and to test some assertions of other print historians.

Chapter 3 compares the operation of the Learned Press at Oxford with that of the printing house of Cambridge University and other major English printing houses of the time, and shows how the different perception each university had of its Press manifested itself in different strategies in the acquisition of premises and type in particular.

Chapter 4 concerns the organisation of the Bible Press in the 1770s, its productivity in the areas of composition and presswork, and man management, again making comparisons with the operation of the Cambridge Press at the start of the eighteenth century.

Chapter 5 generalises the approaches I used for working with the evidence on which I based my research, examining the pros and cons as they emerged in practice, and proposing how they might be applied in other research areas.

Chapter 6 summarises my claims for my research to date, identifies future papers for publications, and lists potential avenues for further related research.

2 Sources and methods employed in my research

In this largely technical chapter I identify my main research sources and I describe four methods I used to work with them, thereby clearing the way for subsequent chapters to focus on the analysis. I describe the use of spreadsheets for the extraction of information from unstructured data, a relational database for the capture of structured data, pivot tables[13] for the analysis of spreadsheet data, and network mapping to understand process flows within an organisation. Working in the pre-spreadsheet age, McKenzie was only able to work on paper; for my research I have had the advantage of transferring data to software tools that open the way to many different analyses.

2.1 Using spreadsheets to extract information from unstructured data

My research relating to the Learned Press has been primarily dependent on the evidence provided by surviving manuscript records. This evidence invariably provides a multitude of individual details (what I shall refer here to as 'data points') – the purchase of a quantity of paper, a payment to a compositor, the size of an edition – and in order to develop the narratives that were my aim I needed to be able to pull together related data points in different ways. In this section I describe the method I used for working with large numbers of data points drawn from a variety of contemporary sources. The data points were unstructured and varied in nature and content.

[13] A pivot table is a table of statistics that summarises the data of a more extensive table. It might include sums, averages, or other statistics, which the pivot table groups together in a meaningful way.

My primary research sources for the Learned Press included

– the Press Warehouse-keeper's Accounts[14]
– the Delegates' Minute Books[15]
– the University Accounts (the 'Computus')[16]
– the journals of Thomas Hearne[17]
– the journals of Anthony Wood[18]
– Johann Grabe's accounts and notes[19]
– contemporary correspondence and manuscript notes in the Bodleian Library.

My secondary sources included Madan's *Oxford Books*[20] and Carter's *A history of Oxford University Press*.[21]

Where necessary I photographed, or had photographed for me, all primary sources so that I could examine them and make transcriptions at home. I inspected some Oxford Press books in the Bodleian Library and the OUP Archives, and used the EEBO and ECCO online databases to view copies of books from both Oxford and Cambridge.[22]

The evidence in these sources yielded more than 11,000 individual data points, and in order to be able to derive various themes on topics such as the sourcing and purchase of paper, the work of an individual engraver, the use of a particular type-face, or the history of an individual book, they needed to be collated in a structured form. A spreadsheet is the ideal tool, allowing a customisable structure and offering a range of analytical tools. Each data point was recorded as a row in an Excel

[14] Oxford University Press Archives OUP/PR/1/18/1, /2, /4, /5.
[15] Gibson and Johnson 1966.
[16] Oxford University Archives WPβ/21(4), /21(5), /21(6), /22(1), /22(2).
[17] Doble 1885–1921.
[18] Clark 1891.
[19] Bodleian Library MS Grabe 53.
[20] Madan 1895–1931.
[21] Carter 1975.
[22] EEBO: Early English Books Online. ECCO: Eighteenth Century Collections Online.

spreadsheet. Its content was recorded in the column

– *item*: free text, for example a transcription or epitome or extract of a financial account, diary entry, or letter.

Further columns (dimensions) were then added for necessary metadata:

– *source*: one of the primary or secondary sources identified using a standardised naming scheme
– *page*: the page or folio within the source
– *sequence on page or folio*: where necessary for precedence and time ordering to be preserved when sorting
– *first year*: the (first) year to which the record refers
– *last year*: the last year to which the record refers where a period of years is involved
– *photo/file*: a reference to a photograph or file (e.g. for a transcription) on my computer.

To make it possible to focus on particular themes four further columns were added from the outset, describing the content of the item:

– *book*: the book to which the item related (if any)[23]
– *topic*: one of a set of topics to which the item related (see below)
– *person*: the name of a person to whom the item referred (if any), using a standard format of 'surname first-name', e.g. 'Burghers Michael'
– *notes*: free text as necessary.

An initial set of *topics* was chosen to cover

– principal resources: premises, paper, and type (these arose from my initial work on chapter 7 of Gadd 2013a)
– steps in the printing process: editing, composition, correcting, engraving,

[23] I used Madan's numbering system for books to 1680 and Carter's for books from 1690 onwards; for books in the period 1681–89 I used a short title.

presswork, cancelling, collating, binding, advertising (these were chosen to provide information on the process and were prompted by my experience with letterpress printing)

– roles: e.g. binder, bookseller, compositor, and printer.

As the collation of data points progressed and sufficient data points arose, further topics were added that presented opportunities for new avenues of investigation, e.g. equipment, foundry, woodcuts, almanac, carriage, paper-carriage, and maintenance.

It was then a straightforward, mechanical matter using Excel's analysis facilities to extract different perspectives from the spreadsheet. For example:

– Filtering on *person* = 'Caslon' and sorting on *year* yielded time-ordered records related to the typefounder Caslon for coverage of the Learned Press's purchases of type – see figure 1 for a section of the result. These were extracted into a separate spreadsheet which was augmented with columns for the weight and/or cost of a shipment of type to Oxford; this in turn yielded information about the total amount of type delivered by Caslon and the total amount of worn type returned to Caslon.[24]

– Filtering on *topic* = 'paper-carriage' and sorting on *year* yielded a time-ordered set of transactions for the carriage of paper to Oxford. By adding the sheet size, prices paid, and weights carried (where given) to the transactions, I could deduce whether consignments were carried by coach, cart, or barge, and a pivot table yielded the cost per ream of different sizes.[25]

I derived other quantitative spreadsheets to analyse aspects of the working of the printing house. For example:

– The dynamics of Almanack production could be derived from the

[24] Such deductions about Caslon appeared in Ould 2018 (in particular pp. 136–37 and 120–21) and Ould 2020.

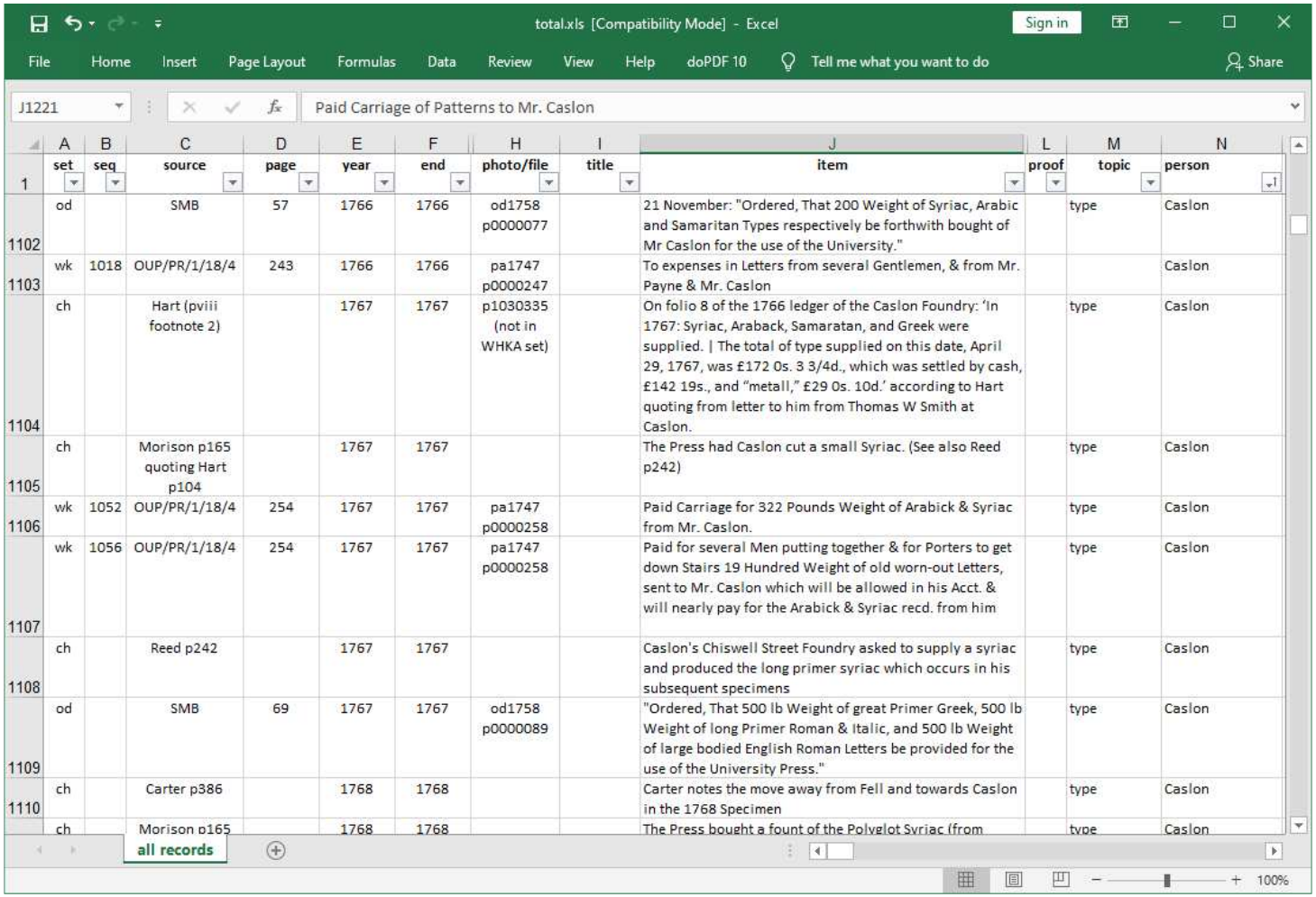
[25] Such deductions appeared in 'Transporting paper to the Press' in Ould 2015a: 138–42.

Warehouse-keeper's Accounts. The Accounts recorded the numbers produced of the annual Almanack, in its large and small paper forms. Graphs extracted from these figures showed, for example, how the total number printed grew rapidly and then declined slowly over the period, and that as the total declined so the proportion of large copies increased significantly.[26]

– The dynamics of the Press's backlist could also be derived from the Warehouse-keeper's Accounts. The Accounts recorded the number of copies of each title held in the warehouse each year. A graph showing the average number of unsold sets per title over time revealed how this figure remained roughly constant in the latter years of the period, showing that the accumulation of unsold sets was due to the increasing size of the backlist, with few titles selling out.[27]

[26] Ould 2013a: 233.
[27] 'Warehousing' in Ould 2019a: 130–35.

Figure 1: a segment of the spreadsheet for the Learned Press after filtering on *person* and sorting on *year*.



total.xls [Compatibility Mode] - Excel

Sign in

File Home Insert Page Layout Formulas Data Review View Help doPDF 10 Tell me what you want to do Share

J1221 | Paid Carriage of Patterns to Mr. Caslon

	A	B	C	D	E	F	H	I	J	L	M	N
1	set	seq	source	page	year	end	photo/file	title	item	proof	topic	person
1102	od		SMB	57	1766	1766	od1758 p0000077		21 November: "Ordered, That 200 Weight of Syriac, Arabic and Samaritan Types respectively be forthwith bought of Mr Caslon for the use of the University."		type	Caslon
1103	wk	1018	OUP/PR/1/18/4	243	1766	1766	pa1747 p0000247		To expenses in Letters from several Gentlemen, & from Mr. Payne & Mr. Caslon			Caslon
1104	ch		Hart (pviii footnote 2)		1767	1767	p1030335 (not in WHKA set)		On folio 8 of the 1766 ledger of the Caslon Foundry: 'In 1767: Syriac, Araback, Samaratan, and Greek were supplied. | The total of type supplied on this date, April 29, 1767, was £172 0s. 3 3/4d., which was settled by cash, £142 19s., and "metall," £29 0s. 10d.' according to Hart quoting from letter to him from Thomas W Smith at Caslon.		type	Caslon
1105	ch		Morison p165 quoting Hart p104		1767	1767			The Press had Caslon cut a small Syriac. (See also Reed p242)		type	Caslon
1106	wk	1052	OUP/PR/1/18/4	254	1767	1767	pa1747 p0000258		Paid Carriage for 322 Pounds Weight of Arabick & Syriac from Mr. Caslon.		type	Caslon
1107	wk	1056	OUP/PR/1/18/4	254	1767	1767	pa1747 p0000258		Paid for several Men putting together & for Porters to get down Stairs 19 Hundred Weight of old worn-out Letters, sent to Mr. Caslon which will be allowed in his Acct. & will nearly pay for the Arabick & Syriac recd. from him		type	Caslon
1108	ch		Reed p242		1767	1767			Caslon's Chiswell Street Foundry asked to supply a syriac and produced the long primer syriac which occurs in his subsequent specimens		type	Caslon
1109	od		SMB	69	1767	1767	od1758 p0000089		"Ordered, That 500 lb Weight of great Primer Greek, 500 lb Weight of long Primer Roman & Italic, and 500 lb Weight of large bodied English Roman Letters be provided for the use of the University Press."		type	Caslon
1110	ch		Carter p386		1768	1768			Carter notes the move away from Fell and towards Caslon in the 1768 Specimen		type	Caslon
	ch		Morison p165		1768	1768			The Press bought a fount of the Polyglot Syriac (from		type	Caslon

all records

100%

Many such analyses were used to bring together all the data points relating to a particular topic of interest, for example 'how much did composition cost?', 'how much business was done with Caslon?', 'what records exist for Morison's Herbal?', and 'how long did Michael Burghers work for the Learned Press?' Some analyses were seen opportunistically, such as the presence of sufficient evidence to explore the cost of different paper sizes over time.

