



# The Virtues of Being Born in 1706

## Citation

Blair, Ann. "The Virtues of Being Born in 1706." Harvard Library Bulletin 17, no. 1-2 (2006): 1-13.

## Permanent link

<http://nrs.harvard.edu/urn-3:HUL.InstRepos:29669482>

## Terms of Use

This article was downloaded from Harvard University's DASH repository, and is made available under the terms and conditions applicable to Other Posted Material, as set forth at <http://nrs.harvard.edu/urn-3:HUL.InstRepos:dash.current.terms-of-use#LAA>

## Share Your Story

The Harvard community has made this article openly available.  
Please share how this access benefits you. [Submit a story](#).

[Accessibility](#)

# HARVARD LIBRARY BULLETIN

Benjamin Franklin: A How-to Guide

Catalog of an Exhibition at Houghton Library

June 5 - September 23, 2006

and the Collection of Historical Scientific Instruments

June 5 - December 19, 2006

*Edited by*

*Joyce E. Chaplin*

Spring-Summer 2006

Volume 17: Numbers 1-2

*Editor*  
 William P. Stoneman

*Coordinating Editor*  
 Matthew Battles

ADVISORY BOARD

BERNARD BAILYN *Adams University Professor, Emeritus* • CHARLES BERLIN  
*Lee M. Friedman Bibliographer in Judaica in the Harvard College Library* •  
 LAWRENCE BUELL *Powell M. Cabot Professor of American Literature* •  
 BARBARA S. GRAHAM *Associate Director for Administration and Programs*  
*in the University Library* • FRANCISCO MÁRQUEZ *Arthur Kingsley Porter*  
*Professor of Romance Languages, Emeritus* • ROGER E. STODDARD  
*Senior Curator in Houghton Library, retired* • RICHARD F. THOMAS  
*Professor of Greek and Latin* • HELEN VENDLER *A. Kingsley Porter University*  
*Professor* • ARTHUR E. VERSHBOW *Honorary Curator of Illustrated Books in the*  
*Harvard College Library* • CHRISTOPH. J. WOLFF *Adams University Professor* •  
 JAN ZIOLKOWSKI *Arthur Kingsley Porter Professor of Medieval Latin*

*The Harvard Library Bulletin is published quarterly by Houghton Library of the Harvard College Library. Annual subscription \$35 (U.S., Canada, and Mexico), \$41 (foreign); single issue \$15.*

*Editorial correspondence should be addressed to William P. Stoneman, Houghton Library, Harvard University, Cambridge, MA 02138, email stoneman@fas.harvard.edu; claims and subscription inquiries should be addressed to Monique Duhaime, Houghton Library, Harvard University, Cambridge, MA 02138, email duhaime@fas.harvard.edu.*

*Publication of the Bulletin is made possible by a bequest from George L. Lincoln '95, and by a fund established in memory of William A. Jackson.*

*The paper used in this publication meets the minimum requirements of the American National Standard for Information Sciences—Permanence of Paper for Printed Materials, ANSI z39.49-1984.*

*Copyright © 2007 by the President and Fellows of Harvard College. Periodicals postage paid at Boston, Massachusetts.*

*ISBN for this issue is 0674021452. Distributed by Harvard University Press, Cambridge, Massachusetts and London, England.*

Contents

Preface	vii
<i>Joyce E. Chaplin</i>	
The Virtues of Being Born in 1706	1
<i>Ann Blair</i>	
Amusing Physics	14
<i>Jessica Riskin</i>	
American Knowledge: Import and Invention	29
<i>Joyce E. Chaplin</i>	
Benjamin Franklin and a Tale of Two Electrical Machines	33
<i>Sara J. Schechner</i>	
Poor Richard's Offspring: Benjamin Franklin's Influence on the American Almanac Trade	41
<i>Thomas A. Horrocks</i>	
BENJAMIN FRANKLIN: A HOW-TO GUIDE	47
Catalog of the Exhibition	51
<i>Joyce E. Chaplin</i>	
I. HOUGHTON LIBRARY	
The Circulation of Knowledge	
A. How to ... learn things	51
B. How to ... get the word out	54
C. How to ... understand the big theories	57
D. How to ... do good	59
E. How to ... be a political animal	62
F. How to ... spread your ideas	64
G. How to ... see the world	68
H. How to ... be Benjamin Franklin	69
I. Additional Items	71
II. COLLECTION OF HISTORICAL SCIENTIFIC INSTRUMENTS	
Science and Sociability	
A. How to ... be well rounded	74
B. How to ... be charming	75
C. How to ... see clearly	78
D. How to ... do an experiment	80
E. How to ... talk to Neptune	87
F. How to ... win friends and influence people	90
Contributors	100

## Preface



Il est né le 17 de Janvier  
à Philadelphie, en la Colonie de la Pennsylvanie.  
C'est le plus grand génie de son pays.  
Il est mort le 17 de Mars de l'année 1790.

Figure 1. Portrait of Benjamin Franklin, in *Oeuvres de M. Franklin*, ED. JACQUES BARBEU-DUBOURG (Paris, 1773), frontispiece. Reproduction courtesy of Houghton Library.

AT AGE EIGHT, Boston native Benjamin Franklin was bound for Harvard. Josiah and Abiah Franklin's bookish son seemed suited for the kind of contemplative life that would begin at a grammar school, progress through college, and end with a career in the pulpit, as a Harvard-educated divine. His father, Benjamin later recalled, intended him "as the Tithe of his Sons to the Service of the Church." But Franklin's father ran short of money and, rather than pay his son's school fees, had to put him to work. Benjamin Franklin would be famously self-educated, an outsider to academia. Yet throughout his life he kept returning, in one way or another, to Harvard, the institution of higher learning with which he had the longest and strongest connections. That was possible because Franklin's life marked an important, historic development: the rise of self-education and its eventual convergence with the formal education typical of colleges, academies, and learned societies.<sup>1</sup>

It seemed appropriate in 2006, the 300<sup>th</sup> anniversary of his birth, to explore the nature of Franklin's education and to do so at Harvard. This issue of the *Harvard Library Bulletin* is devoted to the recent exhibit, *Benjamin Franklin: A How-to Guide*, held jointly at Harvard's Houghton Library and Collection of Historical Scientific Instruments, the only major exhibition on Franklin to be organized in the Boston area during 2006. It may seem an odd tribute to a man who had not only abandoned Boston for Philadelphia but who had also sent up Harvard College in one of the satirical and anonymous "Silence Dogood" letters his brother published in his newspaper, the *New-England Courant*.

