7 Natural history as print culture

With the invention of the printing press in the mid-fifteenth century, the making, distribution and use of printed materials soon became a key part of natural history. As well as transporting and collecting natural objects themselves, practitioners attempted to make and transport printed records of them. Some of the resulting artefacts have remained at the centre of historians' attention ever since. It is hardly an exaggeration to say that the books produced by such figures as Gesner, Aldrovandi, Ray and Buffon have come to constitute the historical identity of natural history.

We must, then, attempt to understand these artefacts. We need to know how and why they were made, how they reached their audiences, and how they were put to use. These are not straightforward questions, and answering them may mean reaching some rather unexpected conclusions. In particular, secure in our own experience of print as providing for reliable communication to large and dispersed audiences, we all too readily consider its history in terms of *fixity* and *quantity*. Printing was unique, we may say, because it caused a vast increase in the numbers of books available, and enabled the stabilization of reliable texts in multiple copies; other consequences then flowed from these. Many historians have indeed predicated their accounts of printing on these elements, and their importance is beyond doubt.[1] Yet a close look at an activity like natural history soon shows that too easy an acceptance of quantity and fixity as foundational can in other respects be rather less satisfying. Above all, it means that those elements themselves remain beyond analysis, since they are regarded as definitive of printing itself. Because of this, such an approach tends to underplay the complexity of the social mechanisms through which early printed books could be not only made, but warranted by their makers as reliable. Nor can it easily comprehend the different meanings accorded them by different audiences. Yet these complications loomed large in the lives of natural historians, and it seems perverse to dismiss them as peripheral. Recently, then, historians have rediscovered these problems, by restoring attention to the work involved in making and reading printed materials. Far from the meaning of a book being fixed by

the printing press, they reveal it as something arrived at constructively, by different communities pursuing interpretative conventions specific to their time and place. Their counter-intuitive conclusion is that quantity and fixity are far from self-evident or necessary concomitants of the printing press.

Early printed books existed in, and were constituted by, various complex and dynamic regimes of practice. To understand them – and understanding them is essential to understanding the cultures of natural history – now means comprehending in a single narrative a series of connected worlds: of book traders and readers, of creative collectives and individual authors. How can this be done? One approach has been to look, not at the sheer numbers of copies made and distributed, but at the fate of a single book through its appropriation by different communities. Roger Chartier calls this the 'object study'.[2] Such a strategy allows for a finer appreciation of the subtleties involved at every stage. A related approach will be followed in this chapter. It will construct an object study, of a sort; but it will do so by making use of a mode of communication employed in the early modern era itself.

Seventeenth-century England knew a literary genre, minor at the time and since forgotten altogether, which, for want of a better name, we may call 'sighs literature'. A work conforming to its conventions would typically be biographical, or more specifically autobiographical, in nature. It would be a designedly moral, justificatory, legitimizing autobiography, designed to vindicate its writer from some terrible slur, or to make a moral example of his or her life. To that end, at every point in that life when a major event had occurred, it would break off into an italicized digression called a 'sigh'. These 'sighs' allowed the writer to interrupt the narrative as if by divine *fiat*, in order to articulate its full moral implications. Scripture provided ample resources for such *cris de cœur*. The sighs of troubled cavalier Richard Atkyns (1615–77), to name one such seventeenth-century writer, were steeped in the language of Job and the lamentations of Jeremiah. The result, then, was a bifurcated narrative, marrying the ideal to the real, the general to the particular, and the providential to the contingent. It was a peculiar way of writing, but it had its uses – even though Atkyns himself died in debtors' prison, signally unvindicated.

Without wishing to advocate its revival to any wider extent, this chapter appropriates the most prominent features of 'sighs literature'. It does so in order effectively to discuss the making, distribution, structure and use of printed books in early modern natural history. Sighs literature offers a peculiarly useful structure for such a discussion. For one thing, it jolts us sharply out of our own, twentieth-century, experience of print – the experience which invests fixity and quantity with all the authority of self-evidence.

It does so, moreover, by allowing us to present a credible account of how printed books might act in natural historical communities, directly alongside a critical analysis of that very account. Were the historical impact of print really as simple as we often assume, the following narrative could proceed uninterrupted. The aim in showing that it cannot – that it must be interrupted at every stage by 'sighs' – is to encourage us to question that implicit faith, and to articulate the hidden historical foundations both of print culture and of the enterprise of natural history. In the story which follows, then, it may be best to bear in mind one final counter-intuitive point: for once, the sighs might just be everything.[3]

The Vindication of the Reverend and Learned Doctor *Peter Heylyn* his *Cosmographie*, with certain SIGHS at the end of every *CHAPTER*

The history I have in mind is not that of a person; it is the history of a book. The work I am going to trace is the *Microcosmus*, latterly the *Cosmographie*, of Peter Heylyn (1599–1662). This was one of the most frequently reprinted works of its type in the seventeenth and early eighteenth centuries, and its history is unusually revealing (Table 7.1).

Peter Heylyn was a major religious polemicist, scholar and historian of his time. As his son-in-law affirmed, he was no 'ordinary common Clergy-man', but a favoured agent of the ecclesiastical and political authorities, 'singularly well acquainted . . . with the principal motions and grand Importances in his time both of Church and State'. A staunch supporter of William Laud, the latest Archbishop of Canterbury to be beheaded, Heylyn incurred particular odium among those he called 'the rabble' for his vigorous defences of high-church priestcraft. For all that his contemporary reputation was that of a Laudian militant, his *Cosmographie* left Heylyn's other works far behind when it came to the numbers of editions printed and the longevity of its influence.