2.2 Using a relational database to capture structured data

The primary sources for my research on the Bible Press were the Bible Bill Books that record weekly payments to compositors and press-crews,[28] and the printed bibles and prayer books themselves.

In contrast to the very varied nature of the data points collected for the Learned Press, those from the Bible Press accounts had a regular and consistent format and content; such structured data required a different approach. I needed to be able to make analyses to understand the Bible Press in quantitative terms, and to derive time-ordered analyses to understand its dynamics. The analyses I was able to carry out became the basis of the two submitted papers.[29]

The first extant Bill Book covers three years from December 1769 to November 1772. Thanks to the work of Dr Jo Howe, the two sets of entries – for composition and for presswork – were transcribed into two relational databases using Microsoft Access. These allowed an appropriate structure to be imposed on the data and, importantly, preliminary data cleaning to be done, notably the resolution of synonyms for works and men.[30] It would have then been possible to carry out some

[28] Oxford University Press Archives OUP/PR/14/6/1–7. McKenzie (1966a) asserts that the Cambridge records form 'a collection of printing-house documentation unique in England'. Certainly they cover more than composition and presswork, but in those respects they are matched in detail by those in the Bible Press Bill Books.

[29] Ould 2019c, Ould 2019d.

[30] For example, was 'W. Musgrove' the same as 'Mr. Musgrove'? Was the '24mo Prayer book' the 'Nonpareil 24mo Prayer book'? I kept a running record of decisions made.

analyses on the database using SQL,[31] but my greater familiarity with Excel's facilities and the power of its pivot table and graphical facilities led me to export the data from the two relational databases into two Excel spreadsheets, one for the payments to compositors 'At case', and one for the payments to press-crews 'At press'. Excel's ability to handle many types of data, textual and numeric, make it an appropriate tool for analysing the kind of financial data in the Bible Bill Books – data that is invariably well structured – whatever the field of research.

2.3 Using pivot tables to analyse historical data

Each row in the 'At case' spreadsheet captured an individual payment to a compositor, specifying how much he was paid to set which pages of which works in which week. Each row in the 'At press' spreadsheet captured an individual payment to a press-crew, specifying how much they were paid to print how many copies of which formes of which works in which week.

The two spreadsheets were the basis for further spreadsheets (perhaps thirty or more) that were derived mostly by using pivot tables and that allowed the quantitative nature and the dynamics of composition and presswork to be exposed.

Pivot tables generated from the 'At case' spreadsheet gave, for example,

- A matrix showing which men were working which weeks as compositors and hence the staffing profile over time – see figure 2 below. This in turn showed the number of weeks each man worked, their average and median stay in weeks, and which men were probably itinerant and which were relatively permanent.
- A matrix showing which men worked on which works and the total number of pages they set for each. This exposed the degree to which composition of a given work was spread over a number of compositors.

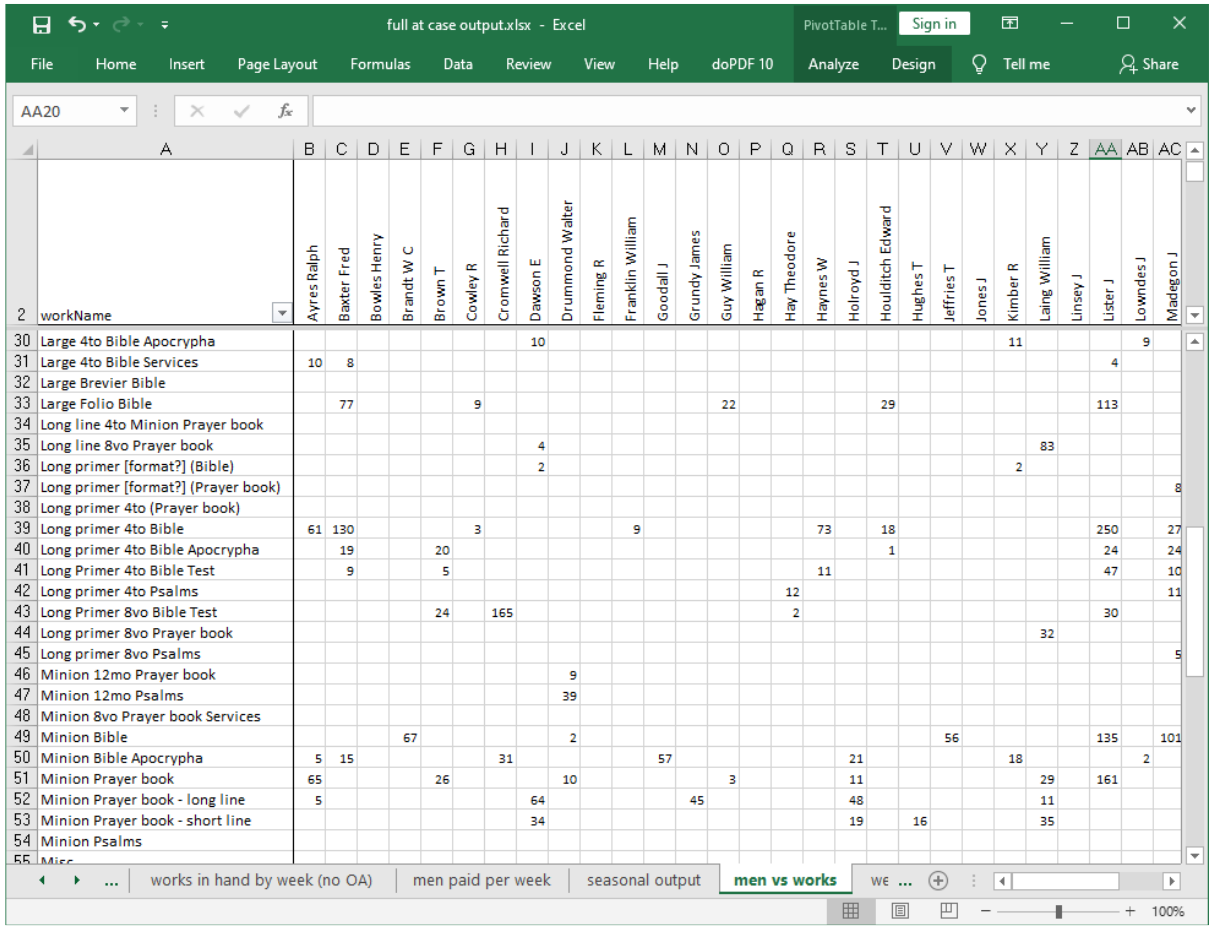
[31] Structured Query Language.

Pivot tables generated from the 'At press' spreadsheet gave, for example,

– A matrix showing the total number of impressions made in each week. A histogram pulled out the distribution, and simple calculations gave the average and median output figures.
– A matrix showing the number of different works printed by each press-crew each week – see figure 3 below. This indicated the degree to which press-crews moved between works as opposed to being dedicated to printing one particular work.

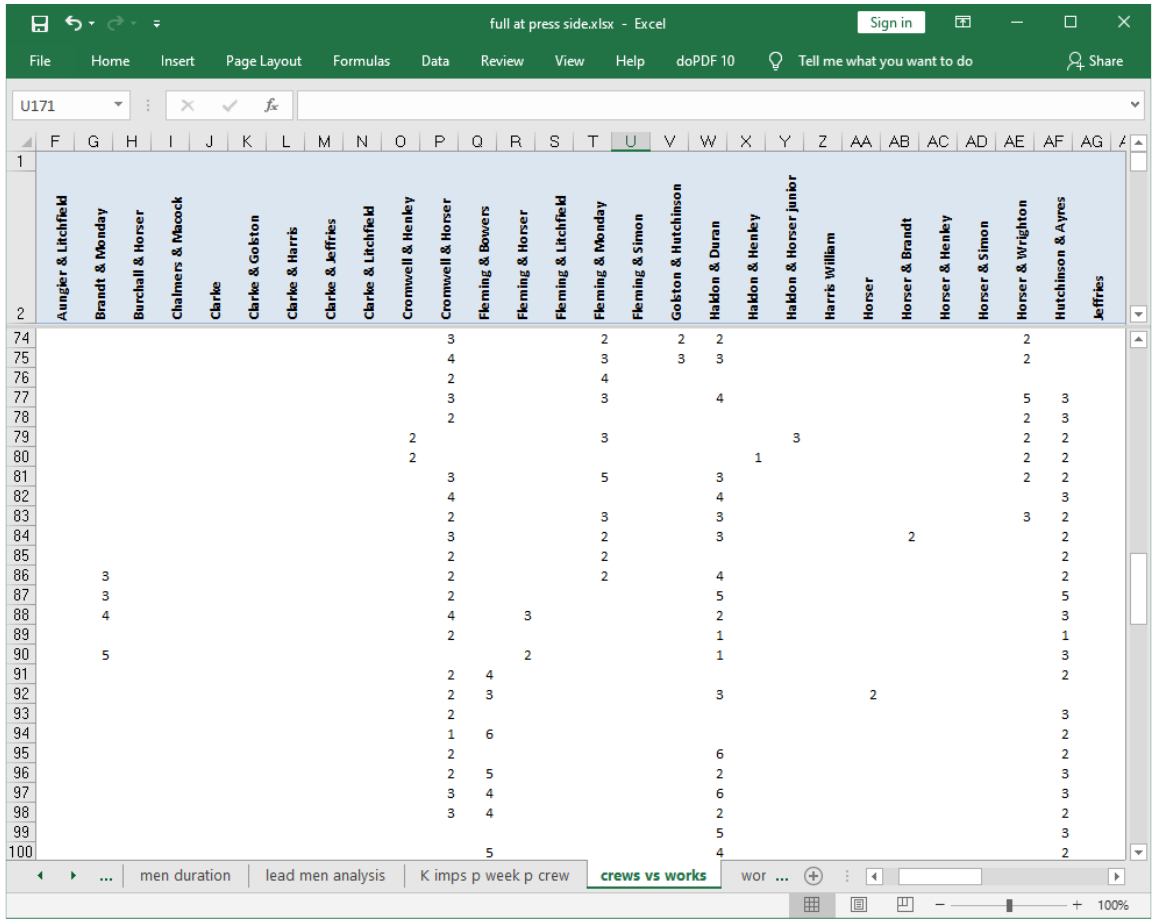
The analyses I carried out were of two sorts: those that corresponded to obvious questions for my research ('how much were press-crews paid for their work?', 'what was their output rate?', 'in what order were sheets composed and printed?), and those that subsequently suggested themselves ('how many press-crews were active each week?', 'how long did men stay at the Press?', 'was there a preference for printing inner or outer formes first?'). This subsequently allowed me to challenge assertions about similar questions asked about the Cambridge Press by McKenzie (who, lacking mechanical help, would only have been able to sample the data in the Cambridge vouchers rather than dealing with the entire set).

Figure 2: part of the pivot table showing which compositors set which works and how many pages they set of each.



2	workName	Ayres Ralph	Baxter Fred	Bowles Henry	Brandt W C	Brown T	Cowley R	Cromwell Richard	Dawson E	Drummond Walter	Fleming R	Franklin William	Goodall J	Grundy James	Guy William	Hagan R	Hay Theodore	Haynes W	Holroyd J	Houlditch Edward	Hughes T	Jeffries T	Jones J	Kimber R	Laing William	Linsey J	Lister J	Lowndes J	Madegon J
30	Large 4to Bible Apocrypha								10															11				9	
31	Large 4to Bible Services	10	8																								4		
32	Large Brevier Bible																												
33	Large Folio Bible		77				9								22					29							113		
34	Long line 4to Minion Prayer book																												
35	Long line 8vo Prayer book								4																83				
36	Long primer [format?] (Bible)								2															2					
37	Long primer [format?] (Prayer book)																												8
38	Long primer 4to (Prayer book)																												
39	Long primer 4to Bible	61	130				3					9						73		18							250		27
40	Long primer 4to Bible Apocrypha		19			20														1							24		24
41	Long Primer 4to Bible Test		9			5												11									47		10
42	Long primer 4to Psalms																12												11
43	Long Primer 8vo Bible Test					24		165									2										30		
44	Long primer 8vo Prayer book																								32				
45	Long primer 8vo Psalms																												5
46	Minion 12mo Prayer book									9																			
47	Minion 12mo Psalms									39																			
48	Minion 8vo Prayer book Services																												
49	Minion Bible				67					2												56					135		101
50	Minion Bible Apocrypha	5	15					31					57						21					18				2	
51	Minion Prayer book	65				26				10					3				11						29		161		
52	Minion Prayer book - long line	5							64					45					48						11				
53	Minion Prayer book - short line								34										19		16				35				
54	Minion Psalms																												
55	Misc																												

Figure 3: part of the pivot table showing how many different works each press-crew worked on each week.