In that spoof, the sixteen-year-old Franklin's alter ego, the Widow Dogood, dreams she enters the Bay Colony's "Temple of LEARNING," a place fiercely guarded by "Riches." In the great hall of the temple was a throne, on which "sat LEARNING in awful State." Dogood notes that the throne was attended by the personification of "English," who seems pleasant enough, but also by "Latin, Greek, Hebrew, &c.," who are withdrawn and forbidding. She mocks the many students who depart the temple with the ability "to carry themselves handsomely, and enter a Room genteely," yet remain "as great Blockheads as ever, only more proud and self-conceited."<sup>2</sup> (How little the stereotypes of Harvard students have changed over the past three hundred years.)

Franklin, in the guise of Dogood, was able to criticize academic education meaningfully because he had an alternative. His praise of "English" indicated the new range of materials, available in vernacular languages, which conveyed knowledge to

1 *The Autobiography of Benjamin Franklin*, ed. Leonard W. Labaree, et al., 2nd ed. (New Haven: Yale University Press, 2003), 52.

2 Silence Dogood, no. 4, printed in the *New-England Courant*, May 14, 1722, *The Papers of Benjamin Franklin*, Leonard Labaree, et al., eds., 37 vols. to date (New Haven: Yale University Press, 1959-), II, 15-17.

people who did not know Latin, Greek, and Hebrew, the arcane tongues that had once been necessary for true learning. Franklin was born just in time to enjoy a wealth of how-to reference works and guides to everyday or even specialized skills, from swimming to experimental science. He used the new books and pamphlets, as well as educational and technical instruments, to educate himself. Not only does Harvard own many historical texts and objects from this how-to universe, but many of them were from Franklin himself, donations he made once he was the famous Dr. Franklin, master of electricity and leader of a new and revolutionary nation.

When I approached the Houghton and the Collection of Historical Scientific Instruments about doing a Franklin exhibit, I wanted that exhibit to offer a middle way in Franklin studies. On the one hand, there is the popular myth of Franklin as unprecedented frontier autodidact, unique in his ability to rise above his provincial surroundings and become an icon of wisdom. Many of the recent biographies of Franklin have repeated and embellished that myth. On the other hand, academic specialists in several branches of history and literature point out that Franklin's self-education itself had a history—he did not start a tradition of self-improvement, but inherited and then elaborated one. The popular and scholarly images have, unfortunately, led almost completely separate lives.<sup>3</sup>

Myths die slowly, but the exhibit might, I hope, have changed a few people's minds about Franklin. He is all the more interesting for having brilliantly exploited the new possibilities that self-education offered him. And I hope the exhibit might have prompted even the academic specialists to consider new topics in Franklin studies and in eighteenth-century studies generally. The essays in this issue of the *Harvard Library Bulletin*, for instance, re-examine Franklin's reading and his printing; analyze the experimental science done in Britain, France, and British America; and note the long history of the European reference works that were central to Franklin's experience. We present here a highly academic analysis of the history of self-education—a fit tribute to the self-taught Boston boy who managed both to poke fun at and make donations to an institution he never attended, Harvard College.

I am grateful to William Stoneman, Thomas Horrocks, and Sara Schechner, as well as the institutions listed on page 49 of this catalog, for their help with the exhibition. And I thank Duncan Todd, who helped prepare the catalog.

Joyce E. Chaplin

December 2006

<sup>3</sup> For an overview of many of the recent works on Franklin, see my "Benjamin Franklin and Science, Continuing Opportunities for Study," *Perspectives on Science* 14 (2006), 232-51.

## The Virtues of Being Born in 1706

Ann Blair

We will likely someday find ourselves telling those born in 2006 about the remarkable technical and social transformations in the decades that preceded their birth—changes which we have experienced and which they will take for granted. This is a cycle of American identity formation which has repeated itself many times over, notably within living memory over the last century: my grandmother remembers the introduction of the automobile, my father that of plastic, and I can talk about life before the PC and the VCR. My children may remember the introduction of the cell phone or may regale younger generations with stories of what life was like before the next major innovation which has not yet appeared on the market. For all the impact of new technologies on early twenty-first-century American lives, many of them associated with lasting social changes, to be born in 1706, as Benjamin Franklin was, was to take for granted recent transformations that were more radical even than those of which people born in 2006 will be told.

The transformations of the final decades of the seventeenth century were not primarily technological (though the microscope was invented in this period) nor limited to complex theoretical developments, such as the ideas of Newton or Spinoza, but constituted what one historian has called a "crisis in European consciousness" in which a large majority of the reading public abandoned many long-held traditional assumptions about the nature of the physical world and of human experience.<sup>4</sup> Aristotelian physics, which had been under piecemeal attack since the sixteenth century by various developments we call for convenience the "Scientific Revolution," was virtually abandoned almost everywhere.<sup>5</sup> In its stead the University of Paris, bastion of conservatism, embraced Cartesianism in the 1690s, precisely as Newton was being lionized in England for his *Principia* (1687). Paris would shift to Newtonian views only in the 1740s. Whether Cartesian or Newtonian, the new physics was in any case a mechanical philosophy based on the assumption that all natural phenomena could be explained by the interactions of matter in motion. Gone were physical explanations based on form and intrinsic qualities, sympathies, or direct divine intervention.