The enterprise of cosmography is no longer pursued as avidly as it was in Heylyn's day. Of what, then, did it consist? The short answer is that it consisted of all knowledge about the world. As such, cosmography was essentially universal: it would perhaps be easier to list those branches of knowledge which it did *not* include. Heylyn himself described the field as providing a 'universal comprehension of *Natural* and *Civil* Story', by combining three main approaches. From '*Natural History* or *Geographie*', it treated 'Regions themselves, together with their Sites, and several Commodities'; from civil history, it discussed 'Habitations, Governments, and Manners'; and from 'the *Mathematicks*', it encompassed 'the *Climates* and Configurations of the Heavens'. It was also as

Table 7.1. *Peter Heylyn*, Microcosmus *and* Cosmographie, *1621–1703*; *Edmund Bohun/John Augustine Bernard*, Geographical Dictionary, *1688–1710*

1621	*Microcosmus, or a little description of the Great World*	Oxford: J. Lichfield and J. Short	4°
1625	*Μικρόκοσμος ... Augmented and revised*[a]	Oxford: J. Lichfield and W. Turner; sold by W. Turner and T. Huggins	4° in 8s
1627	... Third edition, revised[b]	Oxford: J. L[ichfield] and W. T[urner], for W. Turner and T. Huggins	4° in 8s
1629	... Fourth edition	Oxford: W. T[urner] for W. Turner and T. Huggins	4° in 8s
1631	... Fifth edition	Oxford: W. Turner	4° in 8s
1631	... Another issue[c]	Oxford: for W. Turner and R. Allott [London]	4° in 8s
1633	... 6th edition	Oxford: [W. Turner] for W. Turner and R. Allott	4° in 8s
1636	... 7th edition	Oxford: W. Turner; sold [by M. Allott, London]	4° in 8s
1639	... 8th edition	Oxford: W. Turner	4° in 8s
1639	... variant[d]	Oxford: W. Turner	4° in 8s
1652	*Cosmographie*	London: for Henry Seile	fol.
1657	... 2nd edition	For Henry Seile	fol.
1665	... 3rd edition	For Philipp Chetwind	fol.
1666	... 'Third' edition	For Anne Seile	fol.
1666	... Anr. edition	For Philip Chetwind	fol.
1669	... Anr. edition	For Anne Seile; sold by George Sawbridge, Thomas Williams, Henry Broom, Thomas Bassett, Richard Chiswell	fol.
1669	... Anr. edition	For Philip Chetwind	fol.
1674	... Anr. edition	For Anne Seile and Philip Chetwind	fol.
1674	... Anr. edition	For Philip Chetwind and Anne Seile	fol.
1677	... Anr. edition	By A.C. for P. Chetwind, and A. Seile; sold by T. Basset, J. Wright, R. Chiswell, T. Sawbridge	fol.
1682	... Anr. edition	For P.C., T. Bassenger, B. Tooke, T. Sawbridge	fol.
1703	*Cosmography* '7th' edition, 'Improv'd... by Edmund Bohun'[e]	For Edw. Brewster, Ric. Chiswell, Benj. Tooke, Tho. Hodgkin, and Tho. Bennet	fol.
1688	*A Geographical Dictionary*	For Charles Brome	8°
1691	... 2nd edition	For Charles Brome	8°
1693	... 3rd edition	For Charles Brome	fol.
1695	... 4th edition	For Charles Brome	fol.
1710	... '4th' edition[f]	For R. Bonwicke, W. Freeman, T. Goodwin, J. Walthoe, M. Wotton, [and 5 others]	fol.

Notes: [a]Sometimes lacks table of climes (as do next 7 issues). [b]Sheets vary: corrected in press. [c]Cancel title-page. [d]Misprinted title page: '1939'; Sheets sometimes mixed with those of 7th edition. [e]Discontinuous pagination; printed by subscription (*Proposals* circulated separately). [f]Discontinuous pagination.

Sources: A. W. Pollard and G. R. Redgrave (2nd edn., W. A. Jackson, F. S. Ferguson and K. F. Pantzer), *A Short-Title Catalogue of Books Printed in England, Scotland and Ireland, and of English Books Printed Abroad, 1475–1640* (3 vols. London, The Bibliographical Society, 1986–91).

D. Wing, *A Short-Title Catalogue of Books Printed in England, Scotland, Ireland, Wales, and British America and of English Books Printed in Other Countries, 1641–1700* (2nd edn. 3 vols. New York, Modern Language Association of America, 1972).

F. J. G. Robinson, G. Averley, D. R. Esslemont, P. J. Wallis, *Eighteenth-Century British Books: An Author Union Catalogue* (5 vols. Newcastle, University of Newcastle/Folkestone, Dawson, 1981).

omnivorous of sources as it was ambitious of scope. Heylyn thus chose epigraphs for his book to signal that it employed at once the classics, Scripture and natural history: on its frontispiece and title-page were inscribed the testimonials of Virgil, St Paul and Pliny. In fact, Heylyn selected the latter's *Natural History* to exemplify the entire enterprise of cosmography.

What, specifically, was his book *for*? Heylyn himself made it clear that although he might play 'the parts of an *Historian* and *Geographer*' when writing it, he remained primarily a '*Church-man*'. His purpose was to argue for a particular ecclesiastical polity: that of episcopacy. The rule of bishops, he alleged, was the only form of Church governance established by God. In the years immediately preceding the Civil War, a conflict which has been called the last of the Wars of Religion, this was a highly contentious claim. That was why it was both proper and necessary for a churchman like Heylyn to be writing such an exhaustive work. He believed that he could prove his case beyond doubt by grounding it in an authoritative survey of the natural, political and historical knowledge of his time. We can summarize the project, in fact, by reference to the imperatives of Heylyn's most powerful ecclesiastical patron. Laud was championing a notoriously vigorous view of governance which he called 'Thorough', and which he hoped would revitalize Charles I's realm. It would not be inappropriate to see his client's cosmography as 'thorough' natural history.