Two historical questions answered for the Bible Press

The 'At press' spreadsheet captures, in particular, which press-crews printed which formes of each bible and prayer book. I transcribed the 'press figures' printed on the sheets of the 1772 Large Quarto Bible into a further spreadsheet. By bringing together the two spreadsheets I was able to address two questions of interest to printing historians and bibliographers.

Firstly, the meaning of press figures has been a matter of debate in the literature (not least because of the paucity of collateral supporting information except for the Bowyers printing house) – what can they tell us about the printing of a book?[32] By mapping press-crews to the press figures on the formes they printed I was able to establish that at the Oxford Bible Press there was a strong though not total correlation of press figures with the senior man in a press-crew.[33] This tells us that a press figure did not identify a press-crew or a press-man, but more likely identified a press, thereby suggesting a degree of 'ownership' of an individual press by a senior man in a press-crew. In the 1772 Large Quarto Bible we find press figures from 1 to 9, suggesting nine presses; an average of eight press-crews were paid each week at that time, which lends support to the proposition.

Secondly, establishing the chronological order in which formes were printed can be important for establishing the order in which textual corrections were made.[34] Was there a preference at the Oxford Bible Press for printing the inner or outer

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[32] R. W. Chapman, 'Printing with figures', *The Library*, s4-III(3) (1922), 175–76. Philip Gaskell, 'Eighteenth-century press numbers, their use and usefulness', *The Library*, s5-IV(4) (1950), 249–61. William B. Todd, 'Observations on the incidence and interpretation of press-figures', *Studies in bibliography*, 3 (1950/1951), 171–206. K. Povey, 'A century of press-figures', *The Library*, s5-XIV(4) (1959), 251–73. D. F. McKenzie, 'Press-figures: a case-history of 1701–1703', *Transactions of Cambridge Bibliographical Society*, 3 (1959), 32–46. J. D. Fleeman, 'William Somervile's "The Chace," 1735', *Papers of the Bibliographical Society of America*, 58 (1964), 1–7.

[33] Ould 2019d: 35–40.

[34] See for example Peter W. M. Blayney, *The texts of King Lear and their origins*, 1 (Cambridge: Cambridge University Press, 2007), pp. 89–91.

forme of a sheet first? Given that composition was by formes and that sheets could be printed in any order, there would have been no reason for a preference. Indeed I found that it was essentially random, with the two possibilities occurring with equal frequency.[35] However, as the Bible Press was in the reprint business, my observation cannot be compared with printing houses such as that at Cambridge where new texts were the order of the day.

2.4 Using network mapping to understand organisational flows

Much further analysis could be done from the two Bible Bill Book spreadsheets as they stand. Concurrent printing was clearly normal at the Bible Press. It would be interesting to relate the composition of sheets to their printing on a time axis and thereby to explore the amount and nature of that concurrent printing. Hitherto I have examined the flow from composition to printing only for individual works. However, I have carried out one analysis using the NodeXL add-on to Excel, a tool that is intended for the analysis of social networks – see section 4.4 below. This tool could be used further to explore the way that concurrent printing operated at the Bible Press.

[35] Ould 2019d: 36.

3 The operation of Oxford's Learned Press compared with that of the Cambridge Press and of other major printing houses of the time

In this chapter I explore the differences and similarities that my research exposes in the progress and operation of the Oxford and Cambridge Presses following their establishment in the latter half of the seventeenth century, and I trace them back to the differences and similarities to be found in the way the two universities perceived their respective printing houses. I show how their different perceptions led to different strategies for the acquisition of premises, printing type, and paper to print on. Finally, I contrast my findings about the printing process at the Learned Press with, in particular, McKenzie's about the Cambridge Press and challenge some of McKenzie's assertions on pay rates.

3.1 A comparison of the approaches of each institution to the management of its printing house

Until the end of the seventeenth century Cambridge University had no interest in being a publisher, no interest in printing scholarly works, and no interest in owning the place or means of production. As McKitterick puts it, '[t]hough it published a few books, the Press was established in 1698 primarily as a printer. It remained so until the end of the eighteenth century and even beyond.'[36] Moreover subsequent to its founding under Richard Bentley, the Cambridge Press minimally possessed a printing house and some type. By contrast, certainly from the time of Archbishop Laud onwards, Oxford University saw itself as a promoter of scholarship through the printing and sale of books; although initially relying like Cambridge on town printers, in 1672 it founded, under the management (and effective

[36] McKitterick 1998: 173.

ownership) of John Fell and Thomas Yate, an Oxford Press that would be a publisher and a printer that also sold printing services to others to support that aim.[37]

This difference in strategy generated the differences I identify below in their respective attitudes to capital expenditure on their main assets (premises and type), and their different attitudes to commercial gain and the promotion of scholarship demanded a different business model (as we might call it today). With its ambition to be a scholarly press Oxford was obliged to find ways to finance the production of its expensive publications; this included licensing the printing of certain classes of book to others and selling its printing services to authors and editors who would in some way underwrite their books themselves.[38] This was an obligation that Cambridge simply side-stepped.

Whilst both John Fell's Press and Richard Bentley's Press quickly got to grips with the production side of a printing establishment, neither initially fully appreciated the sales and marketing side and the challenges it would present. McKitterick tells us that Bentley 'showed no inkling of the realities of publishing', regarding his Press as just 'an arrangement between scholarship, printers and the University' – no mention of booksellers, 'an afterthought'.[39] In suggesting a parallel with the Oxford Press under Fell, McKitterick quotes Fell's early ambition for 'a press freed from mercenary artifices, which will serve not so much to make profits for the booksellers as to further the interests and convenience of scholars'[40] and Delegate Arthur Charlett's later admission that 'the vending of books we never could compasse'.[41]

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[37] 'Fell's Press' in Carter 1975.

[38] In the event, the Learned Press became more printer-for-hire than publisher: over the period 1690 to 1780, for every one title printed as a Delegates' book seven were printed for others.

[39] McKitterick 1998: 50.

[40] Carter's translation from Vossius's Latin (Carter 1975: 61).

[41] Carter 1975: 61. Arthur Charlett (1655–1722) was Master of University College at the time of his writing (1718).

But should we be as hard on Oxford as on Cambridge? Placing scholars before booksellers does not deny the need for profitability. Moreover, my detailed analysis of fourteen manuscripts principally from Yate's hand in the early 1670s has shown that, by exploring the finances of printing large editions of school-books to sell in bulk to the Stationers' Company as a way of sustaining a learned Press publishing scholarly works, Yate was able to demonstrate that the proposed compact with the Stationers' Company would have been, to use Carter's word, 'disastrous'.[42] Oxford was simply not able to produce school-books sufficiently cheaply – but Fell and partners had at least done their homework and after six months they abandoned the idea, accepting instead an annual payment from the Stationers for forbearing to print the privileged books except the bible. Although the evidence of Oxford's failure to underpin scholarly publishing with fast-selling cheap editions was there to be seen, Bentley made no proposals for the financing of his Press, save support from the University Chest and income from booksellers, and he showed no knowledge of how long it took to sell books, especially in an academic market where books sold slowly.[43]

After early enthusiasm both Presses subsequently suffered a decline in the first half of the eighteenth century as their respective senior managements lost interest and ceded control to their overseers. At Oxford, the printing house was taken over by Warehouse-keeper Stephen Richardson and his family.[44] No-one had the responsibility of acting as publisher: 'The publishing business merely existed: it was neither managed nor promoted.'[45] At Cambridge, management of the printing house ended up entirely in the hands of its manager Cornelius Crownfield, but by the 1730s his energies were declining as was the Senate's and the Curators' interest

[42] Ould 2019b.
[43] McKitterick 1998: 50.
[44] 'The Warehouse-keeper' in Ould 2015a: 63–70.
[45] Feather 2013: 260.

in the Press. Covenants of forbearance with the Stationers' Company in 1706 and 1726 took away the possibility of subsidising scholarly publications by printing marketable school-books.[46]

Both Presses had subsequently to be rescued and given fresh motivation, Oxford by William Blackstone and Cambridge by William Richardson, each institution once more then taking control of the process, finding and securing its place in the overall book trade. At Oxford, in 1758 Blackstone put local bookseller Daniel Prince in place as Warehouse-keeper, instituted a formal costing scheme and more detailed annual accounts, led the Delegates to a greater interest in the quality of the output of their Press as well as a purge of the stock-room,[47] and, through Prince, established stronger links with the London book trade.[48] At Cambridge, in 1741 a report into the state of the Press there found 'great disorder and confusion', with but three men partially employed at two presses. Action was taken: the type was refreshed, presses replaced, and men recruited.[49] It was at these nexus points that the two Presses finally became operations on a par with their London competitors, their initial naivety now replaced by a degree of professionalism and business acumen.

Both Presses evidently recognised that their books would need to stand comparison with the best from continental Europe, in particular Holland and France, and this steered their sourcing of men, type, and paper. Fell was certainly familiar with and influenced by the printed quality of the output of the Imprimerie Royale du Louvre in Paris and of the Dutch printing houses.[50] Cambridge was similarly motivated: writing of Crownfield's purchase of types from Holland, McKitterick observes it was 'an acknowledgement that if the Press was to succeed it must do so

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[46] McKenzie 1966a: 94–97.
[47] Ould 2015a: 68–70.
[48] Feather 2013: 276.
[49] McKitterick 1998: 133.
[50] Gadd 2013b: 613.

in an international context; and thus with materials that would bear comparison with those overseas.'[51] At the time that the two Presses started, England could not provide the skills or materials of the necessary quality to match those available to Presses in continental Europe, particularly compositors (especially those able to set Greek, Hebrew, and other 'exotics'), type-founders, and engravers, as well as quality paper and type. Consequently, as I describe below, both turned to continental Europe to fill the gaps. Firstly though, I look at where the work was done and compare the approaches of Oxford and Cambridge.

3.2 The acquisition and use of the premises of a printing house

My research points up the difference in self-perception of the Oxford and Cambridge Presses as evidenced by how they regarded the venues for their respective printing houses: Oxford always placed its printing house amongst its other important buildings – the Theatre, Library, and Schools – even though in one instance it was a relatively humble wooden building.

McKitterick makes it clear that, up to the lapse of the Licensing Act in 1695, Cambridge was content to see the printing activities that it licensed out to printers take place in everyday buildings around the town.[52] In 1696 it recognised the need for its Press to have its own buildings, 'to have a Presse once more erected at Cambridge', but initially that amounted only to a rebuilding and repurposing of a small theatre belonging to Queens' College. In his detailed description of the sites and layouts of the Cambridge Press's homes in the period 1696–1712, McKenzie demonstrates that the University showed no desire for grand presence for its two-storey printing house, settling for brick and wood rather than ashlar, and in 1707 it moved to the larger printing house previously used by printer John Hayes, a space that

[51] McKitterick 1998: 68.
[52] McKitterick 1992.

had accommodated six presses.[53] Then from the 1760s the Press bought undistinguished buildings on the other side of Silver Street, merely 'converted inn buildings' lacking 'topographical prominence'.[54]

In my publications I chronicle the three buildings occupied by the Oxford Press: the grand but inappropriate Sheldonian Theatre, the modest but centrally placed group of specially constructed wooden buildings next to the Theatre, and finally the grand and purpose-built Clarendon Building.[55] The final move positioned it firmly in the world of scholarship, both physically and metaphorically, a degree of stature that the Cambridge Press would not achieve until its move to the gothic Pitt Building at the head of Silver Street in 1833, three years after the Oxford Press had moved once more to the purpose-built classical premises in Walton Street that are still its home.

Indeed none of the Cambridge Press's homes had the architectural or geographical stature possessed by the Sheldonian Theatre or the Clarendon Building. Should we recognise this as a symptom of the lesser esteem in which the Cambridge Curators held their Press compared to the Oxford Delegates, or was it simply greater pragmatism? As Cambridge did not see itself as a publisher, being content merely to collect rent in some form from its asset, a trophy building was not on its agenda, in stark contrast to Oxford's attitude. There had earlier been an ambition at Cambridge for 'topographical prominence', a printing house alongside the University Library (then in the Old Schools) and the Senate House, but it took forty years to do something about it with the move to Silver Street.

In my publications I identify the requirements for a rationally disposed printing house: in summary, space(s) for the different activities and the possibility of

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[53] 'Sites and buildings' in McKenzie 1966a: 16–35.
[54] McKitterick 1998: 142.
[55] Ould 2013a: 195–202, and 'Premises' in Ould 2015a: 9–59.

smooth flow between them.[56] We can contrast the opportunistic yet flawed and short-lived decision at Oxford to adopt the lavish Sheldonian Theatre as the first home for its Press with Cambridge's lower-key redevelopment of an existing building, and note the greater flexibility in spaces that Cambridge achieved over Oxford.

