"What the Bees Have Taken Pains For:” Francis Daniel Pastorius, The Beehive, and Commonplacing in Colonial Pennsylvania

Brooke Palmieri
University of Pennsylvania, palmieri@sas.upenn.edu

Follow this and additional works at: http://repository.upenn.edu/uhf_2009

http://repository.upenn.edu/uhf_2009/7

2008-2009 Penn Humanities Forum on Change
Undergraduate Mellon Research Fellows
http://humanities.sas.upenn.edu/08-09/fellows_uhf.shtml

This paper is posted at ScholarlyCommons. http://repository.upenn.edu/uhf_2009/7
For more information, please contact libraryrepository@pobox.upenn.edu.
“What the Bees Have Taken Pains For:” Francis Daniel Pastorius, The Beehive, and Commonplacing in Colonial Pennsylvania

Abstract
Brooke S. Palmieri, College '09, English, History

Impudence to Copy: The Relation Between Print Culture and the Manuscripts of Francis Daniel Pastorius

In 1683, Francis Daniel Pastorius (1651-1719), a German-born Quaker and well-trained Lawyer, arrived with the first German settlement to found Germantown, under a charter given him by William Penn. By 1696 Pastorius began the most ambitious of his works, “Beehive”, a massive folio comprising thousands of entries quoting hundreds of books he had read. But Pastorius's concerns with the collection of knowledge at the book's conception had assumed, according to him, "quite an other form or face" by the time the book had doubled in size at the end of his life; a change reflected in the books he gathered commonplaces from, and the system of organization he developed in order that each collected work could be recollected with ease and efficiency.

Comments
2008-2009 Penn Humanities Forum on Change
Undergraduate Mellon Research Fellows

http://humanities.sas.upenn.edu/08-09/fellows_uhf.shtml

This presentation is available at ScholarlyCommons: http://repository.upenn.edu/uhf_2009/7
“What the Bees Have Taken Pains For:” Francis Daniel Pastorius, 
*The Beehive*, and Commonplacing in Colonial Pennsylvania

Brooke Palmieri

2008–2009 Penn Humanities Forum
Undergraduate Mellon Research Fellowship
I. Introduction

Growing up as the son of a progressive public official in Sommerhausen, Germany, Francis Daniel Pastorius was taught early in his life the value of note-taking. As a lawyer trained in Germany’s top universities, he took down notes as the daily habit of “every good Scholar.” Arriving in Pennsylvania in 1683 with a charter given to him by William Penn to found the first German settlement, Pastorius’s prominence in the colony as founder, statesman, and schoolmaster to the Quakers was a function of his scholarly credentials. The Beehive, the massive commonplace book he began in Philadelphia, is a record of the central role he played in the day-to-day life of the growing colony. At the same time, the book remains a testament to the centrality of the scholarly habits he had learned in Europe, which persisted in his daily regime until the end of his life. Built into the title of the book was a link to the activities of the bee that scholars had imitated for centuries. Pastorius’s title claimed his kinship not only with the industry of the bee but also with the endeavors of scholars before him who had taken similar instruction from the bee as a model for the gathering and storing of knowledge. Just as the bee went from flower to flower to glean pollen that it would later turn into honey in the hive, the scholar moved from book to book, culling those excerpts that mattered most.

2 Jim Duffin’s recent Introduction to Acta Germanopolis: Records of the Corporation of Germantown Pennsylvania 1691-1701 (Philadelphia: Colonial Society of PA), 2008, documents Pastorius’s many positions held throughout the years (sometimes for several terms) as Bailiff, Committeeman, Clerk, Recorder, and Treasurer.
to him and organizing them in a series of notebooks. On the first page of *The Beehive*, Pastorius explicitly relates his project to this tradition (see Figure 1):

> For as much as our Memory is not Capable to retain all remarkable Words, Phrases, Sentences or Matters of Moment, which we do hear and read, It becomes every good Scholar to have a Common Place Book, & therein to Treasure up what ever deserves his Notice...And to the end that he may readily know, both whither to dispose and Insert each particular, as also where upon Occasion to find the same again...he ought to make himself an Alphabetical Index, like that of this Bee-Hive... (his emphasis)

In response to the shortcomings of memory, what follows is a vast storehouse of information, with excerpts from hundreds of books, not to mention entries composed by Pastorius himself. The opening lines of *The Beehive* introduce the key elements of the book: the model of the Scholar as Bee, the enactment of that model by keeping a commonplace book, and the Alphabetical Index as a means of ordering what otherwise would be a chaotic collection. The reader is thus introduced to the three aspects of *The Beehive* that would undergo significant changes in the course of its growth, following Pastorius’s changing concerns about the kind of information he was interested in collecting and the means by which it could be recollected.

As a system of mediation between collecting and recollecting information using the model of the bee, an efficient indexical system was the chief concern among scholars who kept commonplace books for themselves.\(^3\) Because Pastorius wanted his book to be

\(^3\) For excellent accounts from the lives of scholars, see Ann Blair’s “Reading Strategies for Coping with Information Overload ca. 1550-1700,” *Journal of the History of Ideas* 64.1 (2003) 11-28, Lisa Jardine and Anthony Grafton, "Studied for Action: How Gabriel
of use to later generations, he approached the problem of indexing with an added anxiety: would his methods be simple and efficient enough for his heirs to find his book useful?

And seeing it is the largest of my Manuscripts, which I in my riper years did gather out of excellent English Authors... My desire, Last Will and Testament is that my Two Sons John Samuel and Henry Pastorius shall have ... my Writings ... to themselves & their heirs for ever, and not to part with them for any thing in this World; but rather to add thereunto some of their Own.

*The Beehive*’s operation is a product of its intended audience. Since his sons John and Henry had not enjoyed a European humanist education, the book includes detailed instructions about reading, extracting, and organizing the gleaned excerpts for future use. In content and form, *The Beehive* reveals many of the problems in how knowledge was traditionally processed and stored by humanist scholars for later recollection and circulation. Because of his Last Will, *The Beehive*’s structural elements also offer a vantage point from which to assess changes in who had access to knowledge. Ultimately, the intersection between Pastorius’s concerns for both the intellectual and the familial traditions housed in *The Beehive*’s pages are symptomatic of important changes in the transmission of knowledge from the sixteenth to the eighteenth century.