<sup>4</sup> Paul Hazard, *Crise de la conscience européenne* (1680-1715), (Paris: Boivin, 1935); translated by J. Lewis May as *The European Mind: The Critical Years, 1680-1715* (New York: Fordham University Press, 1990; first published 1953).

<sup>5</sup> Exceptions included the University of Cervera, near Barcelona, where Aristotelian physics was taught through the 18th century; for an overview of the strength and decline of Aristotelianism, see Ann Blair, "Natural Philosophy" in *The Cambridge History of Science*, vol. 3: *Early Modern Science*, ed. Katharine Park and Lorraine Daston (Cambridge: Cambridge University Press, 2006), 365-405.

In the interpretation of human experience, the “quarrel of the ancients and the moderns” and its complex version in the English “battle of the books” marked the end of a long-lived narrative of human history as an inevitable decline from the grandeur of antiquity. In its place a narrative of progress proclaimed the superiority of the moderns over the ancients. Increased contact with other cultures (which featured admirable moral codes without reliance on revealed religion) helped to foster a sense of cultural relativity, even though non-Western peoples were often also interpreted as primitive in a Eurocentric scheme of cultural evolution. The first stirrings of what would be called biblical criticism questioned the divine authorship of the Bible and the necessity of various Christian dogmas; these trends favored deism, but were less widely diffused than the new science or the new confidence in the modern.

In many cases, antecedents to these various positions associated with the Enlightenment can be identified well before the late seventeenth century, but the decades called those of “crisis” (1680-1715) were crucial in diffusing the new ideas so broadly as to overturn traditional views. New cultural institutions that appeared during these decades supplemented those already in existence since the sixteenth century to help make this diffusion possible. In addition to salons where elite men and women vied for literary prowess, and academies designed to gather the best minds for the advancement of knowledge, coffeehouses offered a space where men could gather, drink a sobering beverage, and read and discuss what they read.<sup>6</sup> Periodical publications grew rapidly starting in the 1660s: monthlies offered reviews on new books, moral weeklies proffered advice on behavior and cultural attitudes, and daily papers combined news with advertisements and practical information. These genres further sealed the fate of Latin as a dead language, used only in school and when an author wished to avoid reaching a large audience.<sup>7</sup> The dominance of books in the vernacular gave greater force to national language barriers, but periodicals also alleviated the problem by reporting on books in foreign languages.<sup>8</sup>

Born in 1706, Franklin was part of the first generation to grow up with a periodical press. He taught himself to write from imitating the essays of the weekly *Spectator*. He gained his livelihood from publishing newspapers, first as an apprentice to his brother, then for employers in Philadelphia and London, and finally for his own considerable

profit. The scarcity and expense of books in the colonies, most of which were imported from England, made Franklin and other colonists particularly reliant on newspapers, which comprised 80% of all items printed in the colonies, 1640-1790.<sup>9</sup>

Being born in 1706, Franklin never had to trouble himself with mastering Latin or the complexities of Aristotelian philosophy and its centuries-long commentarial tradition in order to command the attention of learned men.<sup>10</sup> Franklin was of the first generation to grow up with the ideas of the new science. He could learn from book reviews and essays in periodicals about the latest developments. In adulthood, when he turned his attention to science, he could rely on new reference works, notably Ephraim Chambers’s *Cyclopaedia: or, an Universal Dictionary of Arts and Sciences* (1728) to master what was established knowledge in the various disciplines. Franklin was the only autodidact (to my knowledge) to have risen to the highest level of achievement and recognition in his day exclusively through diligent reading and personal observation. Earlier thinkers may have posed as autodidacts by spurning as useless what they had learned in school, as did René Descartes (1596-1650) for example, but Descartes had in fact been trained in one of the best schools of his time.<sup>11</sup> During the eighteenth century, furthermore, the “new” science was no longer new. As science became increasingly specialized and professionalized, technical training beyond what was available in reference books and journals was a prerequisite to making a significant contribution.<sup>12</sup> But two key components of Franklin’s autodidacticism were new in the early eighteenth century—the periodical and a “modern” reference work like Chambers’s *Cyclopaedia*.

### *The Reference Book and the Periodical*

The reference book and the periodical seem to stand at opposite ends on the spectrum of contemporary genres. A reference book like Chambers’s in two folio volumes was very expensive (four guineas or eighty-four shillings) and designed to last for generations. By contrast newspapers, printed on a whole or half sheet, were ephemeral and cheap

9 See Hugh Amory, “A Note on Statistics,” in *A History of the Book in America* vol 1: *The Colonial Book in the Atlantic World*, ed. Hugh Amory and David Hall (Cambridge: Cambridge University Press, 2000), appendix 1, pp. 512 and 516 (but newspapers represent 43% of all sheets printed in Boston in 1765).

10 Franklin did not own many of the Greek and Latin classics common in large libraries of the time; see James Green, ed., *Poor Richard’s Books* (Philadelphia: Library Company of Philadelphia, 1990), 6; and more generally, Edwin Wolf 2nd and Kevin J. Hayes, *The Library of Benjamin Franklin* (Philadelphia: American Philosophical Society and Library Company of Philadelphia, 2006).

11 At the Jesuit Collège de La Flèche; scholars have recently emphasized Descartes’ debt to the Jesuit genre of meditations and to scholastic argumentation. See for example Roger Ariew, “Descartes and Scholasticism: The Intellectual Background to Descartes’ Thought,” in *Cambridge Companion to Descartes*, ed. John Cottingham (Cambridge: Cambridge University Press, 1992), 58-90.

12 See for example Andrew Warwick, *Masters of Theory: Cambridge and the Rise of Mathematical Physics* (Chicago: University of Chicago Press, 2003).

6 For a good overview of this social context, see Dorinda Outram, *The Enlightenment* (Cambridge: Cambridge University Press, 1995), ch. 2.