For the origins of the *Cosmographie*, though, we must go back to Heylyn's early experiences at university. He graduated at Oxford in 1617. It was customary for graduands to read a series of lectures, and he chose geography for his subject. The lectures were a great success. Heylyn followed 'a *new Method* not observed by others', and managed to display himself 'a good Philosopher as well as Geographer'. So impressed was his audience that he was soon offered a Fellowship. He then decided to publish the lectures. Printed and bound, the first copies began to reach their readers on 7 November 1621.[4]

1st Sigh.—— *'Lord, thou art he that took me out of my Mothers Womb!'*

It can be all too easy to assume that the writing and publishing of substantial tomes about the natural world is self-evidently a worthwhile activity. Yet Heylyn went through a remarkably convoluted process in order to establish the legitimacy of his actions. First, the initiative appeared not to have come from Heylyn himself; friends had urged him to publish the lectures. Heylyn then revised them – a process taking two months of hard work – obtained assent from his father for their printing, and had them perused by yet more 'Learned Men'. Only after receiving their approval did he pass the work on to printer John Lichfield. Why such a complex manoeuvre? The answer had to do both

with his good name and with the fundamental origins of knowledge. In early modern England, the former was put at risk by too insistent a claim to personal originality, especially when that claim was advanced by the notoriously melancholic and antisocial figure of the university don. A gentleman must appear to shun the braggadocious connotations of authorship. This matters greatly, because Heylyn's credit as a proposer of true knowledge – and thus the reception accorded his book – depended on his reputation as a gentleman.

But in Heylyn's post-lapsarian world – a world irremediably tainted by Adam and Eve's expulsion from Eden – a bigger danger loomed. Perhaps it was religious lèse-majesté, *as well as bad manners, to claim personal originality. So Heylyn himself maintained that knowledge did not come from the individual, but from God. Why did he publish? Because, he replied, 'The Lord God brought [the knowledge] to me'.*

This, the first complication to any simple story which would leap directly from discovery to published work, is thus a fundamental one. The question of authorship is not trivial. Much was invested in Heylyn's decision whether to publish, and such reasoning has its own complex history.[5]

Who were the readers of this work? Records are scanty. Yet Heylyn's friends were able to claim that copies of his book were 'bought up by Scholars, Gentlemen, and almost every Housholder', and mainly 'for the *pleasantness* of its reading'. Before long, they alleged, 'scarce any Scholars Study' was without its copy. That there is some truth to this may be indicated by the fact that it (or its successor) appeared in the auction catalogues of many deceased scholars' libraries later in the century. The repeated reprinting of the book also testifies to its continued value: it was reissued at least eight times by 1639.

We can, however, identify two readers, and readers who stand out in importance: King James I and the then Prince of Wales, Charles. *Microcosmus* bore a dedication to Charles, and Heylyn presented the first copy to him in person. But unfortunately for Heylyn, the Prince's evident approval was countered by an explosive reaction from his father. Presented with the volume by John Young, Dean of Winchester, the King was seen to 'peruse' it curiously. This, the second printing of *Microcosmus*, included for the first time a detailed 'Table of the Principall things herein contained', and James turned straight to this table. There he read the first entry, which happened to concern the vital courtly subject of heraldry. '*ARMES*', it said: 'why in the same Eschocheon those of *England* give place to *France*, 490'. Turning to page 490, the King read that the reason for this subordination of honour was simply 'that *France* is the larger & more famous kingdome'. He flew into a rage. In the full heat of his 'Anger and Passion', James

called for this impudent book to be searched out and suppressed. Heylyn seemed about to fall victim to the court's power over the world of printing – to what, in our own day, we might call censorship.[6]

2nd Sigh.—— *'But Lord, what dangers and mischiefs is Man subject to! There is but one way to Live, and hundreds of ways to be depriv'd of Life'.*

Despite his precautions, Heylyn's good name was now in peril. He had to tread carefully. Fortunately, the content of his book had been constructed to be helpful here. Mario Biagioli's recent studies of Galileo suggest that at court a figure like Heylyn worked to 'efface' himself as an author, so as to represent the prince as the source of all knowledge, and himself as a conduit channelling celebrations of that fact. Microcosmus *could thus scarcely offer to add anything to Charles's knowledge of, or power over, the world. Both, axiomatically, were already perfect. Heylyn was a skilful enough participant in the affairs of the court to appreciate that much. It was thus to Charles as 'the greatest and most accomplished traveller' of all that Heylyn presented his own* 'little World'. Microcosmus *could not augment his knowledge; it could only act as an 'abreviarie' of knowledge he already possessed. But Heylyn's book was now an element in court culture: that was what it was* for, *and that culture, with its intricate protocols of presentation, perusal and patronage, would now decide what it* meant.

James's response reveals something of the attendant perils, and is highly suggestive of the politics of royal reading. For contemporaries attributed his immediate discerning of the offensive passage, not to adroit use of the index, but to 'the Kings peircing Judgment'. The royal nous *had immediately 'spyed out a fault, which was taken no notice of by others'. His perspicacity thus constituted yet more support for the notion that 'God always endows Kings his Vice-gerents with that extraordinary gift, (the Spirit of discerning) above other mortals'. The King possessed all the knowledge, all the skill; his was the discerning, discriminating power. This was the inseparable counterpart of Heylyn's representation of the origins of knowledge as divine. If knowledge came from God, then God's representative on Earth was its proprietor.*[7]

Told of this calamity, Heylyn flew into a panic. He risked losing the King's favour. What to do? Young advised him to go straight to court himself, and appeal to Charles's patronage; but, unsure whether Charles, too, might not have been offended, Heylyn dithered. Lord Danby eventually supplied the answer. Heylyn was to write a letter of 'Apology and Explanation', and transmit it to the King. This letter would explain what Heylyn had really meant to say in the offending passage, and reattribute the

undeniably offensive wording to another agent. To restore his good name, then, Heylyn must establish an alternative reading from the literal one. 'Thus Mr. *Heylyn* was the interpreter of his own words'.[8]