**II. The Bee and the Commonplace Book**

In his 1894 poem “The Pennsylvania Pilgrim,” John Greenleaf Whittier imagines Pastorius at work in a comic scene of frustrated domesticity:

---

At evening, while his wife put on her look
Of love's endurance, from its niche he took
The written pages of his ponderous book,

And read, in half the languages of man,
His "Rusca Apium," which with bees began,
And through the gamut of creation ran. 4

While *The Beehive* contains no recollections of a husband’s neglect or a wife’s forbearance, Whittier’s leap from bees to all of creation is hardly a stretch of the imagination. The sum of Pastorius’s many entries on bees runs the gamut from classical antiquity to poems that Pastorius composed himself in praise of the insects. In one entry, for example, Pastorius offers a lengthy list of authors who had come before him in writing of bees. 5 Beginning with the literal description of bees from Aristotle’s *History of Animals*, Pastorius continues to list everyone from Virgil and his famous description of beekeeping in the fourth Georgic to Erasmus and his humanist adaptation of the bee. In another entry, he adds himself to the dramatis personae, and stages the same evening scene that Whittier would place him in two hundred years later:

---

4 “The Pennsylvania Pilgrim.” Whittier, John Greenleaf. LION. ll. 300-305
Pastorius’s self-description as a “two-footed Bee” is a striking visual translation of the correspondence between the activities of the bee and of the scholar. The bee suggests a three-part process that the scholar should imitate: seeking the right flowers, gathering nectar from them, and bringing the nectar back to the hive to be organized. Pastorius writes:

My Friends we see the laborious Bee, In Gardens, Orchards, Fields,
To seek and suck what yields A sweet and wholesome Sap;
Here She loves to tarry, and that Juice to carry Into her Hive.
Thus Let us strive to Imitate the same, Accounting it a Shame
If we should fail to gather some good things for our Reader.

The scholar, in turn, interprets the three parts of the process as an ongoing task of finding the right books, gathering useful excerpts from them, and copying them into his notebook. While the bee stores his honey in “cells” or honeycombs in his hive, Pastorius inserts his excerpts into the compartments that he has ruled on every page, which he calls “paper combs.” It is these cells that he now has to organize in his index.

But the bee was not just a metaphor: Pastorius and many of his predecessors maintained a keen interest in beekeeping. Just how inexhaustible the bee was as a subject of research is suggested by Aristomachus Solensis, who, according to Pastorius,

---

6 In an entry of his *Deliciae Hortenses, or Garden-Recreations*, Pastorius tells us of purchasing two hives of his own from a neighbor on June 2, 1705. By May 6, 1711, he had successfully doubled that number. See Francis Daniel Pastorius, *Deliciae Hortenses*. Ed. Christoph E. Schweitzer. Columbia, South Carolina: Camden House, Inc, 1982.
“did love Bees so well that in 62 years he has done no-thing else but tend them &c. and yet could not thoroly find out their genius & natural properties.” Pastorius’s interest in natural observation as an amateur beekeeper himself serves the basis of his reasoning behind “good” reading practices. In the second half of the poem I have cited above, Pastorius complicates our model of the bee through his observations of its natural environment, and the other insects that inhabit it:

Again we see the cautious Bee in Gardens, Orchards, Fields
To Shun that herb which yields a bitter tainted Sap;
Here She loathes to tarry, This she will not carry into her HIVE.
Thus Let us strive to Imitate the same, Accounting it a Shame,
If we should go & gather What’s hurtful for our Reader.
All Blossoms and all Books, which poisoned filth infects,
We leave to Spiders, Toads, and venomous insects.

The distinction between the bee and the spider is another feature of the commonplace tradition. As he watches the bee gathering from the fields, Pastorius emphasizes the first stage of the commonplacing process, the level of collecting, where each book is a blossom, and only “good” insects collect from “good” blossoms. The opposition between the bee and the spider, the good reader and the bad reader, was central to Pastorius’s first system. The agency of the reader is made clear: “venomous” insects, like Spiders, gather only “poisoned filth.” As Pastorius writes in a later entry on the two, “A Spider gatherereth poison, where a bee would find honey.”

The language of gathering for the hive suggests a number of possible literary modes, and Pastorius writes of creating both “storehouses to pack up all particular words”
and “receptor[ies] of all knowledge.” But the central question for Pastorius is how to organize his “storehouse” or “receptory.” For this, he turned to the humanist tradition. As the primary means by which knowledge was collected, stored, and transmitted, the commonplace book also formed the basis for debate concerning the most efficient way of indexing knowledge that engaged scholars across Europe. By the 16th century, it formed the basis for education on all levels, from grammar school to the university. The commonplace tradition as popularized by Erasmus provided the organizational structure of Pastorius’s Hive. Published in 1512, Erasmus’s De duplici copia verborum ac rerum copia introduced commonplace books as central tools of Northern European pedagogy. Each extract that the student drew from his reading was to be organized under topical headings or loci:

After you...have arranged them in whatever order your prefer, and have next subdivided them one by one into their appropriate sections and have labelled these sections with commonplaces, that is to say with short phrases, then, whatever you come across in any author, particularly if it is especially striking, you will be able to note it down immediately in its appropriate place...

After completing his commonplace book the student should add an alphabetical index of every loci with its page number, a practice influenced by the medieval tradition of indexes and concordances to the Bible.

---

7 Moss, Printed Commonplace Books and the Structuring of Renaissance Thought, 134.
9 Moss, Printed Commonplace Books and the Structuring of Renaissance Thought, 111.
10 Moss, Printed Commonplace Books and the Structuring of Renaissance Thought, 46.
As for the bee, in his *Ciceronianus* of 1528, Erasmus emphasizes its final act of turning pollen into honey rather than the act of selection, as Pastorius does:

> Do bees collect the substance for making honey from just one shrub? Or do they not rather fly busily round every species of flower, grass, and shrub, often roaming far afield to gather material to store in their hives? And what they bring back is not honey to start with. They turn it into a liquid by the action of their mouths and digestive organs, and having transformed it into themselves, they then bring it forth from themselves...\(^{11}\)

The stress on the act of digestion reveals a key feature of Erasmus’s method: the collection of both pro and contra opinions to be stored under each topic heading. The topic headings “should be arranged by similars and opposites; for things which are related naturally suggest what comes next, and the memory is prompted in a similar way by opposites.”\(^{12}\) In addition, Erasmus writes that the collection of opposites will reinforce the rhetorical and argumentative prowess of their collector, engendering more precise and persuasive oration as well as writing.