7 As in the case of Newton’s *Principia (Philosophiae naturalis principia mathematica, 1687)* or Linnaeus’s *Systema naturae* (1735), which was the last major scientific work to be published in Latin. On the fate of Latin more generally, see Françoise Waquet, *Latin, or The Empire of the Sign: From the Sixteenth to the Twentieth Century*, tr. John Howe (London and New York: Verso, 2001).

8 Book reviews appeared in many early journals, such as the *Journal des sçavans* (1665-1939), the *Philosophical Transactions* (1666-) produced by the Royal Society, the *Acta eruditorum* (1682-1731), and the *Nouvelles de la république des lettres* (1684-1718) begun by Pierre Bayle.

(ten shillings per year, or about twopence per issue, for the *Pennsylvania Gazette*).<sup>13</sup> Yet both genres could serve similar instructional purposes, as is clear from their borrowing from one another. One editor of a later edition of Chambers's *Cyclopaedia* was accused of lifting an article from the *Monthly Review*,<sup>14</sup> and conversely the *Pennsylvania Gazette* planned from its outset in October 1728 to reprint articles from Chambers's *Cyclopaedia* systematically. The first editor of the *Gazette*, Samuel Keimer, boasted that this new paper would "Exceed all others that ever were in America":

It will contain, at Times, the Theory of all Arts, both Liberal and Mechanical and the several Sciences both humane and divine. . . . after an Alphabetical Order, the whole being the most compleat Body of History and Philosophy ever yet publish'd since the Creation. . . . [So that] each Person who preserves these Papers, will possess the richest Mine of useful Knowledge (of the Kind) ever before discover'd, except of late in Europe.<sup>15</sup>

When Franklin took over the *Gazette* a year later he abandoned the regular reprinting of articles, noting that it would take fifty years to cover all of Chambers's articles and that this piecemeal publication of an alphabetically arranged dictionary precluded following up cross-references and articles of related interest that might appear ten years apart. But Franklin acknowledged that publishing from dictionaries was useful for the "curious, who never had and cannot have the advantages of good libraries," and promised to communicate such "particular Parts as appear to be of the most general consequence."<sup>16</sup> Franklin reprinted a few articles from Chambers in subsequent issues of the *Gazette*: on "Hemp" (reportedly provided at the request "of some of our Country Subscribers"), "Inoculation," and "Free Masons."<sup>17</sup> The information Franklin disseminated through his periodical distribution network (especially once he held the position of postmaster general and no longer faced the obstruction of his rival Bradford) circulated much faster and more widely than it ever could in reference book form. An article could reach thousands of subscribers in one week.<sup>18</sup> By contrast

13 See Richard Yeo, *Encyclopedic Visions: Scientific Dictionaries and Enlightenment Culture* (Cambridge: Cambridge University Press, 2001), 38 (cost of Chambers), 56 and 70-75 on the relationship between periodical and reference book. On the cost of the *Gazette*, see James N. Green and Peter Stallybrass, *Benjamin Franklin: Writer and Printer* (Newcastle, DE, Philadelphia and London: Oak Knoll Press, The Library Company of Philadelphia, and The British Library, 2006), 36.

14 Yeo, *Encyclopaedic Visions*, 75

15 *Pennsylvania Gazette*, October 1, 1728.

16 *Pennsylvania Gazette*, October 2, 1729.

17 *Pennsylvania Gazette*, October 16, 1728 (hemp); May 28, 1730 (inoculation); and May 13, 1731 (free masons).

18 The *Gazette* reached a circulation of 1,500; Franklin's more popular almanac *Poor Richard* sold about 10,000 copies per year; see Green and Stallybrass, *Benjamin Franklin*, 36, 104.

a reference book like Chambers's took months to print and years to sell its print run.<sup>19</sup> The crucial difference was that readers of the periodical had to be satisfied with and were assumed to benefit from any article Franklin might reproduce, whereas owners of the reference book could themselves select what to read from among the full range of available articles.

The periodical was a new genre for the dissemination of information, but the reference book as a genre was not. Hence to understand what was distinctive to Franklin's time, we need to glance back at the earlier stages of development of reference works. If we take a reference work to be a large book gathering useful information and meant for consultation rather than to be read from end to end, we can trace the genre in a line of continuous development in Europe back to the thirteenth century.<sup>20</sup> Although there probably were consultable reference works in antiquity, almost none of them survived to later periods—only Pliny's *Natural History* was transmitted in the middle ages and beyond. But medieval and Renaissance reference books rapidly featured more sophisticated finding devices than Pliny's list of contents and basic topical arrangement. A variety of factors stimulated the development during the thirteenth century of alphabetical indexes (starting with biblical concordances), the division of scholastic texts into clearly delineated and numbered sections and subsections (which facilitated locating a particular passage to consult), and compilation on a large scale (most often justified as an aid to preachers).<sup>21</sup>

The largest medieval reference book was the *Speculum maius* ("Great mirror," 1255) of the Dominican Vincent of Beauvais, who explained the utility of his work in terms which would have seemed familiar still in the eighteenth century: "Since the multitude of books, the shortness of time and the slipperiness of memory do not allow all things which are written to be equally retained in the mind, I decided to reduce in one volume in a compendium and in summary order some flowers selected according to my talents from all the authors I was able to read."<sup>22</sup> These "flowers" were excerpts from a wide range of authors (Christian and ancient) offering definitions, descriptions, and examples in four volumes spanning the natural world, the arts and sciences, the

19 New editions and reprints provide a good indication that previous editions had sold out; new editions of Chambers's *Cyclopaedia* appeared in London in 1738, 1741 and 1743 and a Supplement in 1753. Print runs could vary, but the average in Chambers's time was 1,500. These figures are from Yeo, *Encyclopaedic Visions*, 50-51.

20 The term "reference work" was only coined in the 19th century; for some discussion of terms used to describe reference works before then, see my "Reading Strategies for Coping with Information Overload, ca. 1550-1700," *Journal of the History of Ideas* 64 (2003), 11-28; and the book I am preparing on methods of information management in early modern Europe (forthcoming, Yale University Press).