'Lord, what obdurate heart is it that will not be concern'd in putting Soul and Body into the Hands of Strangers, and contrary minded Men!' *3rd Sigh.*——

Heylyn had to seize back the 'soul and body' of his words. His tactic of providing an 'interpretation' was a well-recognized one. Moreover, in Charles's court Heylyn himself was to become a peculiarly valued 'interpreter' of books. So in 1633–4, it was he who was entrusted to 'collect' scandalous passages from William Prynne's puritan attack on stagecraft, Histriomastix, *'reduce them into method', and provide Laud with evidence against Prynne for his fateful trial at Star Chamber – a defining moment before the Civil War.*

The point is one of the classification *and* use *of books, and thereby impinges on notions of their* influence. *Opponents of such 'interpreting' procedures objected that with them in play one could no longer even 'tell what a libell is'. Laud's lackeys, they claimed, could 'transubstantiate' any books at all into libels. Mercator's* Atlas *itself was banned at this time, on account of its 'sundry scandalous and offensive passages'. We thus need to appreciate the active processes of adjudication by which natural history books attained their meanings in sites of reception such as the royal court. Courtiers often read a text piecemeal, for isolated phrases, rather than pursuing an extended argument from beginning to end.* Microcosmus *was constructed out of, and for, this sort of reading.*[9]

Heylyn's letter reached James, and succeeded in mitigating his wrath. The 'interpretation' it offered therefore bears repetition. 'The burden under which he suffered', Heylyn maintained, 'was rather a mistake than a crime, and that mistake not his own, but the Printers.' They had printed *is* instead of *was* at the crucial point. This was a convincing tactic, since, as Heylyn was able to remind the King, it was 'most ordinary in them to mistake one word for another'. The printing-house, then, had been the place at which those seditious words had been created, not the scholar's study.[10]

'Lord, how are they increased that trouble me! Yet let them not Triumph over me, nor be believed when they speak Scandalously against me; but let the mischief of their own Lips fall upon them'. *4th Sigh.*——

Heylyn's strategy is revealing of the practical work which had to be done if a book – especially the sort of elaborate volume characteristic

of natural history – were to be successful. To recover that work, we need to look to the printing house [Figure 7.1]. Its culture can be reconstructed by attending to the testimony of printers themselves – from 'their own Lips', as it were.

A printer did not simply reproduce a manuscript slavishly. A substantial degree of interpretative autonomy was expected of him. A good compositor must 'read his Copy *with consideration', manuals advised, 'so he may get himself into the meaning of the* Author'. *He must then use typography to render that meaning clearly for 'the capacity of the Reader'. That is, he must not only interpret the author's meaning but also anticipate readership. But printers had to work quickly. Rather as a typist does today, they seem to have worked by the syllable, word, or phrase, rather than by mentally registering individual letters. As a result, their errors were often multi-character ones, which could 'corrupt & pervert the sence'. The most common of all were monosyllabic; the worst appeared in the early 1630s, when the King's Printers themselves omitted the word 'not' from the Seventh Commandment and exhorted Charles's subjects to commit adultery. Heylyn's attribution of a monosyllabic error to his printers was, then, believable. But he himself admitted that 'if it had been of a higher Crime than of a Monosyllable, it had not been pardonable'.*

Many houses employed a corrector. But good paper was too expensive to throw away casually, so books would be made up of sheets in different states of correction. In consequence, no two copies of a given 'edition' need be the same: there are no identical copies of the first Shakespeare folio, for example. Rooted in the practice of printing, this conclusion is problematic for our assumption that printing 'fixes' texts. Heylyn's book(s) provide a good example: there is no definitive text of Microcosmus.[11]

Heylyn had satisfied the King. Knowing that he could not afford to make a similar mistake again, though, he resolved to remove the passage altogether from future editions. Meanwhile, his reputation at court restored, Heylyn went to France for five weeks. While there, he penned an account of his travels. The resulting text could probably have laid James's fears to rest by itself, such was the virulence of its Francophobia. In the event, it merely caused Heylyn more trouble. Lent to various 'friends', more and more copies were written out by hand, until eventually one of the recipients passed his or her manuscript on to a printer. There soon appeared a published version, 'printed', Heylyn noted with dismay, 'by a false *Copy*, full of gross Errors and insufferable mistakes'. If he had managed to evade responsibility for one result of the printer's craft, he could surely not repeat the achievement for another. Heylyn was forced to print his own text as quickly as he