The collection of pro and contra within the commonplace tradition was familiar to the Quaker community to which Pastorius belonged. In 1690, the minutes of the Philadelphia yearly meeting record a request for six copies of every book printed in England by Quaker authors; in 1691, the print run of approved books to be purchased from the local printer William Bradford was set at 200 copies, to send to neighboring

---

Quaker monthly meetings. By 1702, both the Philadelphia and London Friends agreed to exchange copies of every book concerning the Friends, whether written by Quakers or attacking them.

This Quaker inclusion of arguments pro and contra, familiar to Pastorius as a lawyer and scholar, is preserved in the pages of his Beehive. For instance, in entry number 488, “That it is unlawful for [Chris]tians to wage war,” Pastorius first lists six reasons from scripture to support its unlawfulness, as the Quakers claimed. He begins with the Prophecies of Isaiah and Micah, moves to the teachings of Christ in the Book of Matthew, and finishes with the writings of William Penn:

Love your enemies! ... If my kingdom were of this world, then would my servants fight ....Put up again thy sword into his place...because we wrestle not against flesh & blood...because the primitive [Chris]tians refused to fight, saying we are weapons, If Q[uaker]s can not fight for the Governm[en]t, they can neither fight against it. &c. W[illia]m Pen[n’]s preface to G[eorge] F[ox’s]. Journal.

But the entry includes scriptural references, treatises, and even extracts from fiction that support the contrary opinion:

That it be lawfull, others prove, 1. because Abraham before the giving of the Law, & the Israelites after did war 2. because defence is of Natural

---

13 James Green has suggested that this 200-copy agreement was also calculated to keep a disgruntled William Bradford from leaving the colony and thus leaving Philadelphia without a printer. See his The Rittenhouse Mill and the Beginnings of Papermaking in America, (Philadelphia: The Library Company of Philadelphia and the Friends of Historic Rittenhouse Town)1990.

right & Religion doth not destroy nature. 3 that John the Baptist did not condemn war. 4. That Cornelius & That Centurion Mat 8: 5. were souldiers [sic]...

In the margin, adjacent to both collections of opinions, he adds, “Weigh both in the Ballance of the sanctuary.” Not only are contrasting opinions preserved, but so is the discretion of the reader to choose one or the other. On the other hand, Pastorius does not give equal weight to the arguments justifying war. As a Quaker, Pastorius is a pacifist, and he ends his pro-war extracts with a note that “To all [of these reasons]...R[obert]. B[arclay]. in his Apology doth answer.”

How are the different emphases on the methods of collection—gathering only honey and never poison from the outset versus collecting and storing both for later consideration and use—made compatible within the pages of The Beehive? The Quaker example forms an intermediary link between Erasmus’s extreme tolerance on the one hand, and Pastorius’s poetic obsession with origins of the “good” and the “bad” on the other. While the Quakers are clearly interested in opposing opinions, it is equally clear in his entry against war that the Quaker opinion has already been categorized as honey, and that he who would wage war assumes the role of the spider. It is an instance where Erasmus’s ideal situation of careful collection and consideration of all viewpoints is strained by both the stakes of religious disagreement and the constraints of materials bearing out those disagreements. The books of anti-Quaker sentiment were gathered in order to be categorized as the opposition; and Pastorius remains in a sense stuck at this initial stage of gathering in order to emphasize “good” collection. But in the case of both
pro and contra arguments, Pastorius was limited by what he could lay his hands on in a small American colony, thousands of miles from the libraries and bookshops of Europe.

III. Books Available to Pastorius

The raw material for honey and poison alike depended on the books that were available to Pastorius. In one section, “Authors out of which [The Beehive] is Collected,” Pastorius lists upwards of 827 books, separated into two categories: Quaker and Non-Quaker authors. But the ten-page list of books does not represent the flowers that he selected for the extraction of their nectar. The latter consist only of the titles beside which he added an asterisk. For instance, of the 387 titles written by Quaker authors, Pastorius has asterisked—and so extracted from—110 titles, or roughly 28% of the available Quaker books. Thanks to the painstaking work of Al Brophy’s “Quaker Bibliographic World of Francis Daniel Pastorius’s Bee Hive,” we can calculate the wide range in length of the different titles, from four page pamphlets to Barclay’s nine hundred and eight page Truth Triumphant through Spiritual Welfare. Whether because of Pastorius’s process of selection or because of his limited access to books that he had borrowed, William Penn, Robert Barclay, and George Fox top the list of Quaker writers from whom Pastorius gathered nectar to take to his Hive.

Of the 440 Non-Quaker books listed, Pastorius has asterisked a little over 36%. Out of these 161 books, the variety in length is not as wide as in the case of the Quakers, and multi-volume texts are much more common than pamphlets. On the other hand, the kinds of books to be found under the latter heading are much more varied, ranging from

---

religious writings to husbandry manuals to the collected works of John Milton. For example, in a single page from his list of Non-Quaker titles, Pastorius has put an asterisk next to 26 of the 51 titles, including Thomas Heywood’s *Life of Ambrosius Merlin, with his Strange Prophesies*, George Horn’s *Arca Moses qua Complcitetur Primodia Rerum Naturaliam* (1668), Titan Leeds’s Almanacks for 1714 to 1720, several religious texts by Jane Leeds, Sir Roger L’Estrange’s translation of Seneca’s *Morals* (1696), Thomas Lupton’s *A Thousand Notable Things of Sundry Sorts...* (1675), John Locke’s *An Essay Concerning Human Understanding* (1710), writings by both William and Cotton Mather, and the popular novel *Letters Writ by a Turkish Spy* (1687).

In his study of *The Book Culture of a Colonial American City: Philadelphia Books, Bookmen, and Booksellers*, Edwin Wolf offers a complete survey of books in Philadelphia during Pastorius’s time that helps us to make sense of the list above. Wolf organizes his survey by owner, drawing upon a variety of historical documents from the inventories of estates to the inventories of cargo sent to Philadelphia from England. Wolf’s survey explains Pastorius’s access to the writings of John Locke, whose *Essay concerning Humane Understanding* is listed in *The Beehive*. William Penn had made a deal with Locke’s publishers, Awnsham and Churchill, to send shipments of consignment books. Consequently, there were copies of Locke’s works in Philadelphia, ranging from his *Common-place Book to the Holy Bible* (also referenced by Pastorius) to his more famous *Essay*. Some of the books listed above would have come from Pastorius’s own
library, which was, according to Wolf, “probably the largest in Pennsylvania before James Logan’s time.”