21 On these developments, see Mary A. Rouse and Richard H. Rouse, *Authentic Witnesses: Approaches to Medieval Texts and Manuscripts* (Notre Dame, IN: University of Notre Dame Press, 1991).

22 Vincent of Beauvais, *Speculum naturale* [portion of *Speculum maius*], in *Bibliotheca mundi* (Douai, 1624), I, prologue, 1.

vices and virtues, and human history. Each volume was divided into many books and hundreds of short topical chapters accessible through a detailed table of contents; an alphabetical index to the history volume was also compiled in the fourteenth century. The result totaled some three million words and no doubt engaged the efforts of many fellow Dominicans for a number of years.<sup>23</sup> Although Vincent operated on a grander scale than other medieval compilers, he justified his work in the same terms as others did, referring to its utility (“utilitas”). Vincent expressed confidence that his work would be “of no small utility” not only to himself, but to help all studious readers “to know God and His creatures visible and invisible, and through this to love Him, to excite the heart to devotion ... but also to preach, to read, to dispute, to resolve and to explain clearly almost any method and any kind of art.”<sup>24</sup> Vincent listed there the principal activities of the Dominicans (the immediate target audience for Vincent’s *Speculum*) and of the medieval intellectual elite, mostly clerical, who would have used the work.

During the sixteenth century large-scale compilations became more common. They were cheaper to produce than manuscripts of equivalent size, but always represented the high end of the book market due to their large size. Printing techniques that facilitated consultation included dingbats and separators, alphabetical indexes, and branching diagrams to highlight the breaks and interconnections between topics. Early modern reference works included a few editions of Vincent’s *Speculum maius*, but many more editions of new texts, such as the *Polyanthea* of Domenico Nani Mirabelli (about forty editions 1503-1681), or the nine editions of the largest and most expensive compilation, Theodor Zwinger’s *Theatrum humanae vitae* (“Theater of human life,” 1565) which culminated in a sequel (the *Magnum theatrum* or “Great theater”) totaling over 7000 folio pages (with an estimated 15 million words). The new compilations continued to be focused on authoritative textual material from Christian and an increasingly wider range of ancient and modern authors, thanks to the efforts of humanists. As in the middle ages, some early modern reference books were arranged alphabetically (notably the *Polyanthea*, drawing on medieval florilegia), others systematically (like Zwinger’s *Theatrum* or Vincent’s *Speculum*, though the *Theatrum* featured more alphabetical indexes). Early modern compilers also explained that their work was useful; they especially targeted students, teachers, and preachers, but they boasted that they served

23 For the latest scholarship on Vincent of Beauvais, see *Lector et compilator: Vincent de Beauvais frère prêcheur*, ed. Serge Lusignan, Monique Paulmier-Foucart, Marie-Christine Duchenne (Grâne, France: Creaphis, 1997).

24 “Certus sum enim, et confido in domino, hoc ipsum opus non solum mihi, sed omni studiose legenti non parum utilitatis afferre, non solum ad Deum per se, et creaturas visibiles et invisibiles cognoscendum, ac per hoc diligendum, et cor suum in devotione charitatis multorum doctorum ignitis sententijs et exemplis excitandum, verum ad praedicandum, ad legendum, ad disputandum, ad solvendum, necnon et generaliter ad unumquemque fere modum et genus artis cuiuslibet clare explicandum.” Vincent of Beauvais, *Speculum naturale*, prologue, 3.