The Sheldonian Theatre proved an impractical space for Oxford's printing house and it was vacated after just three years.[57] Following this false start, the Press's second home, the 'New Print-house', was modest but it had hearths and glazed windows and evidently worked satisfactorily as a building for forty years; and, being built for the sole use of the Press, it was no doubt laid out exactly as necessary for the flow of work.[58] Hawksmoor's symmetrical layout for the Oxford Press's third home, the Clarendon Building, was designed to accommodate two separate Presses, the Learned Press and the Bible Press, and it proved rational enough in its format and positioning of spaces until the combined Oxford University Press moved to much larger premises on Walton Street in 1830.[59]

Oxford's poor initial choice of premises for its new Press should have been the clear lesson to Cambridge, two decades later, that a dedicated, structured space was to be preferred. Thus it was that a custom-built home – the repurposed and adapted 'stage-house' – proved the right initial solution for Cambridge, as it was in Oxford at the second and third attempts. McKenzie's forensic deduction of the layout reveals a building to a degree constrained in its structure by being an adaptation of a pre-existing building, but also a building with separate rooms specifically intended for those distinct production steps and following a rational plan.[60] The Cambridge Press's move in 1707 to the vacated printing house that had

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[56] 'Premises' in Ould 2015a: 9–59.
[57] 'The Sheldonian Theatre' in Ould 2015a: 11–26.
[58] 'Little Print-house' and 'New Print-house' in Ould 2015a: 26–34.
[59] 'The Clarendon Building' in Ould 2015a: 34–55.
[60] 'Sites and buildings' in McKenzie 1966a: 16–35, in particular p. 19.

previously been operated by Hayes for the Stationers presented them with a yet larger space that sufficed for composition and presswork for a century, but one that differed considerably in being 'one enormous room in which composition and presswork were both carried on, and another above where the sheets might be dried and stored', a flexible scheme that McKenzie refers to as the 'continental style'.[61]

The Presses at Oxford and Cambridge both operated on what was a significant scale for the time, with large premises to accommodate their work. Whilst the Cambridge Press was able to increase its floor space as its needs determined, my research shows that Oxford was relatively constrained by a fixed, isolated building in each of its three homes and at times was forced to borrow space in neighbouring buildings for some activities, in particular the drying of sheets.

I now examine how the scale of activity varied for all three printing houses and correlate that with the size of the premises they occupied over the years, using as a metric of the size of a printing house the number of presses it possessed. (Of course it is possible to have any number of presses yet to do no printing.) This allows comparison with a major trade printing house in London which operated between 1720 and 1761, that of Samuel Richardson whose set-up was on a similar scale to that of the Bible Press.

My research shows that the Learned Press had at its disposal five presses at the outset, later rising to seven but falling back to six by 1794.[62] Once established by Fell, the Press essentially stood still, its annual output varying between just ten and twenty books each year. This constancy is reflected in the long-term occupation of the Press's two homes during the period: the New Print-house and the Clarendon Building. That said, my research also shows that, given its physical

[61] McKenzie 1966a: 31.
[62] Ould 2019a: 71–73.

constraints, the Press was still forced to use other spaces for warehousing: once installed in the Clarendon Building it used the basement of the Sheldonian Theatre, by then vacated by all printers, for storing gathered sheets; no doubt it had done the same during its four decades of residence in the New Print-house.[63]

The Bible Press flourished while the Learned Press languished, the former having a more certain and expanding market for its output. My research shows that it doubled in size between the start and end of our period. When John Fell and Company first leased the bible privilege to others in 1678, the lessees were obliged to put at least four presses to work.[64] As the production of bibles and prayer books took off, more presses were needed and I have shown that there is good evidence that by the 1770s there were nine presses available on the Bible Side of the Clarendon Building.[65] As with the Learned Press, whilst the Clarendon Building could provide sufficient working space for the compositors and press-crews of the Bible Press, storage space was in short supply and a house at the west end of Holywell Street[66] held the overflow of tens of thousands of bibles and prayer books before they could be transported to London, where there was later a bible warehouse in Paternoster Row. Moreover, rooms in the Schools Quadrangle had to be commandeered for drying the sheets before gathering.[67]

McKenzie tells us that by 1702 the Cambridge Press had four presses, and that this number was not exceeded until 1740.[68] McKitterick notes that by 1746 press figures 1 to 4 appear in books, by 1758 1 to 5, and by 1764 1 to 7.[69] Equating press figures with the actual number of available presses we see the Cambridge Press

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[63] 'Warehousing' in Ould 2019a: 130–35.
[64] Mandelbrote 2013: 489–90.
[65] Ould 2019d: 35–39.
[66] 'Where the Indian Institute now stands', now Oxford Martin School.
[67] Madan 1908: 15.
[68] McKenzie 1966a: 43–44.
[69] McKitterick 1998: 140.

Press almost doubling in size. Coinciding with this need for more presses naturally came a need for more space, a need satisfied by the acquisition of further premises on Silver Street. In contrast to Oxford, the Cambridge Press had greater flexibility and was able to solve the problem of increasing demand for space by accumulating buildings.[70] The Cambridge Press was therefore like the Oxford Bible Press in that its output of bibles and prayer books – its principal business – increased as the decades passed, with a resultant increasing demand for drying areas and storage.

Another large-scale printer, Samuel Richardson ran his printing firm in the Salisbury Court area of London, very close to St Bride's Church.[71] He ran a successful, growing business, and was not deflected by a desire for prestigious premises. Maslen uses the press figures in Richardson's books to deduce that in the 1730s he had five presses, in 1740s eight, and in the 1750s nine,[72] putting it on a par with the Oxford Bible Press for size. With the comparative luxury of operating in the environs of Fleet Street, by 1753 his printing activities, including warehousing, were spread over three locations. In 1756 he moved to yet larger premises and rented 'a Court of Houses, Eight in Number, which were ready to fall, [...] pulled them down, and on new Foundations, [...] built a most commodious Printing-Office'.

Summary

Richardson's Press in London effectively doubled in size in three decades, an increase that was flexibly managed by purchasing ever larger premises in the area. This was an option also open to and adopted by Cambridge. Neither of those Presses was concerned with prestige location or grandeur in its premises. The Learned Press, seemingly more concerned to make a statement, remained locked in grand buildings on prime sites, one of which – the Clarendon Building – had

[70] McKitterick 1998: 22, 141–42.
[71] Sale 1950: 1.
[72] Maslen 2001: 10.

nevertheless been purpose-built, while the Bible Press was forced to spread from the Clarendon Building into neighbouring buildings as best it could.

3.3 The acquisition and use of type

My research exposes the difference in the approaches adopted by the Presses in Oxford and Cambridge to the acquisition of type, considered from three aspects: range, convenience, and aesthetics. Once again, the difference in approach derives from the Presses' self-perceptions. Oxford always had the more extensive range of types, but I raise here the question as to the actual value of that range to its operation, given that Cambridge managed with a smaller armoury. My research shows how the radically different approaches that Oxford and Cambridge used to obtain type affected the ease with which they could build and maintain their respective type inventories. A shared goal of quality in their books led both Presses to look for the best types with which to print them, and because of the poor quality of English type both initially looked to Holland for their type; there is also a time dimension to the aesthetics: during the period concerned there was a major shift in fashion in the typefaces used in English printing,[73] and I demonstrate that, because of its unconventional approach to obtaining type, Oxford was less able to move as fashion changed.

Range

From Laud onwards, senior figures at Oxford were determined that their Press should have a full armoury of types available for scholarly printing, an ambition seemingly not shared by Cambridge; Fell in particular recognised the capabilities of the great Imprimerie Royale in Paris and the Sacra Congregatio de Propaganda

[73] 'The rise of William Caslon [. . .] stopped the importation of Dutch types; and so changed the history of English type-cutting, that after his appearance the types used in England were most of them cut by Caslon himself.' (Updike 1937: 100)

Fide in Rome. Whilst the Cambridge Press was content to limit its range of types initially to romans and italics, later purchasing Hebrew, Arabic, and Greek only when required, by 1706 the Oxford Press had established a range of types in a range of sizes that was the equal of any in Europe.[74]

Until the creation of their Press in 1696, the Cambridge Curators would have had little interest in type – this was simply a matter for the licensed printers in the town: books from Cambridge were restricted to the scripts for which those printers possessed founts, typically romans, italics, and some Greeks. That year Richard Bentley was given the task of obtaining type for the new Press. During time previously spent in Oxford,[75] he had witnessed the work of the Oxford Press in the hands of Fell's successors and had seen their adoption of Dutch types. Once back in Cambridge he delegated his task to Dutchman Cornelius Crownfield (Cronefelt) who was quick to place orders for the necessary romans and italics in Holland.[76]

Even in the years immediately following 1696 the Cambridge Curators evidently saw no immediate need to build an inventory of exotics like that at Oxford; type for Hebrew was not bought until 1709 (from Holland) and 1711 (from the Grover foundry in London). And it was not until 1729 that they acquired a small fount of Caslon's English Arabic cut five years earlier, and even that was a present that would be little used beyond some Verses.[77] But we should ask: realistically, how great was the call for a fount of Samaritan? The different priorities that the Oxford and Cambridge Presses gave to the acquisition of exotics raise two questions.

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[74] '1693–1706: The first three Specimens and the status quo' in Ould 2018: 93–94. Carter reckons that 'only the printing-office at Rome of the Sacra Congregatio de Propaganda Fide outdid Oxford for the number of languages that it could print.' (Carter 1975: 127)

[75] Bentley was involved with Oxford's 1691 edition of Malalas's history.

[76] McKenzie 1966a: 36–37, 52. Also Reed 1974: 226–28.

[77] McKenzie and Ross 1968: 32, note 11; McKitterick 1998: 116–17.

Firstly, was Cambridge's relative indifference to the possession of exotics a by-product of its disinclination to be a scholarly publisher? A decent range of romans and italics was of course mandatory, and some Greeks a bonus, and these the Cambridge Press maintained throughout. But why invest in a fount of Samaritan if the return would not be to the University, and its customers were not demanding such types? Where an exotic fount was not available, a work-around could sometimes be employed.[78] Until Caslon could supply a full range of exotics in the early 1730s, Cambridge would have had to have imported such types from the Continent at considerable expense if it was to avoid the relatively poor versions available in London. Its later concentration on bibles and prayer books made the possession of exotics ever more nugatory.

Secondly, what was the value of Oxford's range of exotics to its publishing ambitions? Fell's publishing programme, drawn up in 1672, immediately pointed to the need for Coptic and Syriac.[79] A range of Greek, Hebrew, and Arabic in suitable sizes was unavoidable for printing biblical studies, and founts of Samaritan and Armenian also potentially had their place. However, if we set aside the exhibitionism displayed in gratulatory Verses,[80] in the event the answer to the question is 'very little'. In my publications I identify the rare occasions on which Oxford's founts of Anglo-Saxon, Gothic, Runic, Cyrillic, Coptic, Armenian, Samaritan, Syriac, and Ethiopic were used, always in highly specialist and unusual publications.[81]

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[78] A poem in Ethiopic for verses on the death of Queen Anne in 1714 was printed in Hebrew. (In comparison, Oxford was able to use its great primer Ethiopic in its Verses on death of Queen Mary in 1695.)

[79] All Souls MS 239a is transcribed at Carter 1967: 63.

[80] The 1695 *Pietas* contained verses by Bernard in Latin, Arabic, Syriac, Ethiopic, Coptic, and Samaritan.

[81] Ould 2018.

Convenience

My research reveals the detail of the Oxford Press's approach to the acquisition of type, an approach that was radically different from that at Cambridge. Preferring to own the means of production and thereby acquire independence from London type-founders, yet mindful of the need for quality, the Oxford Press under Fell established its own type foundry, employed its own type-founder and punch-cutter (initially all Dutchmen), and acquired from Holland the necessary punches and matrices.[82] Oxford's type foundry stayed in operation until 1733 and the Press only turned to buying in type from Caslon in the 1740s.[83]

The Cambridge Press followed the normal practice for an English printing house in the seventeenth and eighteenth centuries and bought its type from typefounders. Prior to the establishment of the Cambridge Press in 1696, Cambridge University had no interest in acquiring type – that was solely a matter for the printers who printed under licence from the University. Thereafter, needing its own type for its own presses, it bought from typefounders, though for reasons of quality it was in the first instance necessary to go to Dutch typefounders and import from them. As they became available, Caslon's types were generally quickly taken up in the early 1730s,[84] with Cambridge switching from Dutch types in the late 1730s as revealed by a specimen they published.[85] Caslon remained Cambridge's supplier for the full range of text type sizes into the 1780s. As the market in the country began to open up in the mid-1700s the Press also bought founts of the smaller text sizes from (cheaper) Scottish typefounders for printing the thousands of bibles that

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[82] Ould 2018: 35–83.

[83] '1733–1780: Type from Caslon' in Ould 2018: 103–21.

[84] Mosley 1967: 79–80.`

[85] Figure 10 in McKitterick 1998: 134, who says *c.* 1740. See also 'Typography at the Cambridge University Press, *c.* 1700' in Johnson, A. F., *Selected essays on books and printing* (Amsterdam: Van Gendt, 1970).

had become the bread-and-butter work of the Press.[86]

Aesthetics

At the time of their establishment, both the Oxford Press and the Cambridge Press recognised the quality of Dutch types, and when fashion – and the quality of English type – changed they followed it back to English typefounders. Caslon offered a range of sizes of romans and italics cut by the same hand, with an evenness of design that thereby brought an evenness to the page and an individual, English style.[87]

The fact that Caslon's types were taken up quickly by the Cambridge Press in the late 1720s and early 1730s shows that Cambridge was in a position to adopt the newly fashionable as soon as it was available, making the switch from the more expensive – and now out-dated – types from Holland.