Very few of the books Pastorius owned can be found today, and only five of his volumes are now in the Library Company of Philadelphia: the works of Menippus, three works by George Horn (the Arca Mosis, Orbis Imperans, and Orbis Politicus) and Michael Pexenfelder’s Apparatus Eruditionis, or “Apparatus of Learning.” Pastorius also wrote poems and inscriptions about the books that he owned, first writing them into the copies and then transcribing them into The Beehive. In a poem entitled “Before Elisha Coles’s twofold Dictionary,” for instance, Pastorius remembers that it was “The first, though not the best, of all mine English Books, ...[which] deserves your frequent Looks.” As a Latin schoolmaster in the English-speaking Friends’ schools, Pastorius would have relied heavily on the book despite several of the faults noted in his poem:

...What this Book wants, or has but so & so, Go ye, and look my Hive in Folio;
Where to be sure you find much more, yea most that can be had at any Charge or Cost,
For I would not have you think that our brace Coles omitted no word in his Dictionary

The Beehive was not only a repository for extracts from Pastorius’s library but also a place where he recorded annotations and additions to the books he owned. When

Pastorius died in 1719, the books were left to his sons, but what later became of most of them remains unknown. Wolf tells us that as his death Pastorius’s library was valued at £35 10s. This was a large sum, according to Wolf, especially in relation to Pastorius’s 873 acres of land, valued at £150. “In those days of much land and few books, a book was approximately the monetary equal of half an acre of land.”¹⁷

The gap between the sheer number of books mentioned in *The Beehive* and the known books from Pastorius’s library suggests that a large portion of the books that he commonplace must have been borrowed. Pastorius both drew upon and copied out unpublished manuscripts, like Lydia Norton’s Journal. On “the 23rd of the 6th mo[nth] 1718,” he writes, “within 4 days (taking the Nights with it) I Copied 44 Quart[o] Leaves on 43 Pages of Lydia Norton’s Journal to & in Barbados, which she on her departure out of our Province took along.” In return for borrowing the book, Pastorius composed a good luck poem for Norton on her journey “in great haste.” Borrowing printed books is also documented, as with Seneca’s *Morals*, beside which Pastorius writes that the book was only lent to him long enough to commonplace only a small part of it:

This book being lent to me but for a short time, I digested only the preface, Post Script, and after-thought thereof, how ever every line of the whole is worth any mans while of Common-placing.

Looking to Wolf’s inventory, we discover that the lender was probably Pastorius’s neighbor, Henry Clarke, who had the only known copy of the book in Pennsylvania.

By contrast, Pastorius heavily commonplace the first pulp fiction spy novel of the day, *Letters Writ By a Turkish Spy*, although even here he was limited by the fact that

---

he only had access to volumes 1, 7, and 8. Wolf notes that this must have been from the partial set of the *Letters* that belonged to Edward Shippen of the prominent Philadelphia merchant family. We also know that Pastorius borrowed from John Gee’s library all eight volumes of the *Spectator*. And an edition of Sir Walter Raleigh’s *History of the World*, owned by William Penn, made it into *The Beehive* and was returned to its owner, from whom it was later stolen by John Lisk in 1704. From fellow schoolmaster Enoch Flower, Pastorius borrowed Robert Boyle’s *New Experiments, Paracelsus of the Chymical Tradition* and John Evelyn’s *Kalendrium Hortense*. Once again, Pastorius informs us of borrowed texts in the form of poems recorded about the transactions: a certain Samuel Humphrey, for instance, sent Pastorius a copy of Abraham Cowley’s works in folio, and Pastorius only returned it after pasting a Latin poem into the volume. Whether the owner would have wanted to receive the lengthy poem, which concludes that Cowley “out rimes” every Greek and Roman Poet from Sophocles to Catullus, is not recorded.

Pastorius treated books differently depending on whether or not he owned them. The almanacs that he owned offer an extreme example. “One year,” he wrote, “I stitched both D[aniel] L[eed]’s and J[acob] T[elner]’s Prognostications book to book” On the back of his makeshift volume, Pastorius wrote:

> If you look for an Almanack, Some have none; here are two for One

> But which of’em is the best? Answ. You may see yourselves, they lie both together.

> And what they say concerning Weather, I reckon is not worth a Feather...

---

18 Wolf, *The Book Culture of a Colonial American City*, 12.
The poem testifies to Pastorius’s deeply skeptical view of almanacs: the two “lie” together in terms of both their spatial proximity and their truthfulness. But the very fact that he preserves and writes about books that are “not worth a Feather” show how far he had moved from his original project of compiling extracts drawn from the supposed honey of Quakers rather than the poison of almanacs.

IV. Different Methods of Commonplacing

On the level of commonplacing, Pastorius’s methods of transferring commonplaces into The Beehive likewise differ according to whether or not he owned the source texts, and this is another way of reconstructing an idea of which titles were borrowed. Aside from those entries of The Beehive that Pastorius composes himself, such as poems dedicated to his neighbors, copies of letters he has written, or excerpts from his other manuscripts, there are three different practices of transcribing source material into the book. The first is a matter of recycling: Pastorius takes entries from his older commonplace books, largely written in Latin, German, and Dutch, and translates them into English when he adds them to The Beehive (see Figure 2).

Secondly, Pastorius copies out excerpts from books that he owns. Georg Horn’s Arca Mosis mentioned above provides an example of this. The book retains evidence that Pastorius read intensively: he corrects grammatical mistakes where they appear, underlines passages he finds important, and sometimes marks them in the margins. To aid himself in finding his own marginalia, he includes a short index to Horn’s work beside the title page (see Figure 3). Next, the passages noted are transferred to The Beehive, where he notes in his list of books that there is an “Item out of Gorgy Horny [sic] Arca
Mosis.” Looking to entry number 1628 on slavery, entitled “Negro,” a selected “item” has been copied under an appropriate heading: “Aethiopia cupis mollis & porosa, quia sol absumsit particulas rigidas, Arca mos. p. 47” (see Figure 4).