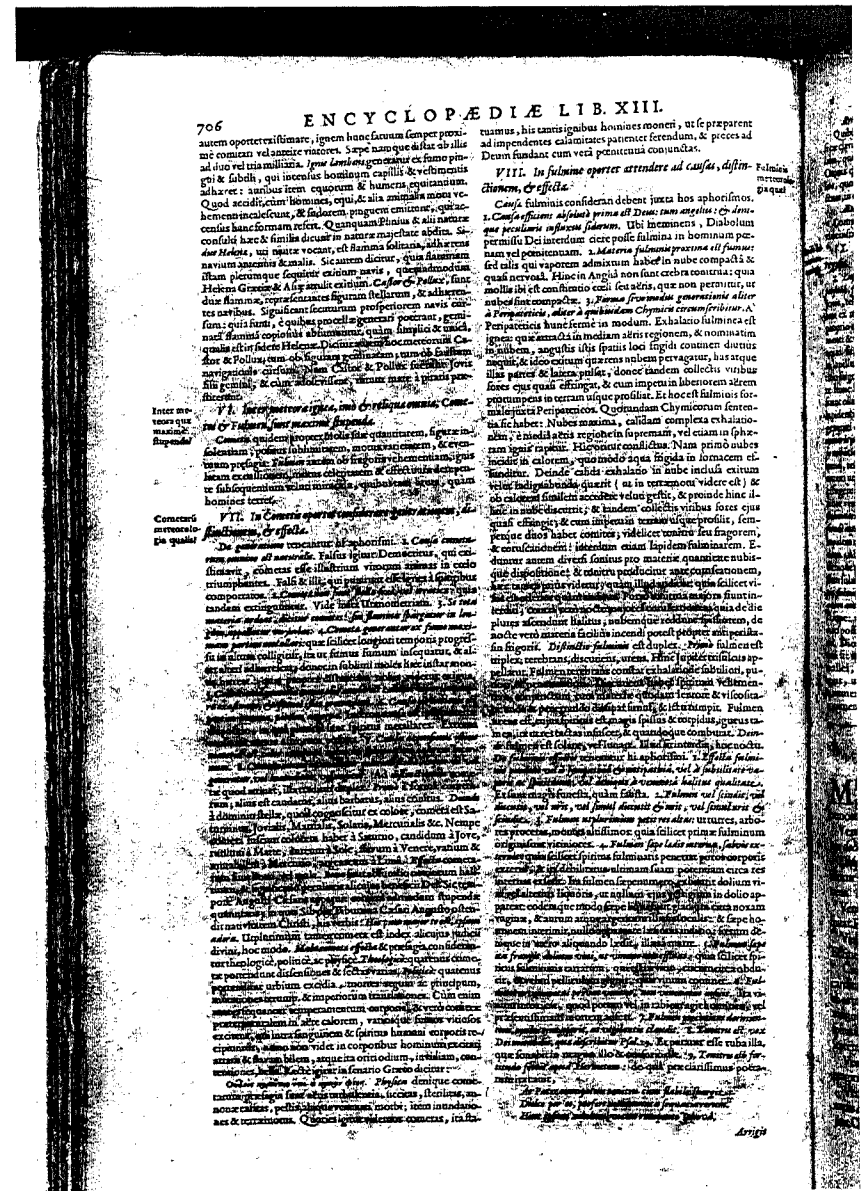


Figure 2. JOHANN HEINRICH ALSTED, *Encyclopaedia* (Herborn, 1630), II, 706, from the section on “mictologia and meteorologia,” in which lighting is discussed in Aristotelian terms as a fiery exhalation, but with reference to chemical interpretations and biblical examples too.

Reproduction courtesy of Houghton Library.



a common, public good by offering something of interest for readers of all kinds, young or old, learned or not, male or female.<sup>25</sup>

What was new, then, with Chambers and other eighteenth-century encyclopedias was neither the alphabetical arrangement nor the claim to public utility, both of which had long antecedents—but rather a new conception of what utility was. Through the mid-seventeenth century the “utility” of large and expensive reference works was to make readily available the vast accumulation of knowledge in Latin derived from received authorities. These works aided Latin composition by providing examples and quotables under topical headings for easy retrieval and they purported to contribute to moral edification by accumulating authoritative sayings and examples of human behavior which reinforced good morals. These reference books had no illustrations. They mentioned direct observation or experimentation only if reported by a venerable authority, like Pliny or Avicenna — not investigations performed recently for the new purpose of ascertaining a “fact.”

The last great Latin encyclopedia, Alsted’s *Encyclopaedia* (1630, reprinted in 1649) was pluralistic in the kinds of explanations it offered, juxtaposing traditional Aristotelian ones (lightning, for example, was a fiery exhalation of the air) with sixteenth-century Paracelsian ones (lightning was sulfurous) and Christian ones (lightning was first of all caused by God and the angels—see figure 2). Alsted’s *Encyclopaedia* was useful especially for the student and scholar. It offered the equivalent of short textbooks on all the traditional school topics and a number of unusual ones, alongside advice on how to lead a studious and virtuous life.<sup>26</sup> But Alsted did not refer to the activities performed outside Latin scholarly debate, so he ignored writings by empirical practitioners who worked in the vernacular. The expensive Latin reference works drew from and contributed to an academic world quite separate from the didactic literature of a practical kind generated increasingly in the vernacular by the seventeenth century.

### *The How-to Manual*

The how-to manual, one of Franklin’s special concerns, had medieval roots just as deep, if not deeper, than the reference book. Books of secrets collected recipes for medical remedies, beautification and love potions, and other household needs, drawn from a combination of textual sources (one of these books was attributed to Aristotle) and oral lore, presumably with some connection to actual practice. In the Renaissance, books of secrets became best-sellers, and one successful author in the genre, Giambattista della Porta, reported consulting craftsmen and testing many of the recipes he printed for

25 See for example Joseph Langius, *Anthologia sive Florilegium rerum et materiaram selectarum* (Strasbourg, 1631), preface.

26 See Johann Heinrich Alsted, *Encyclopaedia* (Herborn, 1630; and in a facsimile edition: Stuttgart-Bad Cannstatt: Frommann-Holzboog, 1989-90); and Howard Hotson, *Johann Heinrich Alsted 1588-1638: Between Renaissance, Reformation and Universal Reform* (Oxford: Clarendon Press, 2000).

viability.<sup>27</sup> Many how-to manuals that were more specialized were also available in print. On some topics early modern manuals were indebted to or reproduced ancient works, notably on husbandry (Varro), or hunting and fishing (Oppian). Books on how to treat the plague were a constant during the period of regular plague outbreaks, from the fourteenth century to the seventeenth. Advice books for rulers (“mirrors for princes”) developed in the Renaissance from medieval antecedents, notably with Machiavelli’s *The Prince* (written in 1513, published in 1532). New in the sixteenth century, given the growth of the princely court as a locus of social advancement, were books devoted to imparting courtly manners, such as Castiglione’s widely reproduced and translated *The Courtier* (1528).<sup>28</sup> Other early modern manuals offered instruction in the many specific skills expected of courtiers (from fencing and dancing to horseback riding and game playing) and of those who served them (with books on cooking, gardening, painting, or pattern books for tapestries and embroidery). The growth of education also triggered manuals for teachers (e.g., Roger Ascham’s *The Scholemaster*, 1570), for scholars and students (books on how to read, to take notes, to write well or in shorthand), and a more general public (how to write letters).<sup>29</sup>

The target audiences of these manuals varied widely. Some manuals were expensively illustrated and costly; others were cheap. Most were in the vernacular, but some were in Latin, either because they were targeted at scholars and students, or because they were meant to display rhetorical skill more than to offer useful instruction. Such is the case of a 1538 Latin dialogue on swimming in which the author, a professor of (classical) languages, explicitly denies wishing to teach the dedicatee to swim, though he praises the skill in general with many classical references (figure 3).<sup>30</sup> We rarely know exactly how the manuals were used and read. Most were of course designed to impart useful knowledge, but some readers may have enjoyed them not for their explicit message as much as for the insight they provided into an activity or a social context about which the reader was curious.<sup>31</sup>

27 See William Eamon, *Science and the Secrets of Nature* (Princeton: Princeton University Press, 1994).

28 See Peter Burke, *The Fortunes of the Courtier: The European Reception of Castiglione’s Cortegiano* (Cambridge: Polity Press, 1995).