My research shows that Oxford, meanwhile, made no major purchase from Caslon until 1742, more than a decade after Cambridge. In the last five years of typefounder Sylvester Andrews's work as a supplier to the Oxford Press, he had cast significant founts from the Press's own matrices so that by the time of his departure in 1733 its cases were adequately stocked.[88] Oxford's only recorded dealings with Caslon between 1733 and 1742 were to supply shortages in existing founts from their own matrices. Once Caslon had been adopted as the new supplier there was a gradual switch in Oxford books from seventeenth-century types to eighteenth-century,

The pros and cons of the Oxford and Cambridge approaches to type

Once Cambridge and Oxford had turned to English typefounders for their type

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[86] McKitterick 1998: 219–20.

[87] Something that Carter said robbed Oxford's books of 'a distinct character' (Carter 1975: 320).

[88] '1703–1733: Type-founder Andrews' in Ould 2018: 95–102.

they were on an equal footing (save that Oxford continued to have its type cast at 'Oxford height'). Before then, their situations were far from equal. My research identifies six areas where the Oxford Learned Press was at a relative advantage or disadvantage to the Cambridge Press.

1. Both strategies – buying type directly from Dutch founders, and building an in-house type foundry – were more expensive than simply buying (poor) type from London founders. Comparison of McKenzie's calculation of the price paid by Cambridge with my findings shows that Cambridge paid more for its type from Holland than Oxford from its own foundry, though both ended up with Dutch type.[89]
2. Possessing both matrices and its own type foundry, Oxford could renew its type more easily and fill any gaps that arose. Employing its own punch-cutter meant that it was also able to have new faces cut. Having bought founts of type from Dutch founders, Cambridge became a captive buyer and was forced to return to them whenever it needed replacement founts or additional sorts for its founts.
3. Equally, Oxford's strategy meant that, having invested in the staff and facilities of a type foundry, together with sets of matrices and punches, it must have felt obliged to stick with the old-style typefaces that those materials implied for longer than Cambridge; only some years after the closure of its own foundry in 1733 did it turn to Caslon. Meanwhile, although it too had started out with Dutch type, Cambridge was able to turn to English typefounders and their more fashionable typefaces much earlier.
4. Oxford had the more difficult task in initially equipping itself.[90] Dutch type founders were naturally happy to sell type, but by selling matrices – the means

[89] McKenzie 1966a: 38. '1703–1733: type-founder Andrews' in Ould 2018: 95–102.
[90] '1669–1672: the search for type on the Continent' in Ould 2018: 35–54.

of making type – they would be doing themselves out of possible future income, and by selling punches they relinquished the typeface completely. By contrast, Cambridge was able to build an inventory of good Dutch type in short order, by simply buying it from the foundries.

5. Possessing Dutch matrices was no guarantee to Oxford of quality type: Reed asserts that in the hands of English typefounders bad castings were to be had from any matrices.[91] However, Fell's solution was to bring Dutch typefounders over to Oxford to cast from their matrices.
6. Having one's own punch cutter was in part a luxury but, for Oxford, it was also a necessity. The continued use of a set of matrices brought with it the need to be able to maintain those matrices: they would not last forever and if, as was the case for most of the typefaces for which it had bought matrices, Oxford did not have the punches, it would be necessary to cut that punch to make a replacement matrix. Possessing matrices means employing a punch-cutter. This was not a problem that faced Cambridge.

Summary

In summary, my research shows that whilst establishing its own foundry was a major exercise for the Oxford Press, financially as well as logistically, there were long-term advantages to it over the Cambridge Press's conventional approach of purchasing from typefounders, until Caslon appeared on the English scene at which point Oxford was left committed to less fashionable type for some years.

3.4 The acquisition and use of paper

Paper was invariably the major cost in printing a book. Where a book was to be printed for a bookseller or author, that person would supply the printer with the requisite paper, the printer thereby avoiding a major call on cash; the Oxford

[91] Reed 1974: 229.

Learned Press used this route when printing Authors' books. Where the printer was printing in their own right they generally went to a London wholesaler or occasionally directly to a mill; this was the case for the Oxford Bible Press and for the Learned Press when printing Delegates' books. My research shows that the Learned Press's experience in acquiring paper parallels that of Cambridge and other large printing houses of the time.

Where did their paper come from?

Bidwell notes that '[a]t the beginning of the [eighteenth] century, printers and publishers still depended on imports [of paper] from Italy and Holland.'[92] Though started nearly three decades apart, at their respective inceptions the Oxford and Cambridge Presses shared the challenge presented by the poor quality of English paper-making at the time and the resulting imperative to turn to continental Europe for printing paper of an adequate quality. They were also both unfortunate with timing: war affected the importation of paper.

The correspondence to Fell from his partner Thomas Yate (who took responsibility for sourcing suitable papers for the new Press's publications) reveals how Yate was forced to buy what paper was available, as there was little standing in warehouses awaiting a buyer.[93] In its early days however Cambridge printed little for itself and hence simply relied on 'undertakers' to supply the paper for their works. By the early 1690s the market had improved sufficiently for the Learned Press to be able to buy paper on a title-by-title basis, a practice that continued until the late 1770s,[94] and one that was followed by Cambridge and other major presses when buying for themselves.

From about 1700 on, despite an increasingly burdensome tax regime applied to

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[92] Bidwell 2009: 201.
[93] 'Paper' in Ould 2015a: 76–142, Ould 2015b.
[94] '1690–1772: Paper stocks in the Warehouse' in Ould 2015a: 130–38.

imported goods including paper,[95] continental Europe continued to supply Oxford and Cambridge. Between 1699 and 1764 there are just a handful of entries in the Oxford Warehouse-keeper's paper inventories naming the country of origin: for example, Dutch, English, and Genoese demy was bought in 1699. However, the ever-increasing cost of foreign paper gave English paper-makers the motivation to improve their standards and claim a greater share of the market-place, so that between 1764 and the end of our period I found no evidence at Oxford of any imported paper.[96] Bidwell observes that in the 1730s 'English papermakers began to hold their own against foreign competition'; indeed by the 1730s the ledgers of Ackers and Bowyer 'gradually ceased to specify foreign and domestic varieties', which Bidwell sees as a signal that it was no longer necessary 'to designate quality by place of origin' and hence that English papers sufficed.[97]

When the Cambridge Press printed the privileged books under its own imprint it preferred to order only such paper as was immediately required, and so suppliers could not always satisfy with a single batch from a mill. It also ordered from the London wholesalers but not from mills directly, except in 1757 onwards when some orders were placed with local paper mills.[98] Oxford did buy some paper directly from the local Wolvercote mill until 1738 but it relied mostly on London wholesalers.

In the latter part of our period, the management of both the Oxford Press and the Cambridge Press began to take a greater interest in the quality of the paper they were buying for their own books: in 1766 the Cambridge Syndics requested samples from three wholesalers for a printing of the bible; in 1760 the Oxford Delegates, now more attentive following Blackstone's shake-up of the Learned Press a

[95] '1700–1780: War and the taxes on paper – an aside' in Ould 2015a: 108–11.
[96] '1699–1780: Where did the paper come from?' in Ould 2015a: 129–30.
[97] Bidwell 2009: 201–02.
[98] McKitterick 1998: 136.

few years previously, also requested samples before selecting a paper and a supplier for a new edition of *Marmora Oxoniensia*.[99]

Near the end of the period, a change in purchasing policy occurred at Oxford that does not appear to have been adopted by other Presses, a change that suggests that cash-flow had become less of a concern. By 1778 the Delegates had observed differences between batches of paper 'which has of late in some degree tarnished the beauty of our most elegant editions';[100] a forthcoming edition of Cicero was no doubt in their mind. They decided that in order to maintain quality and colour across batches they would maintain stocks of regularly used papers, and after two rounds of competitive bidding a shortlist of three preferred suppliers was drawn up. Stocks were then bought in that could be drawn on, principally for Delegates' books requiring large quantities over a long period, but also for customers of the Press to whom the Delegates hoped to sell at a competitive price – the Delegates effectively sought to become a wholesaler to local authors and booksellers having their books printed at the Press.[101]

The cost of paper

Whereas McKenzie is able to give only a handful of prices for paper (as books printed by Cambridge were for undertakers who supplied their own paper) I have been able to extract considerable detail on paper prices from the Press accounts.[102] We do know, however, that the demy for Cambridge's printing of Newton's *Philosophiæ naturalis principia mathematica* cost 11*s*. a ream[103] and this was typical of the price paid by Oxford at the same time. However, to the cost of the paper itself the buyer had to add the cost of transporting it from the wholesaler's premises in

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[99] Ould 2015a: 125.
[100] Oxford University Press, Orders of the Delegates (9 April 1778).
[101] Ould 2015a: 126–28.
[102] 'Paper' in Ould 2015a: 76–142.
[103] McKenzie 1966a: 144.

London and in this respect the Oxford and Cambridge Presses differed. The Cambridge Press was forced to pay *2s. 6d.* a hundredweight for cartage from London in the period of which McKenzie has written.[104] My research shows that the Oxford Presses had the advantage of being able to bring paper up from London by barge on the Thames at about a third of that price, resorting to cartage only when speed was important or the quantity small.[105] Cambridge consequently paid around ten per cent more than Oxford for its paper; even though the Cambridge Press rarely bought paper itself, it was an extra cost to authors.

Summary

Oxford's experience in procuring paper for its publications was shared by Cambridge and other leading printing houses, needing to import from continental Europe until such time as English paper-makers could produce a paper of satisfactory quality. Thanks to its proximity to the Thames, Oxford paid a little less for its paper.

3.5 Printing-house practice

Composition

We have no reason to believe that the process of composing type at Oxford differed from that at any other printing house of the time. However, we might expect differences in the rate that was paid for composition. McKenzie makes assertions regarding the cost of composition from his analysis of the Cambridge records, assertions that can be examined in the light of my findings of Oxford's practice and my three decades' experience in hand-setting and printing type. (An extended discussion is being prepared for submission for publication in the *Journal of the Printing Historical Society*.)

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[104] McKenzie 1966a: 152.
[105] 'Transporting paper to the Press' in Ould 2015a: 138–42.

Below I use the word 'setting' for the act of assembling sorts in the composing stick, and the word 'composition' for the entire process of setting, imposing, correcting, and distributing by the compositor – the process for which a per-sheet rate of pay was typically set for each book.

'A normal standard payment'

McKenzie characterises a 'normal standard payment' for composition at Cambridge at the turn of the eighteenth century as 'almost, but not quite, 4*d.* for 1000 Pica ens of English text in octavo with or without a scatter of notes.'[106] (An en is being used as the equivalent of the width of an average letter and hence a proxy for the number of sorts to be set.)

When Blackstone put in place his table-driven rates scheme[107] at Oxford half a century later, the rate he set for composing a sheet depended on its imposition (folio, quarto, etc.), the type size (great primer, English, etc.), and page size (labelled I to V). His calculations were in terms of the number of letters set. For each page size in each type size, the number of letters per line and the number of lines per page are specified. Reverse engineering his table I deduce that Blackstone assumed a standard 'price per letters' of 4.1*d.* per thousand letters and then an 'allowance at Oxford' of 5*d.*, a rate that applied to *all combinations* of page size, imposition, and type size from great primer to brevier. In other words the compositor was paid the same for picking *a thousand letters* no matter what the imposition, type size, or page size, though naturally, following the calculation, the rate he received for *a sheet* varied accordingly, from 2*s.* to 27*s.* – the larger the type the lower the sheet rate as fewer sorts needed to be picked to fill the sheet. London printer Samuel Richardson's 'Antient rules' of 1748/9 used the same 4*d.*/1000 letters rate (or slightly better).[108]

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[106] McKenzie 1966a: 79.
[107] Ould 2019a: 30–33.
[108] Philip 1957: 124–26. Richardson worked in terms of ems rather than ens or letters.

In summary, for 'standard' settings the 4*d.*/1000 rate can therefore be seen as a universal datum for composition across Presses and the period. My research and printing experience then allow me to examine McKenzie's claims regarding the effect on that rate of three factors: setting large type, the presence of woodcuts, and the presence of footnotes.

In what follows, the /1000 rate is in terms of *ens of the fount* rather than letters; this is the metric used by McKenzie. I have calculated the figure for Cambridge books using the em counts and line counts in McKenzie's bibliography.[109] Item numbers below refer to books in that bibliography.

The effect of setting large type

McKenzie asserts that, in Cambridge in the early 1700s, large sheet formats in large type 'involved more frequent justification, making-up, imposition, and correction', and hence incurred 'apparently quite disproportionally high rates' for a sheet of double pica or great primer (the two largest text sizes).[110] To test his assertion I have here analysed the eighty-seven books listed in his bibliography that are 'uncomplicated' in that they are set only in roman and italic (perhaps save for the odd note in Greek), do not have double column notes (see below), and for which McKenzie gives us the necessary parameters.