In order to collect information from books that he borrows but does not own, Pastorius keeps a “Waste-Book,” that he calls his Alvearialia. The Alvearialia consists of extracts from 75 titles that Pastorius borrowed, including Edward Phillips’s *Theatrum Poetarum*, Nicholas Culpepper’s 1661 *English Physician Enlarg’d* (Pastorius only owned only the 1652 edition), and *Letters Writ by a Turkish Spy*. The Alvearialia has nearly 300 pages, containing “such Phrases and Sentences which in haste were Booked down here, before I had Time to Carry them to their respective proper Places in my English-Folio-Bee-hive.” Materially, its make-up suggests precisely the immediacy of Pastorius’s note-taking: it is made of several different sizes of paper that have been folded into quires and roughly stitched together. Presumably, Pastorius jotted down his notes on the individual quires, which were composed of whatever paper was available. Only later did he stitch them together to form a waste-book. The Waste-Books were the least “digested” of his notebooks, in which the extracts from borrowed books were written consecutively as the books were read, with no regard for the topics into which they would later be sorted.

When he commonplaces *Letters from a Turkish Spy*, Pastorius extracts passages consecutively from volumes 1, 7, and 8, but leaves space between volumes 1 and 7 in the hope of acquiring and commonplacing the other volumes later. Once the chosen passages are copied out, Pastorius goes on to detach each extract from its chronological place in the *Letters*, distributing them under the Beehive’s topical headings, ranging from entries about War and the Ottoman Empire to Reading. Here, for example, is an extract that he
copied down in his *Alvearialia* as he came across it in reading the *Letters* (left column) and as he later transferred an edited and condensed version of it into his massive commonplace book:

**From the Waste-Book:**

<table>
<thead>
<tr>
<th>From the Waste-Book:</th>
<th>To the Beehive:</th>
</tr>
</thead>
<tbody>
<tr>
<td>p. 103 Mamut or Turkish Spy Vol. 1</td>
<td>[a. “Turk”]</td>
</tr>
<tr>
<td>Involved in war without &amp; within.</td>
<td>The letters of this Mahometan full of profitable Instructions &amp; good Morals....The Turks exactness to punish Crimes &amp; to reward Merit. Mamut.</td>
</tr>
<tr>
<td>Masaniello the Moses of Naples.</td>
<td></td>
</tr>
<tr>
<td>He Speaks of things with great frankness.</td>
<td></td>
</tr>
<tr>
<td>Ancient &amp; modern history, his friends &amp; confidents.</td>
<td></td>
</tr>
</tbody>
</table>

**The Turks exactness to punish Crimes & to reward Merit.** To Combat for the destruction of Truth. The Victors & Vanquished make often Bone-fires & sing their Te Deum for the same thing.

The decision-making process is threefold in this method of transfer: Pastorius must decide which heading or headings he wishes to copy the excerpt under, which portion of the excerpt should be copied, and finally what kind of reference to add to the excerpt. In the case of the *Letters Writ by a Turkish Spy*, the only data supplied across commonplace entries is the name of the novel’s protagonist, Mamut.19 Pastorius’s use of the *Letters* in

---

19 The reference is to Mamut as opposed to the novel’s Italian Author, Giovanni Marana, or its status as a fictional novel at all, because Pastorius had no way of knowing the book was a fiction. His entry beside the citation betrays as much: “Mamut the Arabian, who took upon him the name of Titus the Moldavian, who lived five & forty years undiscovered at Paris; giving an Impartial account of the divan at Constantinople of the
his entries for “Reading” (“Use Caution in the choice of books; else ‘tis but time mispent. Mamut”), or “Flies” (“buzzing about like wasps & hornets, stinging everyon they fasten on. Mamut”) follows suit. The displacement of author, title, or genre in the course of Pastorius’s decisions to store extracts from *Letters Writ by a Turkish Spy* is an indication of an important change in the way Pastorius treated books.

It is remarkable that Pastorius ended up commonplacing the *Letters Writ By a Turkish Spy* as much as, or even more than, Quaker works like William Penn’s. This relates to a shift in Pastorius’s conception of *The Beehive* as an encyclopedic project, moving away from an initial privileging of Quaker texts and the accompanying opposition between the spider and the bee. Pastorius adds only a few books to the list of Quaker books and pamphlets at the beginning of his bibliography, whereas the pages listing Non-Quaker books grow steadily. Of the 75 books listed in the *Alvearialia*, a Waste-Book started several years after Pastorius began *The Beehive*, only 4 are by Quakers. The additions to his own library that Pastorius documents in his *Res Propriae* likewise shift from Quaker to secular: 9 of his 17 folios are the works of Friends in his first inventory; but in an inventory that he added several pages later, of 12 folios, only 4 were written by Friends. The ratio is similar regardless of the size of the books. A page before the end of the bibliography taken up by Non-Quakers even includes books that Pastorius paradoxically condemns to the fire (“Books treating of Magical Arts better to be burnt than sold”) even as he asterisks them for commonplacing. These books include:

*The Pleasant Life and Rare Adventurs of the Witty Spaniard Lazarillo de Tormes* (1688),

most remarkable Transactions of Europe, and discovering several intrigues & Secrets of the Christian Courts, especially of that of France, from the year 1637-1682. Written originally in Arabick, first translated into Italian, afterwards into French, and now into English in 12o. 1687"
The Pleasant History of John Winchcombe, in his Younger Years Called Jack of Newberie (1597), and Francis Fairweather’s Pleasant Prognostication (1591).

What explains this shift of emphasis? When Pastorius began to collect his notes, the majority of his extracts came from the Quakers – whether from books defending or attacking them. That Pastorius’s approach would focus on the first level, the flowers and books available to him as a bee and scholar, in contrast to Erasmus’s stress on organization and digestion, makes sense given the scarcity of books to choose from. But by 1700, as Wolf shows, the increasing range of imported books allowed Pastorius to extend his range of interests, although books remained precious commodities.

Availability of books not only constrained Pastorius’s subject matter; it also was a major factor in his choice of language. He wrote on his first title page: “In this Volume I only collected the Best out of English (or Englished) Books, as you may see.” Pastorius writes in his opening page. In contrast to the dominant scholarly tradition, the vast majority of books that Pastorius commonplaces are written in English. To some extent, this was a function of availability: the books that William Penn owned and had imported were largely written in English because it was the tried-and-tested Quaker doctrine that each Friends’ pamphlet, testimony, or journal should be written in “Plain-English.” But Pastorius was also dedicated to “Englishing” because of his decision to educate his children in the dominant language both of his religion and of the colony. The prominence that Pastorius gives to English can, paradoxically, be seen in an entry on “Secret Writing” that displays his multi-lingual skills. When writing secret messages, he notes, “1. Write your English Mother tongue in hebrew, Greek, or high Dutch letters,” or “2. Interchange
hebrew, greek, latin, Italian, french, high & low Dutch with your English.” Pastorius draws upon his impressive knowledge of languages but English is the point of reference.