29 For letter-writing manuals, see Roger Chartier, Alain Boureau and Cécile Dauphin, *Correspondence: Models of Letter-writing from the Middle Ages to the Nineteenth Century*, tr. Christopher Woodall (Cambridge: Polity Press, 1997); for manuals about studying and note-taking see my “Note-Taking as an Art of Transmission,” *Critical Inquiry* 31 (2004), 85-107.

30 “Eum enim potissimum tibi dedicare libuit, non uti te docere velim natare . . . .” Nicolaus Winmann, *Colymbetes sive de arte natandi dialogus festivus et iucundus lectus* (Augsburg, 1538). I am grateful to Elizabeth Hyde for this reference. “Colymbetes” was probably coined by Winmann from the Latin “colymbus” and Greek *kolumbos* for a “swimming-bath.”

31 A point Elizabeth Hyde made in a session entitled “Form, Function and Style: Instructional Manuals in Early Modern Europe,” at the Annual Meeting of the American Historical Association, Philadelphia, Jan. 2006.

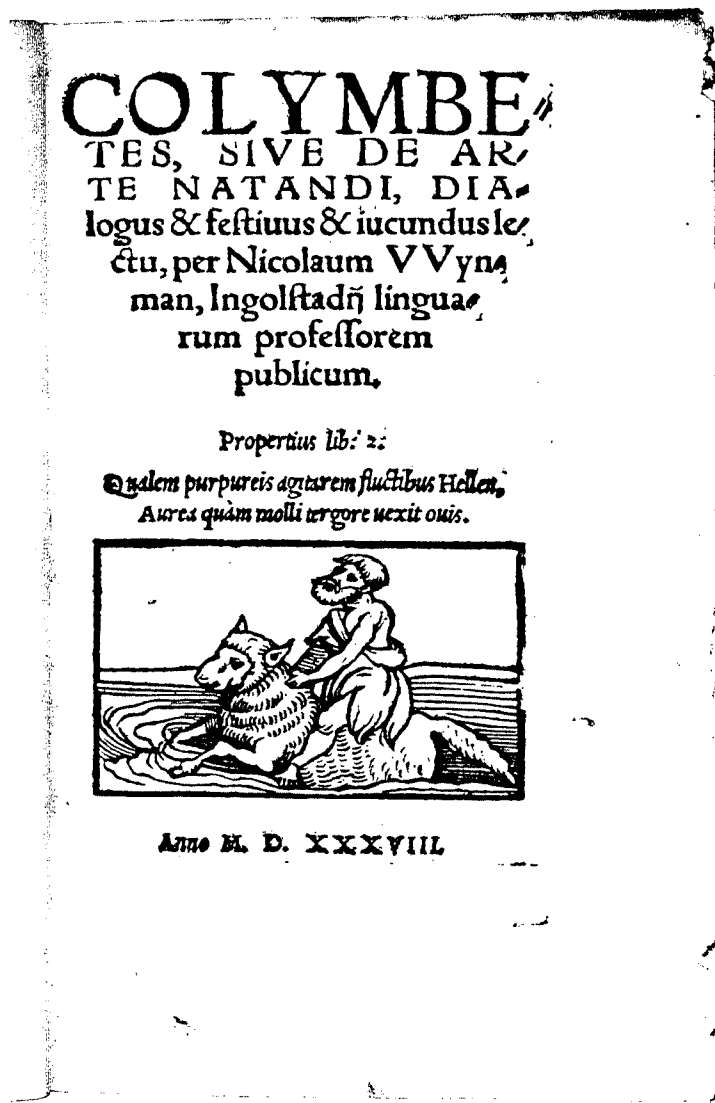


Figure 3. Title page of NICOLAUS WINMANN, *Colymbetes sive de arte natandi, dialogus festivus et iucundus lectu* (Augsburg, 1538), featuring Helle riding on the ram of the Golden Fleece after they had fallen into the sea (where they drowned). The verses are from Propertius, *Elegies*, II, 26a, imagining his love shipwrecked like Helle. Thanks to Matthew Battles for help in explicating the image. Reproduction courtesy of Houghton Library.

A crucial development during the seventeenth century was the increasing movement between the world of the expensive reference book and that of the practical instructional manual. One of Francis Bacon's most lasting contributions was to write for an elite audience of the moral and practical utility of knowledge based on experimentation and research of a practical kind. Bacon's vision of a "New Atlantis" was likely in part inspired, as recent work has argued, by the teeming activity of the craftsmen of London. Hugh Plat's *Jewel House* in particular offers a fine example of the practical know-how, often based in experimentation, represented among the expert practitioners in London.<sup>32</sup> Bacon's vision was thus not particularly original, given its similarity to Plat's, nor was it implemented in his lifetime. But with the posthumous publication of *The New Atlantis* and *Sylva sylvarum* (1627) Bacon's reputation soared. The informal scientific groups which culminated in the foundation of London's Royal Society in 1662 hailed Bacon as their inspiration. Although Chambers did not devote much attention to the mechanical arts in his *Cyclopaedia*, the main authorities on whom he relied in his reference work were members of the Royal Society who felt they were pursuing a Baconian research program.

Franklin's experimental approach to scientific investigation was indebted to the legacy of Bacon, whom he did not mention often, but whom he praised as the "father of experimental philosophy," though he criticized him for his servile conduct as a courtier.<sup>33</sup> After almost 150 years of enthusiasm for Bacon's claims that science was useful, Franklin's lightning rod was the first "major practical innovation" to result from it.<sup>34</sup> Prior to the Supplement of 1753 with an article devoted to "lightning," Chambers's treatment of lightning (in 1728) still showed indebtedness to Aristotelian modes of thought (figure 10), but used new terms (lightning is preferably called an "effluviu[m]," but is also listed under the Aristotelian term "exhalation") and refers to recent investigations (such as those of Dr. Wallis and the *Philosophical Transactions*). The "modern" encyclopedia was modern because it shifted its focus away from textual authorities written in Latin and toward recent investigations, reported in the vernacular

The early how-to manual remains a little-studied genre. For an entry into the topic, see *Didactic Literature in England 1500-1800: Expertise Constructed*, ed. Natasha Glaisyer and Sara Pennell (Aldershot, U.K.: Ashgate, 2003) and, on garden manuals especially, Rebecca Bushnell, *Imagining Early Modern English Gardens* (Ithaca, NY: Cornell University Press, 2003).