All but eleven of the eighty-seven have a /1000 rate less than 7*d.* Those eleven are precisely the books whose main text is set in great primer or in double pica.[111] The other seventy-six, set in English to brevier, lie between 6½*d.* and 3¼*d.* with a median of 4½*d.* These figures confirm McKenzie's assertion of the 'apparently

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[109] Appendix 1 of McKenzie 1966a.

[110] McKenzie 1966a: 77.

[111] Set in great primer: Leng's 1699 Sermon (item 8), 1700 Verses *Threnodia academiæ cantabrigiensis* […] (item 38), 1702 Verses *Academiæ cantabrigiensis carmina* (item 74), 1713 *Verses epicedium cantabrigiense* […] (item 203). Set in double pica: 1699 Horace (item 4), 1701 Virgil (item 6), 1701 Terence (item 10), 1702 Catullus (item 28), St John's 1705 *Quatuor orationes* (item 127), Bouchery's 1706 *Hymnus sacer* (item 153), Ockley's 1712 *Oratio inauguralis* (item 266).

quite disproportionally high rates' for a sheet of double pica or great primer. It can also be shown that higher rates are also paid for smaller types than pica and smaller pages than quarto. McKenzie's evidence shows that at this point in time at Cambridge pay rates were negotiated individually for each book, as they were at the Oxford Learned Press. This would explain the variation even for 'regular' settings.

The effect of the presence of woodcuts

McKenzie asserts that the presence of woodcuts (a) in some cases 'put the rate per 1000 ens up from about 4*d.* to 6*d.*', and (b) might cause 'an increase in some of up to 3*s.* a sheet over the price for normal work'.[112] I contend that there is a fundamental mistake here. The /1000 rate is a synthetic figure, purely derived by calculation from properties of the sheet *that can relate only to type*. Its calculation is only meaningful for pure text setting; the presence or otherwise of cuts cannot be taken as a factor in its calculation. In particular, it is not valid to compare the /1000 rate of a sheet with cuts with that of a sheet without cuts. Thus McKenzie's first assertion above is meaningless.

Next, what of his second assertion, that an increase of up to 3*s.* a sheet could be caused by the presence of woodcuts? In a paper I am preparing, I challenge McKenzie's reasoning on four grounds. Firstly, the presence of woodcuts on a sheet has the effect of *reducing* the amount of type to be set per sheet and hence the setting component of the per-sheet charge. Secondly, the presence of woodcuts does not substantially slow up the process of composition. Thirdly, complex texts such as those involving mathematical expressions are considerably more time-consuming to deal with than continuous English text, and the four books that McKenzie cites as evidence of a higher than usual rate for composition are all remarkable for the complexity of the mathematical matter to be set, and hence the presence of woodcuts is not what caused the increase. Finally, the work involved in distribution –

[112] McKenzie 1966a: 77.

a necessary part of the process of composition – is underplayed by McKenzie,[113] a fact that strengthens my assertion that cuts will have a far smaller effect on rates than the nature of the text they accompany.

The effect of the presence of footnotes

McKenzie observes that complex notes 'would normally mean greatly increased costs of imposition as distinct from straight composition', though admitting that 'the need to work from different cases and perhaps with different measures would certainly slow up [composition] too.' His finding at Cambridge reflects mine at Oxford.

He cites Barnes's quarto edition of Homer's *Odyssey* (1711) (item 200), for which a 16*s*. compositor rate was charged. As someone who composes type by hand, I can confirm that it is indeed a tricky piece of imposition due principally to the double-column layout for the footnotes. However, certainly some of the increase in price is due to the setting of two heavily ligatured Greeks; Blackstone recommended a premium of fifty per cent for setting Greek.[114] Moreover, since the footnotes mix roman and Greek, distribution would also have been more time-consuming.

We can make a direct comparison with Hudson's 1698 quarto on the Greek geographers which called for 24*s*. per sheet for the Oxford compositors; indeed, here the notes would have been even more complex to impose since they are run together in full width lines rather than being separated and in columns: in the Cambridge *Odyssey* individual notes were kept separate and could be moved around as separate units, but for the Hudson they would have been reset and concatenated as necessary when imposing the sheet.[115]

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[113] He notes only that distributing the type was just one of 'a great many other duties, important and time-consuming that compositors [...] had to perform without additional payment'. I prefer to say that distribution was *included in the rate for composition*.

[114] Philip 1957: 31.

[115] Ould 2019a: 29.

Presswork

Manuscript documents written by Yate show that, when checking the economics of printing 3000 school-books for the London Stationers, he explored the financial effect of a *range* of pay rates between 2*d.* and 4*d.* per hour, recognising in particular that working a sheet of pot might command 2*d.* whilst a sheet of demy could go to 3*d.*[116] This squares with payments of between 3*d.* and 4*d.* at Cambridge three decades later.[117] My research also shows that at this stage of the Oxford Press the pay rate was closely related to the sheet size,[118] and that over the period 1690–1758 (when a piece rate rather than hourly rate operated) the larger the sheet the higher was the rate for a perfected token.[119]

In contrast, McKenzie prefers to relate press-crew payments to *type* size, observing that rates for small type were 'usually identical' to those for large and 'occasionally cheaper', only noting that '[i]n some cases lower prices for presswork may indicate that the formes were small enough to be laid across the press and printed at one pull.'[120] This assumes that small type meant a small sheet, which was not always so.

McKenzie shows that the normal rate at Cambridge during his period was 3½*d.* per hour or 1*s.* 2*d.* per perfected token. He asks 'how do these Cambridge figures for presswork compare with rates elsewhere in the country at about the same date?'[121] In answer, for Oxford he quotes Blackstone's fixed figure of 1*s.* 6*d.*[122] which dates from half a century later (1758) than McKenzie's 1*s.* 2*d.*; nevertheless, my research shows that 1*s.* 6*d.* was indeed 'in line with the average across all formats and

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[116] Oxford University Archives SEP/P/17b/1(p). Ould 2019b.
[117] McKenzie 1966a: 86.
[118] Ould 2019a: 84. The presswork for Fell's bible was charged at 3*d.*
[119] Ould 2019a: 86.
[120] McKenzie 1966a: 88, note 2.
[121] McKenzie 1966a: 88.
[122] Philip 1957: 89.

edition sizes over the previous seven decades'[123] and in that sense confirms McKenzie's assertion that 'Cambridge rates for presswork in this period [...] were certainly cheaper than those at Oxford'.[124]

Engraving and rolling-press work

It is generally held that, as McKitterick puts it, 'the tendency was for the two distinct skills [of letterpress and rolling-press printing] to be organised into separate establishments where each could follow its trade according to its particular needs and conventions'.[125] The result is that data on the commissioning of engravings and of printing at the rolling press is rare. My research brings to light Oxford's experience of both and highlights the difference between Oxford and Cambridge in this area.

Both McKenzie and McKitterick note that Cambridge was not unusual in that it rarely embellished its books with engravings and when it did so it relied on having both engraving and rolling-press work done in London.[126] The absence of a rolling-press facility in Cambridge was surely a discouragement for authors of books requiring detailed illustration to have their books printed there. Although Cambridge acquired a rolling press in 1699 it appears to have been hardly used, Crownfield choosing to send sheets to London to have engravings printed on them. McKenzie asserts that '[t]o do this may have been more convenient and possibly, in the long run, cheaper.'[127] It would have been cheaper than employing full-time what would have been an under-utilised man in Cambridge, but on the other hand it meant the *inconvenience* of packing printed sheets, carting them to London, and having them printed, repacked, and carted back. If an engraving, say a head-piece,

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[123] Ould 2019a: 87.
[124] McKenzie 1966a: 89.
[125] McKitterick 1998: 211.
[126] McKitterick 1998: 23–24, 140.
[127] McKenzie 1966a: 51.

was to be added to a sheet of letterpress, the printed sheets would have had to be redamped by the rolling-press man before printing, which is not ideal treatment for a sheet that has already been printed and dried.

In contrast, the Learned Press had its own rolling presses and at times employed its own rolling-press printer, so that damp sheets could be taken directly from the press-crews to the rolling press.[128] Oxford was also fortunate in that the presence in Oxford of engravers such as Michael Burghers meant easy access to rolling presses and men capable of using them. Burghers had other customers in Oxford and London and hence did not need to be employed full-time by the Learned Press. That easy availability meant that the Learned Press (and independent editors such as Hearne) could more readily include engravings in its books and in those for others.[129] By 1794 the Press had more than 700 engraved plates in store.[130]

How did the price of rolling-press work compare between Oxford and Cambridge? The only two figures available to McKenzie at Cambridge are 8*d.* and 9*d.* for 100 impressions.[131] For Oxford my research revealed considerably more data allowing me to give figures, and to say that there was significant variation naturally related to the size of the plate.[132]

Organising the work: companionships

In later years a common practice amongst both compositors and press-crews was to work in small groups known as companionships.[133] A companionship would be

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[128] Ould 2019a: 101, 115.

[129] 'The printed page' in Gadd 2013a: 511–45, 'The copper engraver's work' in Ould 2019a: 100–14, and Ould and Nottingham 2020.

[130] Ould 2019a: 112–13.

[131] McKenzie 1966a: 93.

[132] 'The rolling-press man's work' in Ould 2019a: 115–25.

[133] Ellic Howe (ed.), *The London compositor* (London: The Bibliographical Society, 1947), pp. 55–57. Companionships had become the norm in the printing trade by the time of Stower's *The printer's grammar* of 1808 (republished by Gregg Press, London, 1965).

paid as a group, one man dividing out the work, receiving the payment, and dividing it amongst the members.

At Oxford, the Learned Press accounts give insufficient detail to tell us whether companionship working was common, but in my research I record individual receipts, for payments to what were effectively companionships, kept by Oxford scholar Dr Johann Grabe who employed Learned Press men in the printing of his 1709 Septuagint: a small number of compositors were paid as a group, and small numbers of press-men similarly.[134] There is nothing to suggest either way that the same scheme operated when the men were working on Delegates' books. In the three years covered by my research into the finances of the Bible Press I found just one instance where four compositors appear to have worked as a companionship over a sixteen-week period.[135] It is not clear from the accounts entries whether they shared the money equally – no doubt that was sorted out privately.

McKenzie does not note any evidence for the existence of companionship working at Cambridge, but Maslen identifies companionship working at Bowyer's, each companionship consisting for the most part of two men, and he assumes that 'sums claimed were shared equally'.[136] (This possibility is reinforced by Hansard who noted a game of chance used by compositors in a companionship when work of an uneven difficulty was being divided amongst them.[137])

Summary

The evidence of Oxford, Cambridge, and Richardson's Press, shows a rate of 4*d.*/1000 letters for composition of a 'basic' text in pica as a constant across Presses and the period, and that pay rates were negotiated individually for each book, with variations from a 'straightforward' text resulting in adjustments to the basic rate.

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[134] Ould 2019a: 158–61.
[135] Ould 2019c: 101.
[136] Maslen 1993: 117.
[137] Hansard 1825: 543.

Although McKenzie asserts that the presence of woodcuts could result in an increase of up to 3*s*. a sheet over the composition rate for normal work, I have demonstrated that the evidence he brings to bear is in fact evidence of the effect that complex mathematical texts have on the rate and that the presence of woodcuts is coincidental.

My research confirms McKenzie's findings at Cambridge that complex notes 'would normally mean greatly increased costs of imposition as distinct from straight composition', and that 'Cambridge rates for presswork in this period [...] were certainly cheaper than those at Oxford'.

Two differences become evident: Oxford was in the advantageous position of having the services of one of the finest engravers of the period and his rolling press in Oxford, a facility Cambridge could not offer; and, my evidence shows that, unlike Cambridge, companionships operated at the Learned Press at least some of the time and at the Bible Press occasionally, as they did to a lesser extent at Bowyer's.

4 Organisation and productivity of the Oxford Bible Press compared with that of the Cambridge Press and other major printing houses of the time

In this chapter I show how my research exposes differences and similarities in the way that work was organised and paid for at the Oxford Bible Press and the Cambridge Press, and I challenge some of McKenzie's assertions about press-crew output at the Cambridge Press in the light of my analysis of the records of the Oxford Bible Press. My research supports McKenzie's demonstration, in his well known essay 'Printers of the mind', of the prevalence of concurrent production, the 'normality of non-uniformity' of production, and the danger of assuming the existence of 'norms',[138] but I also challenge his handling of the question of 'the efficient disposition of work' and the balance between compositors and press-crews.

4.1 Sources

The records for the Oxford Bible Press are unique in their detail for an eighteenth-century printing house engaged in long print-runs, runs that could produce an edition of as many as 30,000 copies of a prayer book. The Bible Bill Books contain detailed weekly accounts of the work done by compositors and press-crews and the payments they received. They are a resource hitherto unexplored by scholars. Through an analysis of these accounts for that three-year period, my research has yielded new evidence about the use of standing type, the seemingly *ad hoc* flow of work from compositors to press-crews, the allocation of presses to press-men, the degree of concurrent printing, the ordering of the printing of formes, the pay rates and productivity of compositors and press-crews, and the employment habits of the men.[139]

[138] McKenzie 2002: 23.
[139] Ould 2019c, Ould 2019d.