In the few instances when Pastorius cites Dutch books, he hastens to add that “Though these writings be in high Dutch, yet I set them here down in English & Latin.” If the books available to Pastorius shaped the design of *The Beehive*, they also determined that his book would promote English as a suitable language for scholarly discourse..

V. Changing Indexing Practices

Pastorius’s shifting interest in the content of *The Beehive* is paralleled by innovations in its structure. I began with the first page of *The Beehive* but this page was in fact only added at a late stage in the process. On the verso of the page, Pastorius includes the following couplet:

Francis Daniel Pastorius’s Paper Hive

Whose Beginning once was in page Fifty-five add pag. 54, 51, 49, 9, 8 & 7

In other words, Pastorius added the page numbers, together with a new title page, only at the very end of his project. The first “beginning” is now to be found on page 55. Other scholars have proposed looking at these title pages as a way of understanding the workings of the Beehive, but they have not traced Pastorius’s changing methods. See Patrick Erban, “‘Honey-combs’ and ‘paper-hives’: Positioning Francis Daniel Pastorius's Manuscript Writings in Early Pennsylvania,” *Early American Literature* NUMBER OF ISSUE (2002), PAGE NUMBERS, and Marion Dexter Learned’s *Biography* of Pastorius.
pages, as well as to the different systems of indexing that Pastorius had previously used to organize his information. Pastorius was constantly refining his methods of indexing, and stitching new pages into the front of the book to enact these changes. He was also constantly adding new material at the end of the book. The binding of the book reflects those constant changes: it is, in fact, a vellum folder rather than a proper binding, and it includes strips of vellum that Pastorius added to the spine so as to make space for new gatherings. By reassembling these pages in the order in which Pastorius wrote them, we can see that *The Beehive*’s opening page is in fact the final blueprint for the whole project.

The description given to readers on page fifty-five, the first title page, suggests that Pastorius conceived of *The Beehive* as an educational tool for his sons, Henry and John, only after he had already compiled part of its content (see Figure 6):

> After I had collected Two Volumes of delightful Proverbs, witty Sentences, wise and godly Sayings, Comprizing for the most part Necessary & Profitable Caveats, Advises, Doctrines, & Instructions. Out of many Authors of many minds & different Opinions... that my two Sons...might hereafter have some of their Fathers Steps, thereby to be guided to the same Diligence and Assiduity of Picking the BEST out of GOOD Writings.

The “Two Volumes” he refers to are a series of entries alphabetically organized under topical headings, and the first title page directs the reader to the earliest indexing system that Pastorius used in his *Beehive* (see Figure 7-9). I have illustrated the layout and workings of this index in Diagram 1: the chief principle of this first organization is a
division of the “many minds” into those two opposing camps, “Quaker” and “Non Quaker” authors. But he soon filled up this space and so he had to refer the reader to further pages that he added at the end of his alphabetized spaces. When the list of authors and texts grew beyond the original three pages that Pastorius had assigned for it, he ruled new pages, but now had to cope with the task of preserving alphabetical order, so he made what he at that time considered to be the necessary space for the authors and titles that he would be adding in future, and gave the blank spaces letter headings as well as references to the page number of the initial space they were meant to occupy, in order to key in the additions to their proper spaces in the first three pages (Steps 5-7). In another attempt at predicting how much space he might need in the future, he adds numbers and rules to blank spaces (Step 8) that also serve the function of saving space: with preruled lines, Pastorius would not be tempted to include anything more than the essentials of Author, Title, and publication date of the books.

Eventually, the problems of space and alphabetical order compelled Pastorius to begin an entirely new index:

For as much as the Old Index beginning formerly at this side, was not only too Compact being pressed together in the narrow Bounds of three Pages, but also defective & without true Alphabetical Order, &c. I at the latter Renewal or Renovation of this Manuscript...prefix a better & Completer at
the very Entrance or Threshold of this Book, to which I refer the
inquisitive Reader for his more satisfactory Content.

Pastorius’s main change in indexical systems occurs between the second and third title
tables (see Figures 10-13). On the Second Title Page (page fifty, Figure 11), he writes:

The Contents of this portable Volume of Importation, which, having
several times been fenced in by Stitching more Sheets, thereunto got quite
an other Form or Face than Its first was, even in the eyes of the Compiler
himself.

On the list of contents that follows, earlier directions to the old index are visibly crossed
out and replaced by instructions that direct the reader to the new index that has been
added at the front of the book, the innovations of which are illustrated in Diagram 2.
Instead of ruling alphabetical spaces in advance of the extracts that he would be
collecting, and later adding new sections to be keyed into an old and outdated index, each
entry was numbered consecutively in his newer system. Consequently, he no longer had
to worry about that preplanned alphabetical sequence that he used as his first method of
commonplacing, nor did he have to worry about wasted space, because every numbered
entry could be indexed under an appropriate heading or headings in the index at the front
of The Beehive for easy reference and recall. The new system of indexing varies
graphically from what we have seen in Diagram 1: the older index had a layout
comprised of horizontal entries, similar to that of the actual commonplace entries
themselves, while the appearance of the newer index splits the page into vertical
columns, a more efficient use of space made possible by the simplicity of topical
keywords as opposed to entries including the authors, titles, and publication information.
of books. Each of the keywords, once organized alphabetically under the appropriate letter, also allow the reader to recall both the alphabetically organized entries of the older style, whose reference symbol is “a,” as well as to other areas of the Beehive he had begun to develop, such as “p” is used to refer his reader to a separate section of the book entitled “Emblematical Recreations,” and finally, as the Beehive expanded with the numerical system he had introduced, so too would the index direct the reader to the “n” or numbered entries as he wrote them (Steps 1-4)

The new system also includes what Pastorius calls his “Annex” to help cope with concerns of space. In this system, keywords in the alphabetical index that run out of room for added entry numbers are organized numerically, and the number they are assigned to is referred back to the alphabetical index (see Steps 5-6). Using what he calls “Crotchets,” or brackets placed around a number, the reading looking at the new index is alerted instances where a particular topic, for instance “overmeasure,” has overmeasured its allotted space, and can moreover find the continued entry. It is a repetition of the same principle Pastorius introduced to save space between his entries, a numerical system, to help cope with the burden of space the index had taken on.