32 See Deborah Harkness, *The Jewel House of Art and Nature: Elizabethan London and the Social Foundations of the Scientific Revolution* (forthcoming, Yale University Press).

33 "On the 7th of this month, 1626, died that great little man, Sir FRANCIS BACON; great in his prodigious genius, parts and learning; and little, in his servile compliances with a little court, and submissive flattery of a little prince. Pope characterises him thus, in one strong line; 'If Parts allure thee, think how BACON shin'd, The wisest, brightest, meanest of mankind.' He is justly esteem'd the father of the modern experimental philosophy." *Poor Richard Improved* (1749).

34 I. Bernard Cohen, *Benjamin Franklin's Science* (Cambridge, MA: Harvard University Press, 1990), 6.

and frequently experimental in nature. Chambers's *Cyclopaedia* also included some illustrations, while Diderot's *Encyclopédie* devoted eleven volumes to lavish plates depicting the work and workers of many trades.<sup>35</sup>

The gulf that had separated the how-to manual from the expensive reference book in the sixteenth century was largely imperceptible in Franklin's experience. Franklin drew from and contributed to both kinds of books. Franklin clearly had access to, if he did not own a copy of, Chambers. In 1749 the *Gazette* advertised copies of Chambers's dictionary for sale by Franklin's partner David Hall.<sup>36</sup> In later years Franklin was active in procuring copies of the latest reference work, the *Encyclopédie*, for himself and for others.<sup>37</sup> Franklin also owned how-to manuals (on making cider and making wheels), and, famously, wrote them. Franklin's books on how to swim (figure 12) or how to build an efficient stove promised through clear instructions and illustrations to guide a reader to the successful completion of these tasks.<sup>38</sup>

### *The Colonial Context*

Franklin's ability and willingness to move easily between the how-to manual and the reference book, the practical and the philosophical, owed much to the spread of Baconian ideals, but were likely also facilitated by the colonial context. Utility was the watchword for colonial publications. This utility was quite different from the utility of Latin reference works, except in one area—moral edification. Moral and behavioral advice can be found throughout Franklin's writings, in his autobiography, written to instruct his descendants, in the *Gazette*, and most famously in his almanac, *Poor Richard*, where pithy sayings served as filler, tucked away even in the blank spaces in the moon calendar. Just as in the Latin reference works, the sayings were not original—Franklin copied them from earlier compilations, some of which have been identified. They were published separately as the *Way to Wealth*, which was reprinted dozens of times and translated into six languages.<sup>39</sup>

Being born in the American colonies also created unique opportunities for an ambitious and able young man like Franklin to move rapidly and with minimal competition from one activity to another. Franklin worked in small print shops in Boston and Philadelphia where he could try his hand (and excel) at every task, from

35 See Jacques Proust, *L'Encyclopédie de Diderot et d'Alembert: planches et commentaires* (Paris: Comité national du bicentenaire Diderot, 1985).

36 *Pennsylvania Gazette*, October 12 and December 19, 1749.

37 See [www.franklinpapers.org](http://www.franklinpapers.org) for several letters regarding Franklin's help in procuring copies of the *Encyclopédie*, including a committee of the Library Company of Philadelphia to Franklin, April 27, 1772; Franklin to Arthur Lee, April 4, 1778; Michael Hillegas to Franklin, January 6, 1783; Francis Hopkinson to Franklin, [March 27, 1783]; Franklin to Benjamin Rush, December 26, 1783.

38 See *Poor Richard's Books*, 26-27.

39 See Green and Stallybrass, *Benjamin Franklin*, ch. 6.

writing and composing text to pulling the pressbar or running the business. Franklin noticed by contrast during his year working in printing houses in London that workers there were more specialized in their tasks.<sup>40</sup> Competition among printers in the colonies was also minimal, especially outside Boston, which Franklin left partly because he chafed under the constraints that came with a more European pattern of trade, in which printers worked for publishers and apprentices for printers (as Franklin did for his brother). In Philadelphia Franklin had only to outmaneuver one or two rivals to gain control of lucrative government printing jobs and the newspaper market, both of which he managed very skillfully. Franklin parlayed the money he acquired through printing into a variety of intellectual and philanthropic projects which warranted him prominence in Philadelphia and eventually international recognition of his scientific and then diplomatic activities.

In 1783, Benjamin Franklin articulated a very modern kind of regret—that of having been “born so soon, since I cannot have the happiness of knowing what will be known 100 years hence.”<sup>41</sup> In earlier generations the more common regret was, on the contrary, having been born too late, after the decline from previous greatness, whether in antiquity or in the sixteenth century, a period of the Renaissance that was lionized by many in the seventeenth century as a time of great monarchs and great scholars. Franklin benefited from enormous cultural changes which had occurred in the decades just preceding his birth. The tools and nature of intellectual activity had changed in crucial ways since the last publication of Alsted's *Encyclopaedia* barely fifty years earlier. Without passing through a formal education Franklin learned from periodicals, recent reference works, and how-to manuals. These sources were unified in language and tone by a focus on modern developments and progress, on the mechanical philosophy and on experimentation, on utility of a practical kind, associated with moral improvement. No one drew on and contributed more successfully to all these currents than Benjamin Franklin.

40 Benjamin Franklin, *Autobiography*, ed. J. A. Leo Lemay and P. M. Zall (New York: Norton, 1986), 36-37.

41 Letter to Joseph Banks, July 27, 1783, as quoted in Joyce E. Chaplin, *The First Scientific American: Benjamin Franklin and the Pursuit of Genius* (New York: Basic Books, 2006), 338.