Detailed records exist for the Press at Cambridge but the print-runs there were in the customary range from the period, rarely exceeding 1500 copies. Writing in the pre-spreadsheet age, McKenzie was able to provide only a printed transcription of the vouchers that form his source data for the Cambridge Press.[140] For the Bible Press I have had the advantage of being able to have a representative three years of Bible Bill Book entries transcribed into digital form, thereby rendering them amenable to many different analyses, as described in sections 2.2 and 2.3 above.

4.2 Composition

Organisation of composition

McKenzie finds that the composition of any one book in the Cambridge Press was usually a simple matter of progression from sheet to sheet, and, when it was set by more than one, it was by *consecutive* compositors, taking turns. The few exceptions were where the copy could be cast off, as for a page-for-page reprint, when sheets could be set in any order and simultaneous setting was practical;[141] McKenzie maintains that this could have been either for quicker completion or to keep men at work, but that we cannot tell which. By contrast, I show in my research that at the Bible Press several compositors might be involved in the setting of a single title at the same time, that more than one compositor might set pages in a given forme, and that although formes were often set in the 'natural' order it was by no means the rule given that setting by formes was practical – every edition was a reprint and hence formes could be set and printed in any order.

Composition production rates and compositor earnings

From the evidence available McKenzie finds himself unable to challenge the 'common assumption of 1000 ens as the amount of type that a single compositor of

[140] McKenzie 1966b.
[141] McKenzie 1966a: III.

average ability is likely to have set in an hour'. I have not attempted to determine the rate at which compositors set type at the Bible Press, but the surviving records would make it possible to assess the claim.

Over two sample periods, McKenzie shows an average weekly wage of just under 11*s*.[142] On average, under a number of assumptions, I estimated that a Bible Press compositor took home an average of 14*s*. 6*d*. a week over my three-year period.[143] Assuming the inflation in goods and services costs of approximately thirteen per cent over the seven-decade gap,[144] the comparable figures are 12*s*. 5*d*. and 14*s*. 6*d*. The premium at Oxford could be explained at least in part by a more reliable stream of available work.[145] McKenzie stresses the considerable variability in the take-home pay and hence the output of compositors,[146] a feature shared with the men of the Bible Press.

4.3 Presswork

Organisation of presswork

On several points of practice the Oxford and Cambridge Presses operated in the same way. McKenzie notes that 'any [Cambridge] press-crew might get any sheet of any book to print off, and consequently it was rare for any book of more than two or three sheets to be printed solely at one press.'[147] I found the same to be true

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[142] McKenzie 1966a: 82, table 3.

[143] Ould 2019c: 103. This figure excludes any additional payments that might have been made for, for example, copy money, laying type, or papering cases.

[144] Bank of England, *Inflation calculator*, <https://www.bankofengland.co.uk/monetary-policy/inflation/inflation-calculator> [accessed 16 March 2021].

[145] January 1770 saw a fire at the London warehouse of a wholesale stockist for the Bible Press which would no doubt have prompted accelerated reprinting for restocking (Timperley, Charles, *Encyclopaedia of literary and typographical anecdote* (London: Henry G. Bohn, 1842), p. 721).

[146] McKenzie 2002: 20.

[147] McKenzie 2002: 29. He also notes that '[t]he position in the Bowyers' shop is much more complex, for it is clear that *formes*, not just sheets, might be sent to any press which happened to be free and that any sheet might well be printed at one press

at the Bible Press, where it was rare for a sheet to be printed and perfected by the same crew.[148] At Cambridge 'a press-crew […] would usually be working on several books at a time';[149] similarly, at the Bible Press a crew might be paid in one week for working on several different books,[150] and I have also illustrated the high degree of concurrent printing over a six-month period in 1770.[151] McKenzie's observation that '[a]s a rule, therefore, it seems rather more likely that sheets printed by different press-crews were also printed at different presses'[152] is true also of the Bible Press.

Asking '[d]id each crew have and maintain its own press, at which it regularly worked; or were certain presses set aside for certain books and operated by either crew?', McKenzie is inclined to answer that at Cambridge 'each crew did have a press of its own for which it was responsible.'[153] At the Bible Press an analysis of press figures in the 1770 Large Quarto Bible shows that each of six of the nine presses was principally used by a press-crew led by a particular man, though not exclusively, and that the other three presses were in occasional use by varied press-crews.[154]

While McKenzie deduces that at Cambridge '[n]ormally the crew (and the press) which printed a sheet also perfected it',[155] the opposite was generally true at the Bible Press because of the large editions: with the exception of some folio works in short-runs, press-crews very rarely perfected their own sheets.[156] Moreover, both cross-perfecting and tandem-perfecting were practised, so that wet

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and perfected at another.'

[148] Ould 2019d: 40.
[149] McKenzie 2002: 29.
[150] Ould 2019c: 108, table 2.
[151] Ould 2019c: 107, table 1.
[152] McKenzie 1966a: 125.
[153] McKenzie 1966a: 125.
[154] Ould 2019d: 38.
[155] McKenzie 1966a: 125.
[156] Ould 2019d: 39.

tokens did not sit waiting too long to be perfected.[157]

At Cambridge, '[b]ecause shrinkage of a sheet during drying would also have upset the register, it is rare to find claims [for payment] for a particular sheet spread over two payment periods.'[158] Again, the longer runs at the Bible Press meant that some sheets were printed over more than one week, for example 11,000 copies one week and 9000 the next;[159] however, in such cases the sheets went to another press-crew for perfecting rather than being allowed to dry.

McKenzie shows that it was the rule to print the inner forme of a sheet first at Cambridge, whereas, based on an examination of the records for the 1772 Large Quarto Bible, my research indicates that there was no preference at the Bible Press either way.[160]

The Cambridge press-men did not normally use press-figures (with just one exception); by contrast, press figures were frequently used at the Bible Press and I established that they indicated a press that could be recognised as 'allocated' to a particular man. They also allowed me to detect probable recording errors in the accounts.

Presswork production rates and press-crew earnings

Examination of McKenzie's figures for the weekly output for press-crews at Cambridge shows an average of 5800 impressions by one man at half press and 12,500 by two men at full press.[161] (These figures cover two years.) My finding at the Oxford Bible Press was an average of 6800 impressions at half-press and a little less than 13,500 at full press.[162] (This figure covers the three years of my analysis.) The higher figure at Oxford is readily explained by the long print-runs there, which

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[157] Ould 2019d: 44–47.
[158] McKenzie 1966a: 125.
[159] Ould 2019d: 45.
[160] Ould 2019d: 36.
[161] McKenzie 1966a: 132–33.
[162] Ould 2019c: 109.

would have meant far fewer changes of forme than at Cambridge.

Notable amongst McKenzie's observations is the 'quite exceptional' output allegedly achieved by the press-crew of Cotton & Ponder, working off 10,350 sheets across four different books in one week, equivalent to an average of 3450 impressions a day, output that McKenzie considers 'prodigious'.[163] However, my finding in analysing the Bible Press accounts has been that a record of a payment in a certain week for certain work cannot be assumed to mean that that work was *done* in that week: not uncommonly, one or more weeks without payment would be followed by a week in which a much larger than usual payment was made. Applying a similar argument to the Cambridge vouchers in a paper in preparation, I offer an alternative reading of them which allows the output of Cotton & Ponder to align with the norm.

Over two sample periods, McKenzie's data shows an average weekly wage per press-man of 15*s*. 6*d*. for full-press working.[164] On average, under a number of assumptions, I estimated that a Bible Press press-man took home about 17*s*. 8*d*. a week over my three-year period.[165] Assuming the inflation in goods and services costs of approximately thirteen per cent over the seven-decade gap,[166] the comparable figures are 17*s*. 6*d*. and 17*s*. 10*d*. As with composition, both Presses exhibit considerable variation in the weekly figures.

4.4 From compositor to press-crew

McKenzie finds that, even with just two presses, it seems 'unlikely that a particular press consistently served the compositor or compositors setting a particular

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[163] McKenzie 1966a: 90, McKenzie 2002: 21.

[164] McKenzie 1966a: 91. His figures include small amounts for quarterage and copy money.

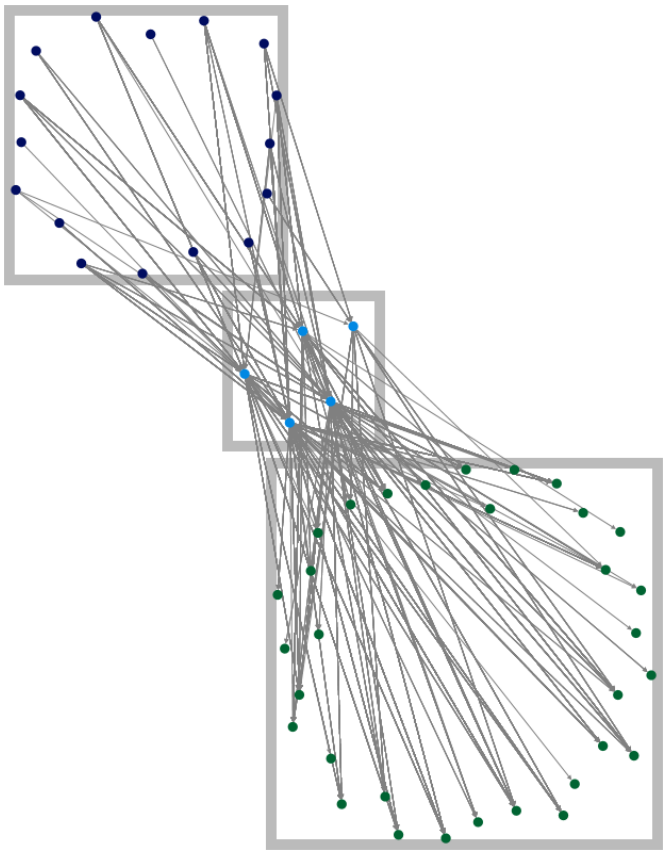
[165] Ould 2019c: 106. This figure excludes, in particular, copy money.

[166] Bank of England, *Inflation calculator*, <https://www.bankofengland.co.uk/monetary-policy/inflation/inflation-calculator> [accessed 16 March 2021].

book', and that the practice of printing a number of works at the same time resulted in unpredictable complexities of work-flow.[167] Maslen notes that the same was true of Bowyer's printing house in the 1730s, the greater size of that house leading to even more complex work patterns, a point reiterated by McKenzie.[168] McKenzie's claim that '[t]here is no evidence to suggest that any other English printing house of comparable size in the sixteenth, seventeenth, or eighteenth centuries organized its work in a manner significantly different from the Cambridge Press' is supported by my research into the operation of the Bible Press.

I have subsequently mapped the flow of sheets of five Bible Press works from compositors to press-crews in 1771 in order to see whether there was any pattern, for instance particular compositors working with particular press-crews.[169] The resulting graph shows that there was no discernible pattern, again confirming McKenzie's and Maslen's findings. (The five works are dots in the central square, with compositors in the top square and press-crews in the bottom square.)

[167] McKenzie 1966a: 124, McKenzie 2002: 19.
[168] Maslen 1993: 91, McKenzie 2002: 29.
[169] This was done using the NodeXL add-on to Microsoft Excel.



4.5 The management of the men

Staff duration

My research has shown that the profile of employment at the Bible Press is similar to that described by McKenzie at the Cambridge Press and that at the other large printing houses of the period.

The men of the Bible Press were seemingly of a lower grade than those of the Learned Press or the Cambridge Press, no doubt given the fact that exact reprints called for little or no judgement from compositors and little more than stamina from press-crews. In 1756 Blackstone reckoned that 'the pay in Mr. Baskett's Side of the House is much inferior to what is given by the University in the other.'[170] Oxford Warehouse-keeper Daniel Prince wrote to a correspondent in 1783 that

[170] Philip 1957: 24.

'[t]he Bible-printing here employs a great number of hands, not one of which would suit me; few of them can do any other work.'[171]

I demonstrated that only four of the forty-three compositors paid by the Bible Press in the period could be considered to have been anywhere near 'full-time' (in the modern sense) throughout.[172] The rest showed great variability in how long they stayed.[173] Similarly, it was not unusual for press-men to come and go, but they tended to stay longer and their pairings in crews could be stable and long-lived.[174] I found only sparse data from which to gauge how long men stayed at the Learned Press, and could identify only a handful as long-term employees.[175]

McKenzie reveals a similar if more stable pattern at Cambridge.[176] Over the period 1696 to 1712 a 'loyal trio of long-service compositors' worked for Crownfield, with a number of men staying for periods in excess of a year, whilst others 'remained only a few weeks or months'.

In comparison, over a period of ten years one third of compositors and just over half the press-men stayed at Bowyer's in London for no more than three months.[177] That said, against that background of mobility, there was a changing core of experienced workmen.[178]

Staff attendance

In his analysis of compositors' wages at Bowyer's,[179] Maslen questions Gaskell's 'near assertion' that 'if a man could get his bread by less than a whole week's work,

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[171] John Nichols, *Literary anecdotes of the eighteenth century* III (London: Printed for the author, 1812), p. 696.
[172] This is a (close) approximation as there is occasional doubt about name equivalents. The same qualification applies to press-men below.
[173] Ould 2019c: 100–01.
[174] Ould 2019c: 104–05.
[175] 'The compositors' in Ould 2019a: 49–56, 'The press-men' in Ould 2019a: 91–96.
[176] McKenzie 1996a: 83–84.
[177] Maslen and Lancaster 1991: xxv.
[178] Maslen 1993: 113–16.
[179] Maslen 1993: 117.

he might well take the rest of the time off. Sometimes this was done simply by staying away [...], but perhaps more often by contracting with the master to work less.'[180] Maslen seeks evidence for this. Addressing the second part of Gaskell's postulate, he notes that the Bowyer ledgers do not show 'that compositors were in the habit of claiming a fixed sum per week or fortnight, and settling for the difference at a later date.' Nor is this noted by McKenzie about the Cambridge Press.