Nevertheless, those concerns of space persist, and the newer index prefixed to the front of the Beehive is again re-written, but this time in a different book altogether. Looking once again to the opening page of The Beehive, its appearance differs from that of the title pages we have seen. Pastorius’s opening directs the reader to an external index, whose title page is a fair copy of that initial introduction (see Figure 19-20). The movement to an external index allows for a final innovation in the mechanics and efficiency of the book. The new index catalogs all of The Beehive’s contents, and
moreover it can be flipped through and consulted without having to jump between content and index. Although the spacing of the index itself remained a potential problem, with the external index Pastorius had finally arrived at a system that could be used and added to indefinitely both by himself and by those who would inherit it.

The list of authors he had once used was now abandoned as a principle of organization, and it was only retained to serve as a bibliography. What had previously operated as a kind of index was now itself indexed under “A” as “The Authors, out of wch [The Beehive] is collected.” Pastorius continued to add to the bibliography as he would to any other entry, and the last books added to the list have publication dates up to 1717, two years before Pastorius’s death.

The new index dispenses with religion and author, instead using a system of alphabetized topics with the numbers corresponding to the appropriate extracts (see Figures 14-17). The change affects all previous methods. Under the new system of keywords, it is the topics themselves that are the focus, not the authors or books from which the extracts are selected. Indeed, he can now add to the list of authors/Authorities with which he began: “In this Volume as ye find Friends & No friend speak their Mind, But Reader of these Two, Care more for WHAT than WHO.” The what of the extracted passage is what matters now, not the who from which the extract was taken. In the old system, the entries with their abbreviated citations directed readers back to the list of authors and titles; in the new system, the index is the starting point, directing readers to the extracted sententiae.

In fact, the marginalizing of authorship, including his own, was an aspect of commonplacing that Pastorius was increasingly aware of. “I acknowledge with
Macrobius, that in this Book all is mine, & nothing is mine,” Pastorius writes in the opening to the Beehive, referring to the 5th century scholar whose writings on bees was one of the chief influences on Renaissance scholars. But Pastorius was also emphasizing the “group consciousness” that was promoted by the Quakers. The group consciousness, however, that promoted opposing views, since Quakers collected the attacks upon their beliefs as well as their own writings. Pastorius, having started by opposing the bee to the spider, decided that it was better to gather every point of view, however reprehensible her personally found it. The Beehive’s entry number 428 on “colonies” focuses on bees as well as people, and the relation between them was fundamental to Pastorius’s aims. “When the hive multiplies Nature hath taught Bees a way of ease by Swarms. Sending [the]m out as it were, a New Plantation.” In the next sentence, he adds: “People sent from one place to dwell in another.” Pastorius’s own Beehive was dedicated to the metamorphosis of any reader into a writer, and a bee, that not only digested the nectar of others, but also transformed it into honey.

VI. Conclusion

The same title page that marks Pastorius’s first reference to his newly developed index is also the first title page that conspicuously lacks all mention of spiders:

21 In her discussion of “The Inner Light” or divine inspiration as coined by George Fox at the founding of the Quaker movement in the 1650s, Luella Wright explains a notion of Quaker authorship that entirely concurs with Pastorius’s: “Group consciousness characterizes the entire Quaker literary contribution...The dominance of the Society intervenes between the personality of the writer and the mind of the reader... As an individual, recounting the events of his life, he stressed those that duplicated the experiences of others within the group; as a spokesman for the Society, he subordinates personal episodes in his own life to those shared by the group.” Wright, The Literary Life of the Early Friends, 10-11.
To painful Bees some do prefer (I spie)
The idle Drone, the Wasp, and Butterflie;
Alas! To these they give more leave to thrive!
Than Honey-Birds, who labour for the Hive.
And when perhaps once gotten into Grace,
By Gnats again are beaten out of Place.
So men of good desert
Must often stand apart.

Rather than an opposition between “good” and “bad” reading practices, there is only one bad reading practice: a reading that does not entail writing. Pastorius’s poetry changes the opposition between honey and poison into an opposition between industry and inertia, labor and laziness, bees and the drones, wasps, butterflies, and gnats who “lie at home & eat up what the Bees have taken pains for.” As he later added: “Odit ut expertes Liber hic, Sic odit inertes”: “As this book hates those who do not take part, thus it hates idlers.”

The more indiscriminately Pastorius gathered his materials for commonplacing, the greater the need for efficiency in his reading, writing, and organizing. This in turn engendered new practices of culling excerpts from books, owned and borrowed alike, that were stored in The Beehive. Each detail of the book’s content, structure, and material make-up contribute to a larger narrative of the way in which the circulation of information was changing in the commonplace tradition, and education at large. At the same time that information is stored in more easily accessible ways, it is translated into English, for an English-speaking community. His project had to address new concerns: from his place in Germantown, Pastorius recalled the intellectual life that he had left
behind in Europe while translating a multilingual tradition into the dominant language of his new home: not the German that Germantown might suggest, but English, the language of the great majority of books that he was able to find in his new situation.

Pastorius was constantly thinking through his constraints under which he worked: constraints of the books that were available; constraints of language; constraints imposed by his own systems of commonplacing. But there is a further constraint that he mentions on his first title page: the availability of paper:

I endeavored to Spare times to make this present Hive on a quire of fine paper which a Friend of mine Jacob Tellner departing for Europe did give me; And when all over filled up with honey-Combs, I was constrained to enlarge my Hive with more courser homely or home-spun stuff of this Country-Product.

After using the “fine” paper given to him in Europe, Pastorius was “constrained” to look for paper elsewhere. In fact, the “courser homely or home-spun stuff of this Country-Product” that he refers to was the first paper to be made in North America. It was made in Germantown, the very colony that Pastorius had established, by another immigrant: William Rittenhouse. As James Green has shown, American paper was first manufactured in 1691 when the Rittenhouses opened a paper mill, using the rags that were a by-product of Germantown’s linen industry.22 By 1700, the Rittenhouse mill was employing a watermark that consisted of the name “Pensilvania” and above it a “Kleet-

---

blatt” or three-leaf clover. The “Kleet-blatt” was taken from Germantown’s coat of arms – a coat of arms that which Pastorius himself had designed.