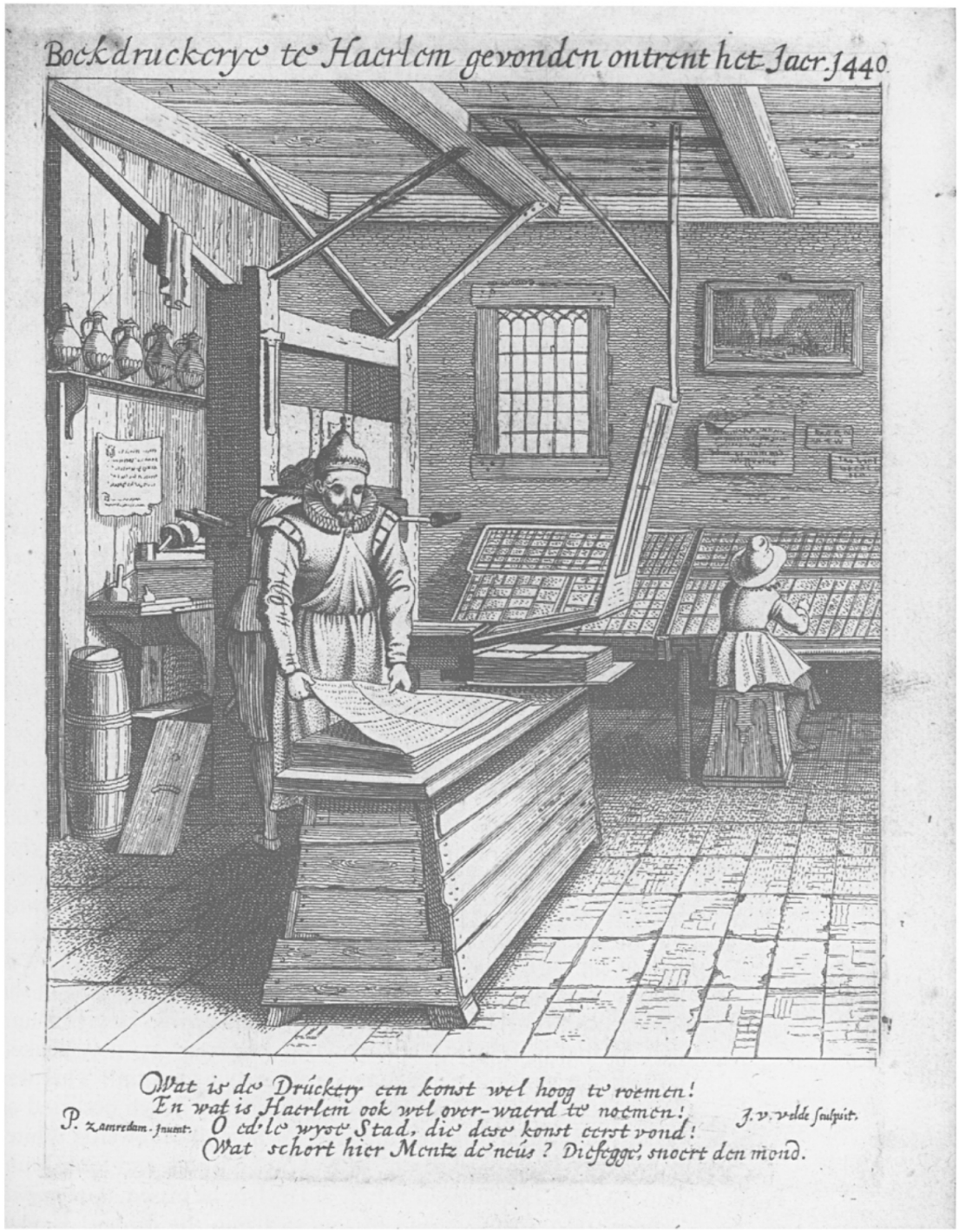

Figure 7.1 The printing house. From S. Ampsing, *Beschryvinge ende lof der Stad Haerlem in Holland* (Haarlem, 1628), facing p. 392. Bodleian Library, classmark Douce A.219.

could, in order to counter this unauthorized version. So it was that his French travel narrative came to be printed with his *Cosmographie*.[12]

5th Sigh.—— *'And now, good God! what a golden opportunity have I lost!'*

Hoping to re-establish his credentials, Heylyn had instead fallen foul of yet another aspect of printing and bookselling which throws common-sense notions into doubt. Unauthorized printing was by all accounts common. Only in the late eighteenth and nineteenth centuries, with the advent of comprehensive mechanisms for the location and safeguarding of literary property and originality, and with the arrival of the steam press, could a modern realm of authorship develop. Meanwhile, an unproblematic publication process was the exception, not the rule. To produce a book was an achievement. *And (sigh!) it was an immensely hard and complex one. Fixity had to be fought for. Figures like John Ray (1627–1705) and Robert Plot (1640–96) devoted themselves to such labour night and day – it was essential to the development of natural history. Yet it remains invisible to conventional historical treatments, which begin by classifying it as incidental. The problem which Heylyn faced here – of 'piracy', as contemporary writers called it – contravenes all the most basic values of our own print culture. It thereby throws their self-evidence into doubt, and serves to focus our attention on their historical development.*

Thanks to such efforts, Heylyn certainly became a recognized authority. The court thought him qualified to pronounce on matters of quite recondite mathematical and natural knowledge. When, for example, one Captain Nelson appeared, claiming to have solved the longitude – the key problem of the mathematical sciences – Heylyn was chosen to adjudicate. On his verdict, he was told, rested 'the credibility of the *phaenomenon*'.[13] But this reputation took a fall with the descent into civil war. In January 1640 Parliament summoned him to appear in answer to charges levelled by his old victim, William Prynne, now newly released from prison and the darling of the London crowds. Although exonerated by the hearing, Heylyn found that 'such as took up matters upon trust and hear-say' now 'looked on me as a person forfeited, and marked out for ruin'. This was epitomized for him by an enigmatic experience which occurred as he left Westminster after the hearing. As he walked towards Whitehall, a mysterious gentleman stepped into his path and forced him into the road. Laughing scornfully at Heylyn, he hissed, '*Geographie is better than Divinity*', and disappeared into the throng. Heylyn never found out his identity. But the moment haunted him for the next decade. What had this man meant?[14]

'Lord, thou hast made mine Enemies rejoyce over me, and laugh me to scorn!' ——*6th Sigh.*

What was this mysterious Londoner's meaning? Heylyn himself was unsure. None the less, his intervention may stand for the fact that printed books do not come with certificates of veracity or instructions for use; they are subject to practices which are necessarily beyond their own stipulation. Heylyn could not control what readers in this newly disordered realm made of his Microcosmus. *All the more so since the book ran through eight editions, six of them unauthorized. That was probably why the passage which had so offended King James was never actually obliterated, despite Heylyn's wish. By 1640, the errors of reproduction had multiplied so greatly that even Heylyn himself, seeing what had become of 'his' book, 'could no longer call it mine'. In what sense had printing fixed Heylyn's text? Or, to put the question another way, could a copy of it found in a London bookshop be trusted?*