In contrast, my research showed that the Bible Bill Books at Oxford record frequent payments 'On account' to both compositors and press-crews, suggesting that a man was paid a certain amount in one week against a future claim for work actually done. This is supported by the fact that the payment in the following week would be double (or thereabouts) that for a normal week.[181]

'Efficiency'

In his essay 'Printers of the mind', McKenzie aims to correct Robert K. Turner and Charlton Hinman for taking R. B. McKerrow's general assertion that 'for a printing house to be carried on economically there must be a definite correspondence between rate of composition and the output of the machine room' to mean that that correspondence had to be maintained *for each individual book*, rather than for the *set of books* in hand at any one time. However, a different assumption still lingers in McKenzie's words, namely that efficiency was the driving force for the allocation of work and that the workflow had to be optimised: '[i]f a compositor had no other work on hand he would be transferred to any that might be offering and for which

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[180] Gaskell 1995: 169. Maslen chides Gaskell for not providing evidence to back his 'near assertion'. I offer, as a statement from his direct experience, Fell's words at the time that he and his three partners had assumed responsibility for the running of the Press: 'to make them always attend their work, is I think, beyond any Skill: Printers having a peculiar obligation to be idle, as being paid for it: Holiday mony being a certain stile in their Bills.' (Fell to Sir Joseph Williamson, 11 November 1672 (State Papers (Domestic), Chas. II, vol. 317, no. 188).)

[181] Ould 2019c: 97, 108 table 2.

type was available'; '[t]he simplest way of using crews *most efficiently* was [. . . ,] given the presswork which was offering, to apportion it so that each crew *always* had something to go on with'; 'the *most efficient disposition of work*, given the variables to be reconciled, could be achieved only by a highly flexible system' (my italics). In a planned paper I shall show that at both the Cambridge Press and the Bible Press flexibility was achieved by taking on temporary compositors and press-men as necessary, that we still cannot say that the balancing was *efficient* or that it *optimised* the use of resources, and that it might be necessary to reconsider how we evaluate productivity in printing houses in the eighteenth century.

4.6 Summary

Writing in 1966 McKenzie found no comparable set of records for a printing house against which he could assess, in particular, the organisation, size, and output of the Cambridge Press. He would later assert that 'all printing houses were alike in being different' and yet 'all printing houses were more alike over the years than many bibliographers are prepared to allow: in size of plant, variability of workforce, edition quantities printed, use of standing formes, proofing procedures, and most important of all in printing several jobs concurrently.'[182]

My research into the Bible Press has now made some comparison possible and it does point to operational similarities with the Cambridge Press: there was no discernible pattern in the flow of formes from compositors to press-crews; the printing of a single work was commonly spread amongst several crews and a crew would work on several works at a time; crews generally had a press at which they regularly worked; a small core of relatively permanent workers was flexibly supplemented by transient workers; and pay rates were comparable.

However, we also observe operational differences: at Cambridge it was rare for

[182] McKenzie 2002: 62.

more than one compositor to be setting the same book at the same time, whilst it was the norm at the Bible Press; Cambridge compositors progressed sheet by sheet through a book, whilst Bible Press compositors did not necessarily; tandem- and cross-perfecting were common at the Bible Press, a practice that was unnecessary at Cambridge; in contrast to the Cambridge Press, a Bible Press crew almost never printed both sides of a sheet.

There are three major *structural* differences that distinguish the two Presses and that can be seen as placing them at opposite ends of a spectrum. Firstly, the Bible Press was significantly larger in its output than the Cambridge Press, running nine presses compared to just two.[183] Secondly, the Bible Press was exclusively in the business of reprints, whilst the Cambridge Press was primarily printing texts *de novo*; compositors setting reprints read from printed matter with line and page breaks predetermined, whilst compositors setting *de novo* read from manuscripts with line and page breaks to be determined. Thirdly, the Bible Press demanded very large editions, up to 30,000 copies, compared to the 500 to 1500 copies typical at the Cambridge Press.

We have seen that it is these structural differences between the Presses that led to their operational differences. Consequently we can say that the validity of any generalisation we might make about printing practices across a set of eighteenth-century Presses will be limited by how close those Presses are structurally, in particular in size of plant, type of work, and edition sizes. McKenzie mixes structural differences (size of plant and edition quantities) with operational differences (variability of workforce, use of standing formes, proofing procedures, and concurrent

[183] Over one year, 1699–1700, the Cambridge men worked nearly 250,000 impressions at full press on two presses (McKenzie 1966a: 132–33), compared with the annual average of nearly 5,500,000 on nine presses at the Bible Press in the three years 1769 to 1772 (Ould 2019c: 109). The Bible Press also outstripped Bowyer's 2,300,000 from eight presses in 1731 (Maslen 1993: 106) and Ackers's 2,600,000 from five presses in 1745 (McKenzie and Ross 1968: 22).

printing). However, it remains the case that we still have very few detailed Press records from which to hypothesise such a generalisation, and any two points define a line.

Finally, my research leads me to reinterpret McKenzie's apparent evidence of 'exceptional' output of some press-crews, proposing that it is an artefact of slow accounting rather than evidence of prodigious effort, and to challenge his assertions about the disposition of resources in a printing house in the pursuit of efficiency.

5 Observations on my approach to the collation and analysis of unstructured data

The previous two chapters have considered in detail the operation of the Learned and Bible Press, and their counterparts at Cambridge and London. This final chapter generalises the approaches I used to working with the data from the primary sources on which I based my research into the Learned Press, examining the pros and cons as they emerged in practice, and indicating how they might be applied to similar areas in the field of printing history or indeed by any historian working with unstructured data points across a distributed corpus of documents.

As noted earlier, the challenge was to extract information from a large number of unstructured data points from a variety of sources.

5.1 The approach generalised

In general terms, the approach is to use a standard spreadsheet to bring together disparate data points through metadata and content descriptors, and then to use filtering, sorting, and pivot table facilities to expose information. Each row in the spreadsheet corresponds to an individual data point; each column corresponds to a 'dimension' of interest, either data or metadata. The steps are:

1 Identify the dimensions for the sources:
   - set a fixed name for each document (e.g. 'Bodl. MS Rawl. D.397')
   - identify the level of granularity required (volume/page/folio/line/…) and add the necessary dimensions (for instance, manuscript + folio + r/v)
   - add a dimension that will be a pointer to a digital form of the source (e.g. an image of a page in a manuscript, or URL) – this is for quick access
   - if there are a number of items in one source (e.g. a page) and the order of entries is of interest (e.g. for time-ordering) consider adding a sequence number as a further dimension.

2 Identify (potentially) useful metadata and content descriptors as dimensions of interest:

- if chronology, then dates to an appropriate level of granularity
- if people, then names in some standard format
- dimensions relevant to the study (e.g. price, country, colour, occupation); where appropriate, prepare a list of allowable values for each dimension, adding to it as necessary during the study
- a free-text dimension for notes.

3 Prepare a spreadsheet:

- create a column for each dimension with the dimension name in row 1 so that multi-dimensional sorts can be done easily
- set a filter on all the columns so that the spreadsheet can be sorted on individual dimensions quickly
- enter each data point as a row in the spreadsheet, completing the relevant dimensions (*person* might not be required for a particular data point, for example)
- where a data point has several values for a dimension create additional rows (e.g. two people might be named)
- leave blank any dimensions irrelevant to a data point.

4 To explore a topic of interest use the filter and sort facilities to gather all related data points together (e.g. all data points referring to a particular person, all data points with a price greater than X):

- use the filter on the relevant dimension to bring all (the rows for) matching data points together
- use the sort facility on the relevant dimensions to order these as necessary (e.g. sort on *family* and then on *country*).

5 Identify a two-dimensional relationship of interest and use the pivot table facility to generate a matrix of values; for example

– What is the median age of people by occupation? Use the pivot table facility to generate a single column of occupations with each cell containing the median age for that occupation.
– How many people are there in each occupation in each country? Use the pivot table facility to generate a 2D matrix of country versus occupation with each cell containing the number of people.

5.2 Pros and cons of the approach

Pros

Simply scanning by eye the individual raw data points spread throughout the original documents or capturing them on paper in some form could not have yielded the insights that were possible with the computerised approach I used. Once the spreadsheet had been populated, opportunities for analysis presented themselves, as described in section 2.1. In particular, the Excel filter and sort facilities enabled the extraction of related and ordered subsets of the data points with a few clicks, the pivot table facility enabled two-dimensional relationships to be explored quickly, and the ability to derive graphs, histograms, and other graphical representations meant that information could be drawn from the raw data.

Although some familiarisation is necessary to use Excel's tools effectively, it is more readily acquired than with SQL.

Cons

Some data points might need to be replicated; for example, a data point referring to two different books would need to have two entries, one for each book. This could lead to an error if the data point needed to be updated or amended – all replications would need to be found so treated. Although this did not prove an issue (replications can easily be brought together with a sort), it can be avoided if

a relational database is used.[184]

It is difficult at the outset to anticipate *all* the dimensions (/columns) that will be useful and feasible, though, as noted in section 2.1, for my research an initial set was evident from the outset given the aspects I was interested in (premises, type, paper, people, etc.). In retrospect I should have started with the obvious dimension of cost/price. However, new dimensions can be added at any time if necessary.

5.3 Potential uses elsewhere in the field of printing history

The many vouchers for Cambridge University Press, transcribed in McKenzie 1966b, could be transcribed into a spreadsheet, thereby opening the possibility of analyses of the sort described above. Not having today's technology, McKenzie was forced to provide an index to give later researchers a route into the transcriptions of the myriad vouchers. Any attempt to explore possible avenues of interest would mean endless page-turning and further transcription making the idea unattractive. With the above scheme it would, for example, be quick and easy to extract a graph showing how the cost of presswork per sheet varied over time. Entries in the First Minute Book of the Curators, the Annual Press Accounts, and the Vice-Chancellor's Accounts from Cambridge could all be accommodated in the same scheme.

The Bowyer ledgers are available only in their original manuscript form on microfiche. As such they present an even larger problem for transcription into digital format. I hesitate to propose this. The Ackers ledgers are similar to the Cambridge Press vouchers, being available as printed transcriptions. The same possibilities apply.

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[184] For an example of the use of relational technology in historical studies see J. Pimpernell, *The application of business analysis techniques to a mediaeval monastic institution: Glastonbury Abbey estate in the early 14th century*, MA Dissertation, University of Bristol (2007).

6 Conclusion

I believe the foregoing demonstrates the originality, coherence, and importance of my published work; that it shows how my work has made a major contribution to the body of knowledge in this area of printing history on a European as well as British level; and that it shows how my work, in various measures, supports and challenges current understanding of the operation of the major printing houses of the period, highlighting similarities and differences.

I hope that my results in the area of pay rates and productivity can be of use to historians working in the economics of the eighteenth century, and my approach to data analysis to those working more generally with archives. Writing in the 1960s of his analysis of the accounts of the Cambridge Press, McKenzie admits 'I have for simplicity here dealt mainly in averages; the actual figures are infinitely more varied and any attempt to trace the total complex patterns week by week, even with all the documentary evidence, is like trying to record the changing images of a kaleidoscope in the hands of a wilful child.'[185] I have shown however that through the straightforward use of databases, spreadsheets, pivot tables, and network analysis tools those changing images can today be exposed and understood at a level below that of the average.

I have in preparation two papers to be offered to the *Journal of the Printing Historical Society*: a critique of McKenzie's assertions on compositors' pay rates and press-crews' productivity at Cambridge University Press that expands on the comparative discussion in sections 4.2 and 4.3 above; a critique, summarised in section 4.5 above, of McKenzie's conclusions regarding the organisation of work at the Cambridge Press in his essay 'Printers of the Mind',[186] that addresses the question

[185] McKenzie 2002: 23.
[186] McKenzie 2002: 22–31.

of whether and how an 'economical' or 'efficient' balance was maintained between compositors and press-crews, a question that touches on what conclusions can be drawn about how many compositors and press-crews were involved in the printing of a text and thence the transmission of the text.

My research to date has surfaced a number of new questions that remain to be answered, some of which I expect to pursue, in particular, what can be deduced from the Bible Bill Books about the amount and nature of concurrent printing that occurred at the Bible Press? In my two papers on the Bible Press I took two-dimensional views of the data, for example the work of one press-crew over time, or the progress of one bible over time. Based on the two spreadsheets described earlier for the payments to compositors and press-crews, I anticipate developing a three-dimensional view of the Press's operation, capturing the concurrent flow of several works through the composition and printing path. My view hitherto has been that the allocation of work was largely *ad hoc*, but it is possible that it was more managed than I have reckoned. It might also be possible to prepare for comparison the equivalent analysis of the Cambridge Press using McKenzie's work.

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