The ”constraint” that paper imposed upon his project right from the outset can best be explained by examining how a typical large commonplace book had been designed previously. In 1572, John Foxe published a commonplace book under the title *Pandectae* of 1572. It consisted of a preface, an index, and hundreds of blank pages with topical headings that awaited a reader’s notes. Cambridge University Library’s copy of Foxe’s *Pandectae* is typical of how such commonplaces books were used: of the 730 pages left blank for commonplaces, the owner added notes on only 99 of them, and the majority of those pages are not even half-filled (see Figure 21). To allocate space for a fixed set of alphabetical keywords with a page for each predetermined category would have entailed an enormous waste of paper, using up hundreds of sheets of blank paper, much of which would go unused. And Pastorius ended up with hundreds of more headings than are in Foxe’s commonplace book. If Pastorius had used Foxe’s method, he would have required more than 10,000 blank pages – a monster of a book that would have been virtually unusable.

But not only did Pastorius’s system eliminate such wastefulness of paper; it also enabled him to add new entries into *The Beehive* whether or not he had a pre-existing heading for them. The external index already contained the hundreds of headings that Pastorius had transcribed from the earlier index in *The Beehive* his earlier, but there was

---

room in the three columns to add new headings as necessary. Moreover, Pastorius could copy a new numbered extract directly into The Beehive and decide later what heading(s) to file the extract under. He could even re-index in new ways the mass of entries that he had already gathered.

Stitching the “fine” European paper to the “home-spun” paper of Germantown, Pastorius stitched together the German humanist education in which he had been trained and the new forms of education that he developed in North America. The stitched quires are physical remainders of the intellectual and linguistic merging that was only just beginning at the end of the seventeenth-century. The intellectual distances traversed by the stitched quires are an invitation to readers to take part in a project of open-access information that would define Benjamin Franklin’s project as a writer and printer. As Pastorius wrote:

Thus I leave it for the Perusing of those for whom it was contrived in the first beginning thereof; Nevertheless if any other besides them should happen to be benefitted by these Miscellanies, It will not sad, but glad my heart.

It is an invitation that echoes throughout the pages of The Beehive, one aspect of the project that never changed.

Works Cited


Pastorius, Francis Daniel. *Alvearialia, Or such Phrases and Sentences which in haste were Booked down here, before I had Time to Carry them to their respective


Figure 1: The Opening Page of the Beehive.
Figure 2: An entry on “Secret Writing from the Beehive (above), the same entry in Dutch in one of Pastorius’s earlier commonplace books. Courtesy of the Library Company of Philadelphia.
Figure 3: Pastorius’s Copy of George Horn’s *Arca Mosis*, with a brief index added. Courtesy of the Library Company of Philadelphia.

Figure 4: Page 47 of Horn’s *Arca Mosis*, with a brief marginal notation. The excerpt was later transferred to the Beehive.
Figure 5: Pastorius’s *Alvearialia*, comprised of different sized quires stitched together and containing excerpts from 75 different borrowed books.
Figure 6: Page 55, the First Title Page of the Beehive.
Figure 7: Page 54.
Figure 8: An Initial Page of “Quakers” in the Old Index (see Diagram 1.1-2)

Figure 9: A page added later to the Old Index (see Diagram 1.3-4)
Figure 10: Page 51, the Second Title Page of the Beehive.
Figure 11: Page 50 opposite, where direction to the old index is crossed out and replaced with the new one; the old index is recovered as a bibliography.

Figure 12: The entry for the old index as a keyword in the new one: “Authors out of which this book is collected.”
Figure 13: Page 49, the Third Title Page of the Beehive.
Figure 14: Page 9, the New Index to the Beehive.

Figure 15: The entry for “overmeasure,” where the “Crotchet” system is used to save space.

Figure 16: The entry for “overmeasure” in the “Annex.”
Figure 17: Page 8, the New Index to the Beehive.
Figure 18: Page 1, the Fourth Title Page of the Beehive.
Figure 19: The Opening Page of the Beehive.
Figure 20: The External Index to the Beehive.
Figure 21: A typical page from John Foxe’s *Pandectae*. 
1.2
6. The page is ruled in the same way, but a numerical system is added to the left margin.
7. The page number and marginal numbers of these new additions are then cited in the appropriate spaces of the initial index, an attempt at preserving alphabetical order despite the lack of space (see step 5).
8. Letters are added to the outer left margin, not in alphabetical order, but nonetheless acting as ways of grouping the entries of each space by last name.
9. Numbers are added to each individual entry (as opposed to each of the larger spaces as in step 6).
10. To preserve numerical order, numbers are added where there are blank spaces. This limits further Author/Title entries to one line (see step 4).

Diagram 1: Pastorius’s Older Method of Indexing Authors

1.1
1. The margins are ruled, and the page is broken up into large, equally size boxes for content.
2. A heading is added to the page: “Quaker” or “No Quaker.”
3. The author of the book is added, and its full title, year of publication, and format.
4. A line is drawn after a finished entry, to separate it from future entries. Since the titles vary in length, entries have no standard line height: the lines here are not evenly spaced.
5. After three pages like this, there is no room left to preserve the alphabetical ordering of last names, and Pastorius begins a new page (see 1.2). Underneath each letter heading, he lists the page number where its continuation can be found.
Diagram 2: Pastorius’s Later Method of Indexing Keywords

2.1
1. The margins are ruled, and the page is broken up into four columns.

2. Each letter of the alphabet is used as a heading; the allotted space under each depends on the letter.

3. Keywords or topic headings that describe the content of entries are organized alphabetically under each letter. Space is left between each pre-existing keyword in attempt to leave room for additions.

4. Attached to each keyword are four possible references that direct the reader to the place in the book where they might find the entry related to the topic:
   “a.” stands for the alphabetical part of the Hive from p. 134 to p. 217.
   “n.” Refers entries organized numerically.
   (that begins on p. 218)
   “p.” Refers to a section of the book entitled “Emblematical Recreations.”
   [. .] Refers to an addition of the index.

2.2.1. “The Annex”
5. Since space is always a concern, Pastorius attaches an additional system that works with his alphabetical index and is organized numerically. He calls the symbols that designate this system “Crotchets:”;

“One or more Figures inclosed in a Crotchet, e. g. [.1.] after the word overmeasure, refers you to the Additions annexed to the Alphabetical table.”

6. Each of these numbers is used as a reference in the main index to when there is no further space to add new keywords and page references in alphabetical order.

Diagrams 2.1-2.2 are also used in the External Index to the Beehive Pastorius later develops.