Heylyn spent the years of the civil wars wandering, 'disguis'd both in his Name and Habit', between Cavalier safe-houses, where he hid from Roundhead soldiers in old Jesuit priest-holes. But by the time of Charles's execution in 1649, the memory of that Londoner's gnomic accusation was so insistent that he resolved to settle down and return to his study of the world. The labour was long and difficult. None the less, eventually his new work did appear. The result of all this effort was the transfiguration of the little *Microcosmus* into a massive folio *Cosmographie*. It was published in 1652, and reissued five years later (Figure 7.2)

This intense reading and writing caused Heylyn serious harm. 'His *Brain* was like a *Laboratory*', recalled his contemporaries, 'kept hot with study'. His natural constitution being hot and dry, 'his Brain, heated with immoderate study, burnt up the Christaline humor of his Eyes'. In short, Heylyn went blind.[15] The *Cosmographie* was the last book he himself penned, and he died ten years after its publication.

'Lord, what variety of troubles are incident to the nature of Man!' *7th Sigh.*——

The Cosmographie *was not only a book presenting natural phenomena. The experience of its own creation could also be understood using notions of nature, and in particular of the human frame. Heylyn's contemporaries habitually employed such notions to understand the experiences of writing – and also of reading – books. That reading and writing could make you blind was not news to them. Physicians had to treat such conditions regularly.*

This should give us pause. For it is routine to site the growth of natural history in the context of a republic of letters characterized by certain new literary and typographic entities: the correspondence network and the learned journal stand out. We assume that the impact of these objects on readers is readily understandable, since reading seems

Figure 7.2 Peter Heylyn, *Cosmographie* (London, 1652; second edn., 1657), frontispiece. Cambridge University Library, classmark Adams.3.65.3.

to us a constant, defined as such by the structure of the human body. They therefore seem to constitute a secure foundation for historical understanding. But early modern writers described the body differently. They accounted for the effects of both texts and images in terms of faculty psychology and the physiology of animal spirits, such that they resulted from a complex interaction of imagination, reason and the body. We should take their words seriously, since people made decisions

about what, when and how to read on the basis of such knowledge. Those decisions were the foundation of any natural historical community constituted by print. It matters, then, that reading has a 'natural history' of its own.[16]

As Heylyn himself had put it, 'Books have an immortality above their Authors'. Each impression was 'to them another being'. His *Cosmographie* was no exception. Both the artefact itself and its readership were being transformed. *Microcosmus* had been a modest quarto, aimed at a single royal reader. The 1650s *Cosmographie* had not enjoyed such patronage. Without a dedication, it bore only an address from Heylyn 'To The Reader' which stipulated how he was now attempting to delimit readership. 'The greatness of the bulk, and consequently of the price', apparently made Heylyn confident that 'none but men of judgement and understanding' would read his work. None the less, he baulked at including more than the minimum of illustrations. To do otherwise would, he declared, 'increase the Book both in bulk and price, and consequently make it of less publick use than I did intend'.[17]

The *Cosmographie* suffered more changes over the following years, being reissued nine times between 1665 and 1682 – a complex history which testifies to intense competition in the ranks of the book trade.[18] But the greatest transformation was still to come. In 1686, an impoverished Tory named Edmund Bohun (1645–1701), shivering in a 'dark, stinking and inconvenient' garret, was put to work by equally Tory bookseller Charles Brome to produce for him a new edition. Cosmography was about to enter the empire of Grub Street.

The *Republica Grubstreetana*, as Jonathan Swift called it, was no place for an unprotected book. The first injury the *Cosmographie* suffered was physical dismemberment. Heylyn's frontispiece, along with significant portions of the book's content, was hijacked for Bohun's other project, a little octavo *Geographical Dictionary* (Figure 7.3). Such a small work was sorely needed, Bohun insisted: 'it is a great mistake [to think] that all useful Books must be of the largest size, whereas some are the more useful because cheap and small'. Readily portable, it was designed to be useful for travellers. But more realistically, it was also ideal for those whose only expedition was to the nearest coffee-house. There, Bohun claimed, 'News being one of the most usual Entertainments, the knowledge of places is of absolute necessity'. Explaining this in terms of the physiology of reading, Bohun alleged that without such knowledge, news impressed only 'faint and confused Notions on the Minds of the Readers'. But the 'first and Principal' use of the book, he concluded, was to act as a 'General Index' to all geographical books. Printing had created such a plethora of

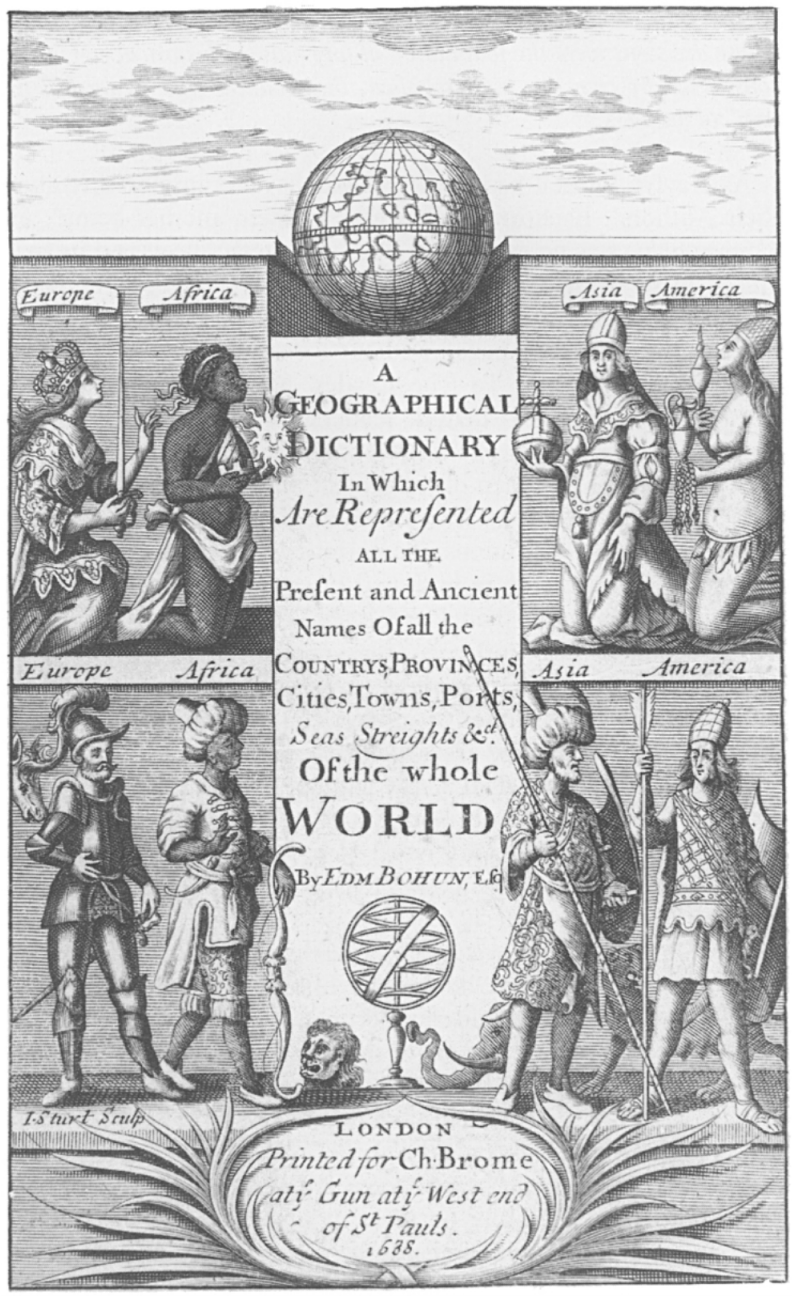

Figure 7.3 Edmund Bohun, *A Geographical Dictionary* (London, 1688), frontispiece. Cambridge University Library, classmark N.10.64.

publications that without such a guide it had become 'above the strength of Human Faculties' even to know where to look for knowledge.

Not even Bohun was in control now. The bookseller, Brome, issued later versions of the dictionary without his consent, and although he advertised Bohun's involvement, he in fact employed

another writer – one 'said to be a Jacobite' – to amend them. His emendations were controversial; readers especially objected to his entry for the River Boyne, in Ireland, which failed to laud William III's victory there. At length the identity of this second writer was revealed. He was John Augustine Bernard – none other than Peter Heylyn's grandson. A convert to Catholicism, Bernard had been forced on Oxford University by James II as professor of moral philosophy. After the Glorious Revolution he had fled to join James in Ireland, where he wrote propaganda for the Jacobite cause. In late 1690 he had returned to England 'very poor and bare', and in this condition had been discovered and set to work.

Seeing Brome's advertisements, a horrified Bohun attempted to publish his own notices repudiating the work. But no printer would accept them. Bohun predicted he would be 'proved a *Jacobite*', and he was right: thanks to the dictionary, he was saddled with a lasting reputation for Jacobitism. This had dramatic effects, moreover, for in 1692 he became licenser of the press – in effect, government censor. A Whig outcry ensued. Bohun was sacked, and the entire licensing system – a regime of press regulation and literary property which had persevered for almost 150 years – came to an end, never to return. The destruction of Bohun had led to the fundamental restructuring of the cultural politics of print.[19]

'Lord, 'tis good for me that I have been in trouble, that I may learn thy Statutes'. *8th Sigh.*——

Books were subject to the communities which made and used them, and to their practical conventions – the social and cultural 'statutes' which governed the world of printing. Problematic cases such as Bohun's help us see this, for one of the most important statutes was that the conventions themselves be invisible. Controversy brought them to light.

Heylyn's work had now gone through a complex series of different formats, texts, titles and 'authors'; its last edition, attributed to the dead Bohun, was financed by subscription [Figure 7.4]. In this it is representative of a central aspect of print. For natural historians classified not just natural entities, but bibliographic ones too. They needed to master not just natural objects, but the vastly increased number of titles purporting to provide knowledge of them. Konrad Gesner is the best-known example. At the same time as his pioneering natural history work, Gesner was publishing a 'universal library', aspiring to list all the printed books then available. Indeed, he pioneered the enterprise of bibliography. Bohun, too, compiled a Universal Historical Bibliotheque *which incorporated natural history books. Transmuted into a geographical 'index', Heylyn's cosmography had now become a synthesis of the two enterprises: a summary both of the order of books, and of that of the world.*

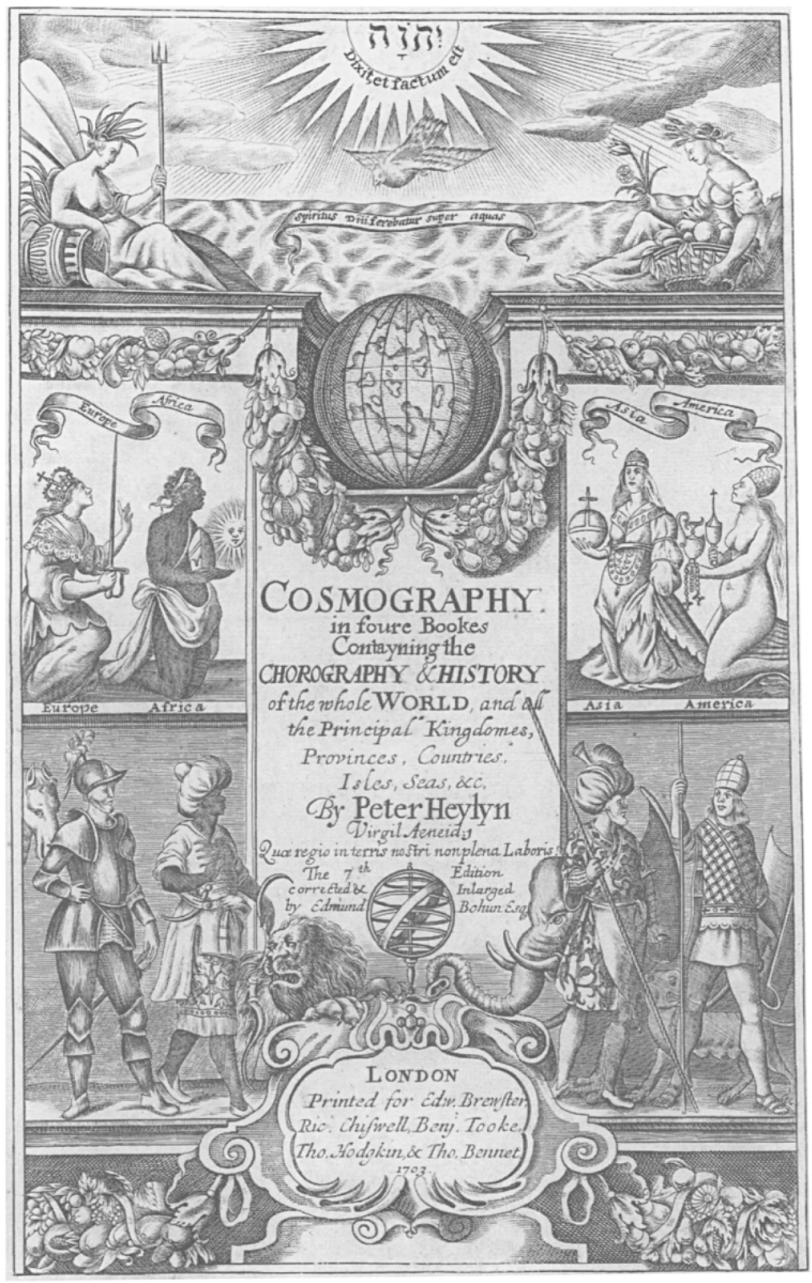

Figure 7.4 Peter Heylyn/ Edmund Bohun, *Cosmography* (London, 1703), frontispiece. Cambridge University Library, classmark N.7.38. Note the multiplication of booksellers' names: from one in 1657 to five in 1703. This represents a change in the social structure of publishing. The figures named here were prominent among London booksellers co-operating in wholesaling alliances called 'congers', to share costs and deter piracy. In another development since Heylyn's early quartos, this edition was produced by subscription.

That world was in transition. The practice of reading was coming to be performed silently and in isolation. New objects facilitated the change: small books, like Brome's Dictionary, *portable by hand and in the pocket. So did indexes – 'index-learning' became the subject not of Jacobean awe but of Augustan disdain. Eventually, a revolution in the practice of natural history would become possible, as workers could take their cross-referenced handbooks into the field.*

That a work from the 1620s was appropriated so drastically in the 1690s is striking, especially when its putative reviser disclaimed responsibility, when he himself was the man entrusted by the state with overseeing the book trade, and when his resulting humiliation played such a large role in the end of the entire regime of press regulation. What replaced licensing, eventually, was the new notion of copyright. It is perhaps the greatest irony of Bohun's story that in the ashes of his own good name lay the origins of a new authorial dispensation.

Bohun's subsequent fate also illustrates the new dispensation in natural history. His ambitions frustrated, he emigrated to Carolina. There he became the colony's foremost natural historian. He spent the following years, not in the library, but in the field. Confessing that it was 'the first time I ever did any thing of that kinde', he travelled the length and breadth of the region, searching out plants, insects and minerals, and procuring correspondents for the London naturalist James Petiver. In 1701 he was about to set sail for England to deliver his collection to Petiver when a ten-month illness suddenly worsened, and Bohun died. The edition of Heylyn's Cosmographie *on which he had laboured finally appeared two years later, financed by subscription and supported by a 'conger' of wholesaling booksellers, joined in a league to combat piracy. It was to be the last of all.*[20]

Books are peculiarly mutable objects. Given its different structure, typography, size, price, audience and interpretation, was Bohun's edition of the *Cosmographie* the same book as Heylyn's? In what sense? It should be clear that our answers to such questions must be historical in character. An alternative may be proposed, then, to our common-sense view of print. This alternative will accept the importance of printing for the history of natural history, and it will acknowledge that that importance derives in large part from fixity and increased rates of production. But it will assert that fixity and production – the very credibility of print, which now seems so obvious – need to be explained. This will allow us to restore to centre-stage the work which Gesner, Ray, Plot and Buffon needed to do to maintain an appearance of constancy and intelligibility for their books. In other words, it will see print as something fully and truly historical.

That said, perhaps it is appropriate to end with one last sigh. This sigh comes not from a seventeenth-century writer, though, but from the ultimate source: Scripture. Since Richard Atkyns concluded his own sighs by remarking on the parallels between his sufferings and those of Job, it is apt to finish with the Book of Job itself. There, persecuted as much by disbelief in his prophecy as by torture of his body, the prophet is eventually reduced to a state of anguished exasperation. What can he do to make his words ring out 'for ever'? With splendid anachronism, James I's

translators appropriated this cry, and had Job hit upon their own greatest hope for a *machina ex deo* capable of transcending the strife of their world. 'Oh that my words were now written', they made Job sigh: 'Oh that they were printed in a book!'[21]

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